54 WORKSHOP TIPS

Holiday Project Special

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#163, DEC/JAN 2013

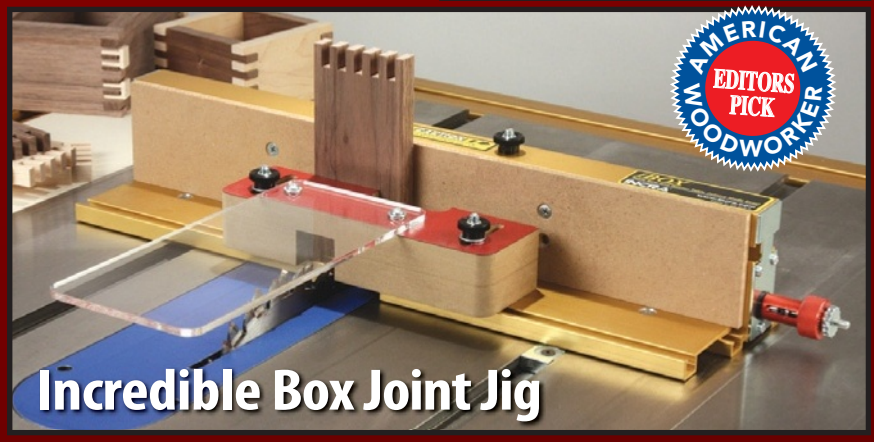
Build a Rustic Sleigh—A Kid's Delight!

9 Elegant Boxes

Self-Locking Spring Joint

Tiny Tools Weekend Project

Turn a Christmas Tree



Incredible Box Joint Jig

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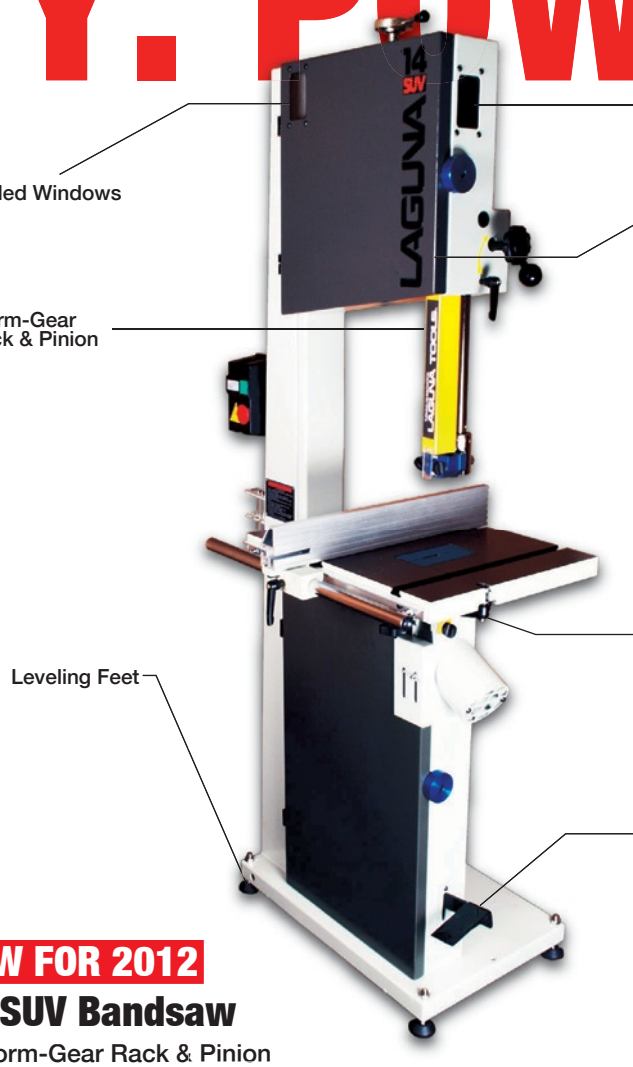

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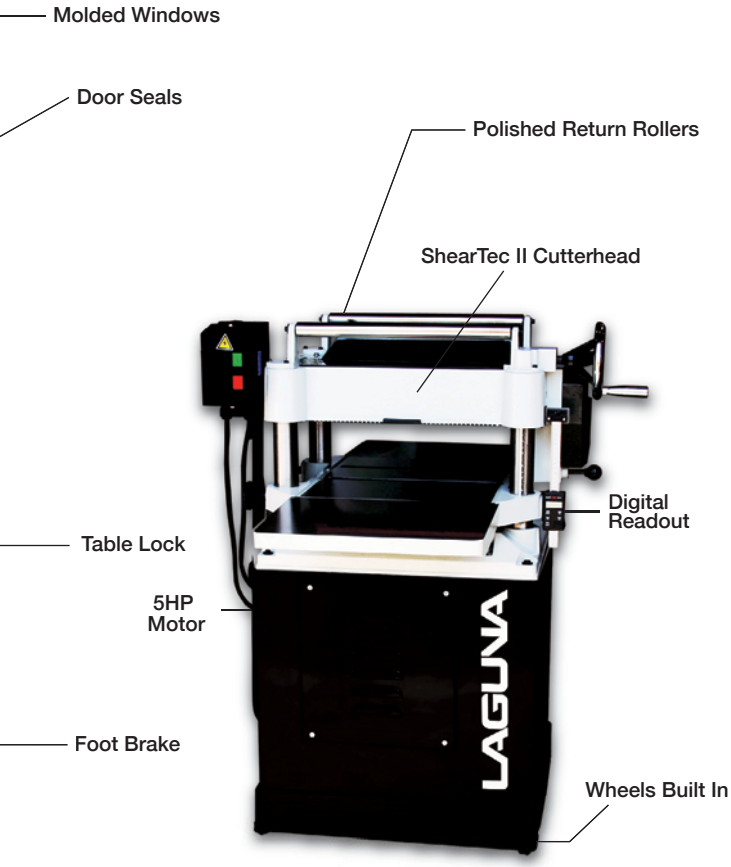

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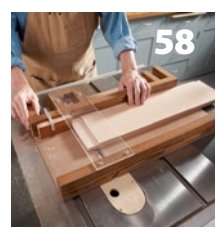

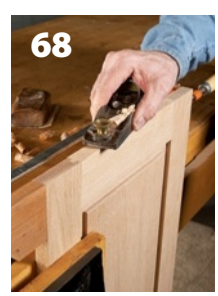

American Woodworker

#163, December/January 2013

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How Do You Create Unlimited Frame & Panel Possibilities?

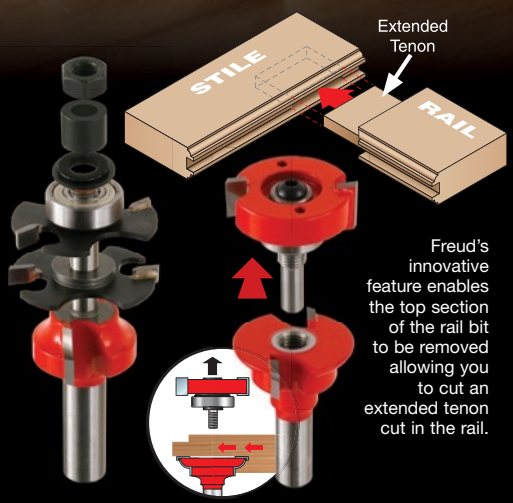
ANOTHER INDUSTRY 1st BY FREUD

With Freud's New Premier Adjustable Rail & Stile System

Freud's patented Premier Adjustable Rail and Stile router bit system is a simple, easy-to-use two piece solution that allows you unlimited creative freedom in frame and panel door construction.

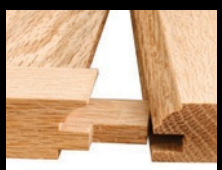
This unique system allows you to create extended tenons for extra door joint strength, adjust groove width for different panel thicknesses and choose from a variety of material thicknesses for your stiles and rails (5/8" to 1-1/4"). As well as use optional add-on cutters to increase your bits' capabilities even more, by creating either glass panel or double-sided profile doors.

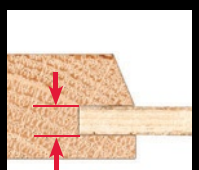
Five profiles are available; Round Over (#99-760), Ogee (#99-761), Round Over Bead (#99-763), Bevel (#99-764) and the NEW Shaker (#99-762).

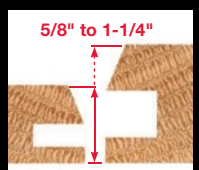


Freud's innovative feature enables the top section of the rail bit to be removed allowing you to cut an extended tenon cut in the rail.

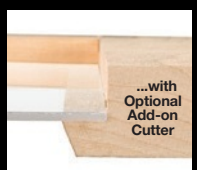
This New System Offers Unmatched Versatility in Cabinet Door Making with:


Extended Tenons

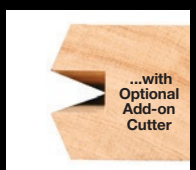

Adjustable Grooves



Varying Stock Thicknesses



Glass/Screen Panels



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Terrific Tip!

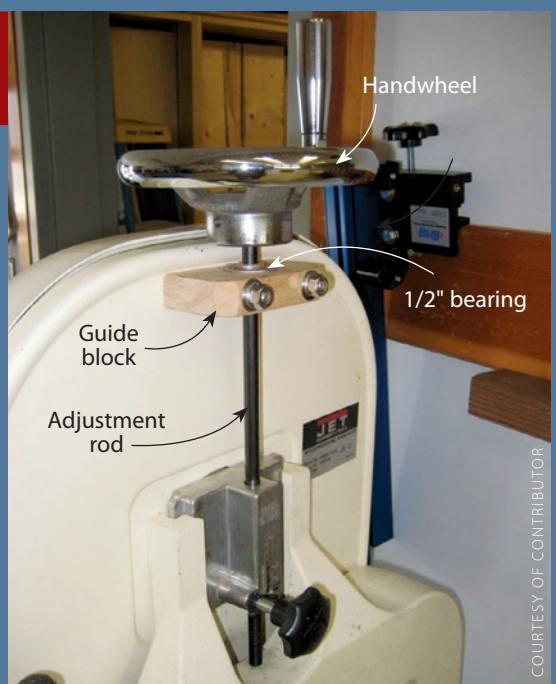
Better Blade Tensioner

MY BANDSAW'S blade-tensioning system used to be wobbly and difficult to turn. Instead of shelling out for a quick-release lever, I came up with this simple, inexpensive fix.

First, I stabilized the long adjustment rod by making a guide for it to pass through. The guide is just a block of wood with a 1/2" i.d. ball bearing recessed into it. I removed the rod's plastic knob, slid the guide over the rod and bolted the guide to the saw's back cover.

Next, I mounted a handwheel salvaged from an old tablesaw on the end of the adjustment rod. The handwheel is far easier to turn than the original knob.

Rand Hall



Cyclone Bag Liner

IF YOU HAVE A CYCLONE DUST COLLECTOR, you've probably struggled with emptying its heavy drum. The answer is to line the drum with a trash bag, right? It's not that simple.

The system doesn't work like a vacuum cleaner. On a cyclone, an empty bag will get sucked up into the exhaust stack—game over! To avoid this calamity, I tried putting a weight in the bottom of the bag, but I had to dig out the weight when the bag was full or throw it away with the sawdust.

My new solution is to hold the bag with a roll of plastic laminate. This works with any cyclone. All you have to do is cut the laminate to fit the height and circumference of the drum. The laminate's size doesn't have to be perfect—close is good enough. Round all the corners of the laminate so it doesn't tear the bag.

Install the bag first, then roll up the laminate and place it inside the drum. The laminate will unroll and hold the bag tight to the side of the drum. When the bag is full, lift out the laminate and use it again.

Richard Tendick

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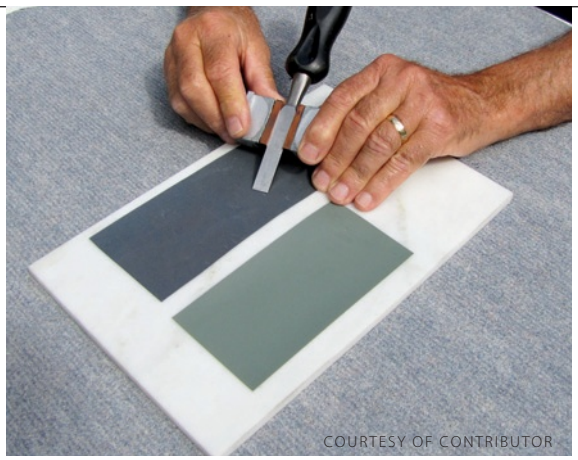
EDITOR: BRAD HOLDEN | PHOTOGRAPHY: JASON ZENTNER UNLESS NOTED



COURTESY OF CONTRIBUTOR

Marble Sharpening Station

MY TABLESAW has served for years as a flat surface for sharpening with adhesive-backed sandpaper. I often thought about buying a slab of granite or machined steel—something portable, which wouldn't tie up the saw—but I didn't want to lay out that much cash.

I found the solution at my local home center. Marble tiles, 8" x 12" in size, make an ideal, dead-flat sharpening surface. Priced at less than 10 bucks each, they're also ideal for my budget. I bought three, enough for six different grits.

Bill Wells

COURTESY OF CONTRIBUTOR

Mix-O-Matic

FOR THOROUGH MIXING, a powered paddle is the way to go. Here's an easy way to make one from a 3/8" dowel rod.

First, cut a slot in the end of the dowel. To do this, attach a fence to your tablesaw's miter gauge, raise the blade about 1/2" and saw a slot through the fence. Cut the dowel about 6" long and clamp it upright to the fence, centered on the slot. Make sure the dowel is secure and unable to rotate. Saw a slot in the dowel.

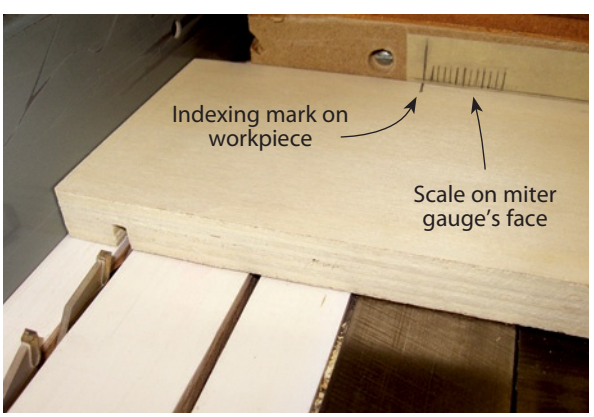
To make the paddle, rip a 1/8" thick piece from the edge of a 1/2" thick board that's at least 12" long. Saw off a short section of this piece—whatever is right for your mixing container—and glue the paddle in the dowel's slot. Chuck the dowel in a drill and mix!

Richard Helgeson

Bit Jack

CAN A ROUTER BIT get stuck in its collet? You bet. Next time this happens to you, make some notched spacers from a few old credit cards or pieces of laminate. Slide as many cards as you can fit between the collet and the bottom of the bit. As you unscrew the collet, it will push against the cards, jacking the bit up and out.

Mike Regan



COURTESY OF CONTRIBUTOR

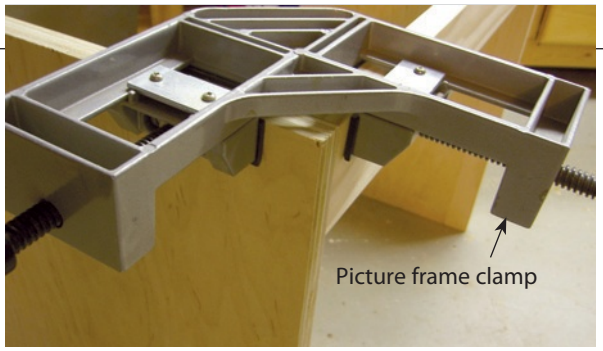
Nibbling Rabbets

WHEN I HAVE a few rabbets to make, and it's not worth the time to install a dado set, I nibble them away with a standard blade. One problem has bugged me, however: Without leaning way over the saw to see my progress, how could I be sure that each cut neatly overlaps the last one?

Here's my solution. Stick a piece of tape on the face of the miter gauge and draw a rough scale on it. Space the lines 1/16" apart.

Make the first cut to establish the width of the rabbet. Then draw an indexing mark on the workpiece opposite the first line on the scale, as shown above. Each time you make a cut, move the workpiece over one line.

John Cusimano



COURTESY OF CONTRIBUTOR

Cabinet Assembly Helpers

ASSEMBLING A LARGE CABINET by yourself is tricky business. How do you hold the parts in place while fastening them together? I dust off my rarely used picture frame clamps and put them to work.

A picture frame clamp has a very low profile and is slightly offset from the joint, so it doesn't get in the way when you hammer nails, drill holes or drive screws. As a bonus, it also helps square each corner of the cabinet.

Dean O. Travis

Miter Gauge Geometry

HOW DO YOU KNOW when your miter gauge is set exactly at 90°? Here's a method I learned years ago, before I could afford a precision square to check the cut.

You'll need a 24" long board that is flat and straight, with perfectly parallel sides. It should be about 6" wide. You'll also need a fence for your miter gauge that is about the same length as the board. Make sure it's straight, too.

Draw a triangle in the middle of the board, so you can tell which face is which. Crosscut the board through the triangle. Turn off the saw. Flip over one side of the board and pull both pieces tight against the fence. Slide the pieces together, so the two freshly sawn surfaces touch each other.

If your miter gauge is right on the money, there won't be any gap between the two pieces.

If there is a gap, the miter gauge is off. You're looking at double the error. Adjust your miter gauge and put the boards back in their original position, so you see the whole triangle. Butt the boards together and make another crosscut, centered on the first cut. Flip one board and …well, you get the idea.

Tom Caspar

Drilling Odd-Shaped Parts

WHEN I MAKE PENS from odd-shaped objects, such as this piece of antler, I drill all the way through. It hasn't been easy—until I discovered a clever method that allows you to connect any two points on an object with a perfectly straight hole.

The first step is to decide where those two points will be; that is, where the hole will enter and exit your object. Mark the points with an awl, then drill shallow 3/16" holes at each location by hand.

Next, you'll need a board that's large enough to clamp to the table of your drill press. A 2x4 planed flat works well. Drill and countersink a hole through the board for a #8 screw, then run in a screw that's long enough to protrude about 1/4" above the board.

Align the board and screw with the center of the drill press chuck. To do this, adjust the height of the table to accommodate the object you're going to drill. Lock down the table. Install a 3/16" bit that's long enough to reach the tip of the screw. (You may have to use an extra-long bit for this.) Lower the chuck and clamp the board so the screw is directly under the bit (**Photo 1**). Adjust the drill press so the bit stops 1/8" short of the screw.

Hold the object with locking pliers and position it so the bottom hole engages the screw's tip. Start the drill press and slowly lower the bit into the top hole; it should catch pretty easily (**Photo 2**). Continue drilling. When you've drilled as far as you can, withdraw the bit and flip the object over. Use the same procedure to finish drilling the hole from the other end.

Drill by hand to enlarge the hole's diameter. Use a series of graduated bits so you don't wander too far.

Phil Freeman

1


2

Our Newest Addition To Our Plane Family

Veritas® Bevel-Up Jack Rabbet Plane

This plane takes large-scale rabbeting work in stride. Weighing 6 lb, with a full-width mouth and 15 1/8″ long body similar to that of a jack plane, it is suitable for very large rabbets and fielded or bevelled panels – anywhere you need to make a long, wide cut that would require major effort with a smaller rabbet or shoulder plane. The long sole and substantial mass help ensure accuracy; it will not follow the bumps and valleys that a shorter plane would, and the 4 3/4″ toe registers solidly to the workpiece. Set flush to both sides of the 2 1/4″ wide body, the 3/16″ thick bevel-up blade makes right- or left-handed corner cuts cleanly and accurately. The 15° bed angle, coupled with the 25° blade bevel, yields an effective cutting angle of 40°. Scoring spurs on either side of the body scribe the cut ahead of the blade, minimizing tear-out on cross-grain work. Adjustable for depth and projection, the spurs can be recessed for working with the grain or to ensure that the outside spur cannot accidentally score the workpiece. Mounted on two steel fence rods with brass collet screws, the 7 3/8″ long removable fence can be set up to 5 1/4″ from the shoulder and is through-drilled to accept a wooden fence extension. The rear tote tilts and locks to either side for knuckle clearance.

The stress-relieved ductile cast iron body is accurately machined, with a sole that is flat and square to the sides. The adjustable mouth can be closed to a narrow slit for fine shavings and minimum tear-out, or opened for heavier cuts. A Norris-style mechanism combines feed and lateral adjustments for easy, precise blade setting. Set screws on either side of the blade prevent it from shifting in use, but allow full lateral adjustment. Includes a lapped blade, available in A2, O1 or PM-V11™ steel. Patented. Made in Canada.

05P53.01	Jack Rabbet Plane, A2	**$299.00**
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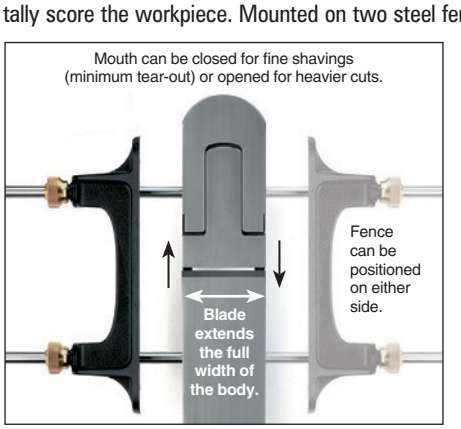

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By Randy Johnson

Spring-Joint Box

Self-locking design requires no glue.

SQUEEZE AND SNAP! That's all it takes to assemble this CNC-routed box. The joint's flexibility comes from a series of slots that allow the hooked tenons to be compressed, so they slide into the mortises. When released, the tenons spring back into position, locking the parts together. While not as rigid as a glued joint, the assembled spring joints are surprisingly stiff. And you can enjoy assembling and disassembling the box as often as you like.

The key to making this joint fit well—neither too tight nor too loose—depends on several things. The primary factors are the spacing, length and number of the slots as well as the tolerances between the tenons and mortises. The spring-jointed front and back are also 1/8" taller than the mortised ends. This small difference in height keeps the hooked tenons slightly compressed after assembly, which adds additional stiffness to the joint. The type of wood and the thickness of the parts also affect the joint's flexibility.

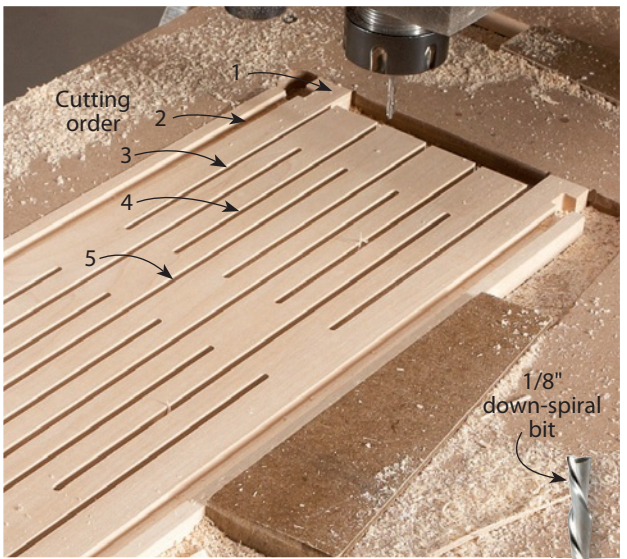
Accommodating all these variables can be a bit of a challenge—I made eight prototypes before I found a fit that I liked. But similar to mastering hand-cut dovetails or mortise and tenon joints, the time spent working out a solution for this box was a very satisfying learning experience.

The slots become part of the box's design and variations are almost unlimited. However, I kept the shape and arrangement of the slots for this box simple in order to show how the parts are made. Plans and tips for routing this box can be found at **AmericanWoodworker.com/CNC.**

PHOTOGRAPHY: JASON ZENTNER

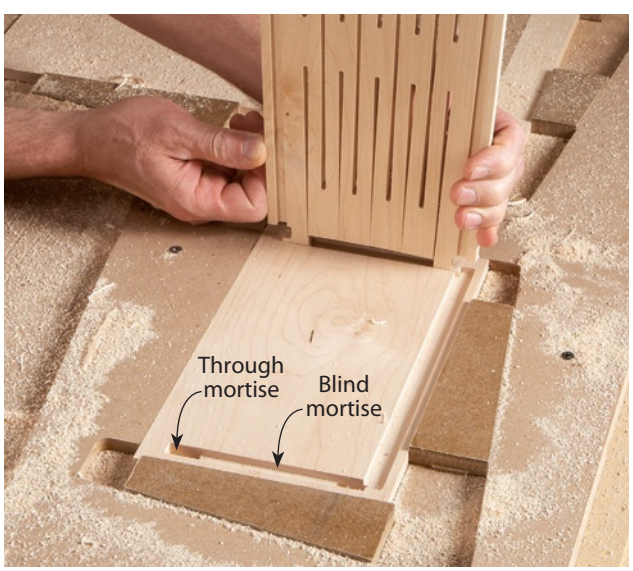
Wedge the parts in place

Holding parts secure is important for all CNC work. For this project I used 3/8" deep pockets—the same thickness as the parts—cut into 3/4" MDF. I then added 1/2" thick MDF wedges to secure the parts. The wedges are very easy to install and remove with a couple mallet taps. Plans and tips for building this type of jig are available at **AmericanWoodworker.com/CNC**.



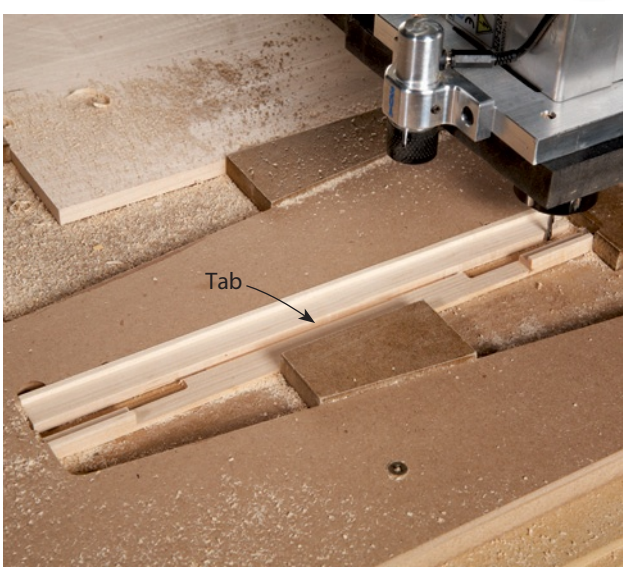
Rout the front and back parts

First cut around the tenons (1). Then cut the grooves (2), the two outer end slots (3), the three inner end slots (4) and finally the center slots (4). This cutting order is important because it keeps the router bit from chattering as the part becomes increasingly flexible. It's also important to use a down-spiral bit, which pushes the part down during routing.



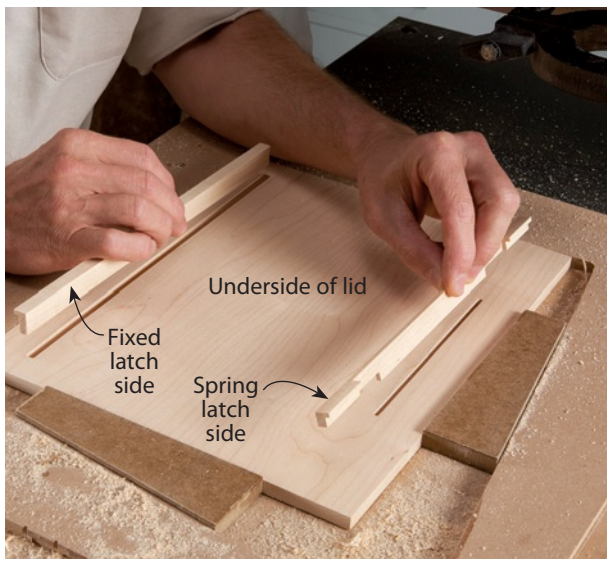
Test-fit the parts

Rout the mortises and check the fit of the tenons. The parts should fit together snugly, but without binding. I found cutting the mortises .015" larger than the tenons provided a good, slightly tight fit. Once the faces of the parts were finish-sanded and the corners were eased, the fit was perfect.



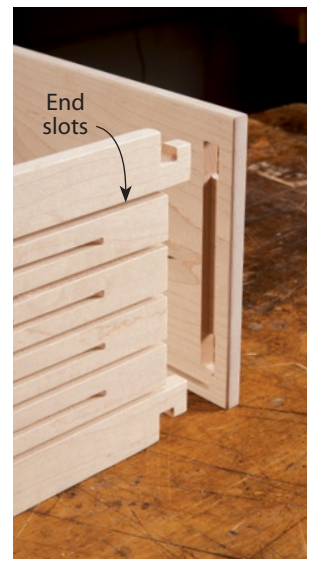
Rout the latch parts

The lid's two latch parts are cut from one piece of wood but connected with a thin tempoary tab between the parts. These parts are somewhat delicate to machine, so the down-spiral bit really proves its worth. An up-spiral bit can lift the parts and chew them up—I speak from experience!



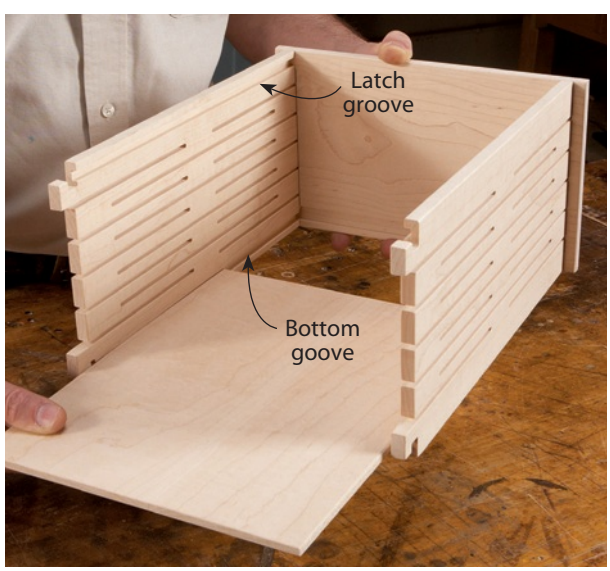
Test fit the latches

Rout grooves on the underside of the lid for the latch parts and test their fit. The groove for the fixed latch runs the full length of the latch. The groove for the spring latch is shorter, since the ends of the spring latch must be free to flex (as shown on page 16). The latch parts are glued into the slots after all the parts are sanded.



Assemble the first three parts

Two dimensions are key to making this joint work. First, the five 1/8" wide end slots allow the tenons to be compressed up to 5/8". Second, the through mortises are spaced so that the hooked tenons only need to be compressed 1/2" to pass through. This 1/8" leeway eases the assembly. Anything less than 1/8" makes the parts difficult or impossible to assemble.



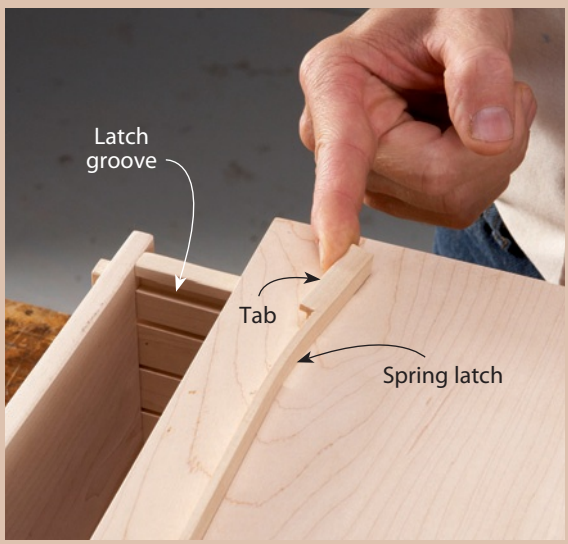
Insert the bottom panel

The 1/4" thick bottom panel fits into grooves in the front and back parts. These parts also have grooves near their top edges, which serve as clips for the two latch parts. These grooves are all the same size, so the front and back parts don't have a top or bottom. The ends have a single groove for the bottom panel.

Snap on the last part

Slip the remaining end over the hooked tenons, working the mortises down equally. Pressing one side down first will only rack the end and cause it to bind. If the parts have been correctly cut, this last end should snap into place with a satisfying pop. If not, a little additional sanding should ease the fit.

Working the Spring Latch



Opening the box is a bit of a puzzler, because the spring-latch system is completely hidden when the lid is closed. Here's how the system works: Tabs at the ends of the spring latch flex about 1/4" (above, left). These tabs fit about 3/16" into the latch groove in the back of the box. When the lid is pressed from the front (above, right), the spring latch flexes deeper into the groove at the back, allowing the fixed latch to slip inside the box. Releasing the lid relaxes the spring latch, which in turn engages the fixed latch in the groove in the front of the box. The lid is now locked in place, because both latches are clipped into the latch grooves. To open the box, simply press on the front of the lid and lift.

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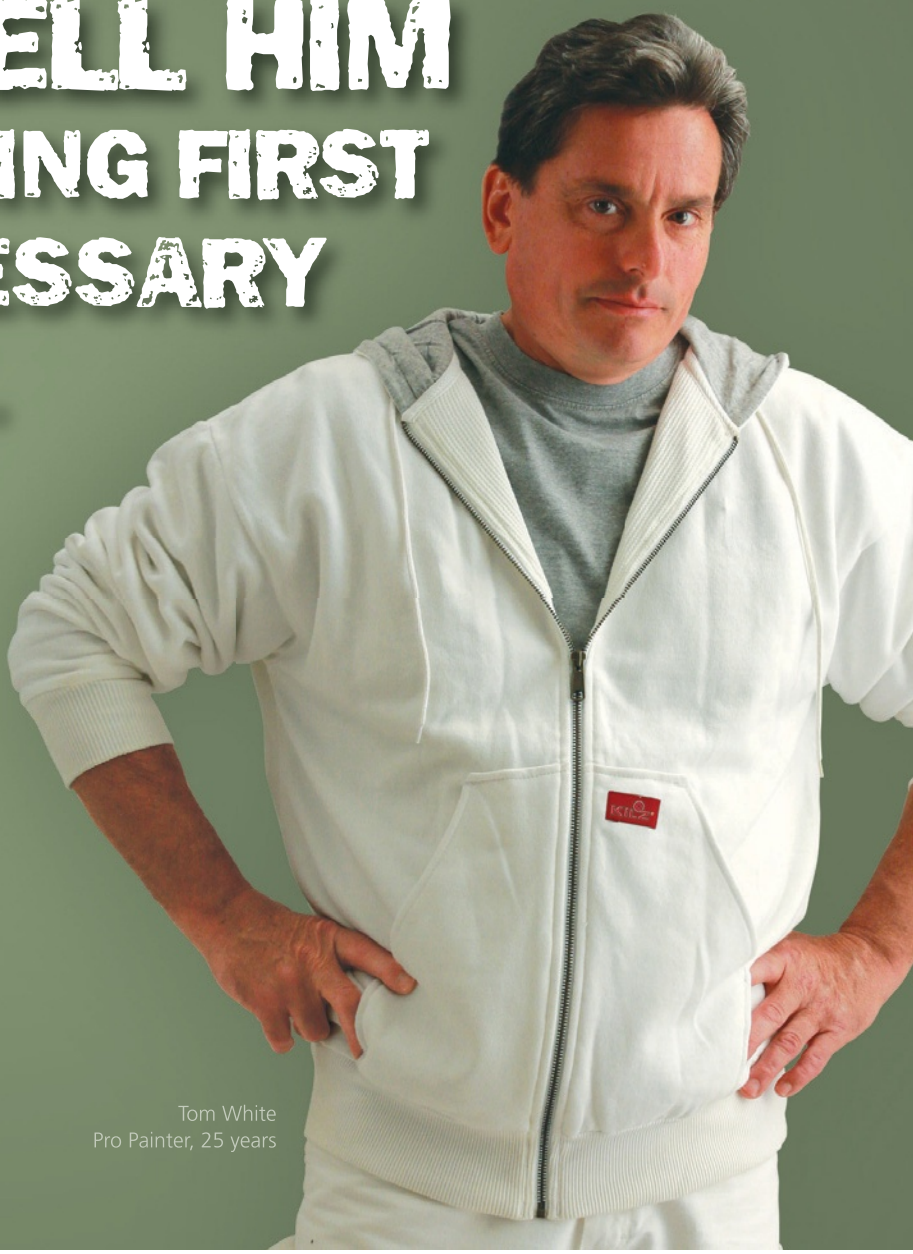

Tom White
Pro Painter, 25 years

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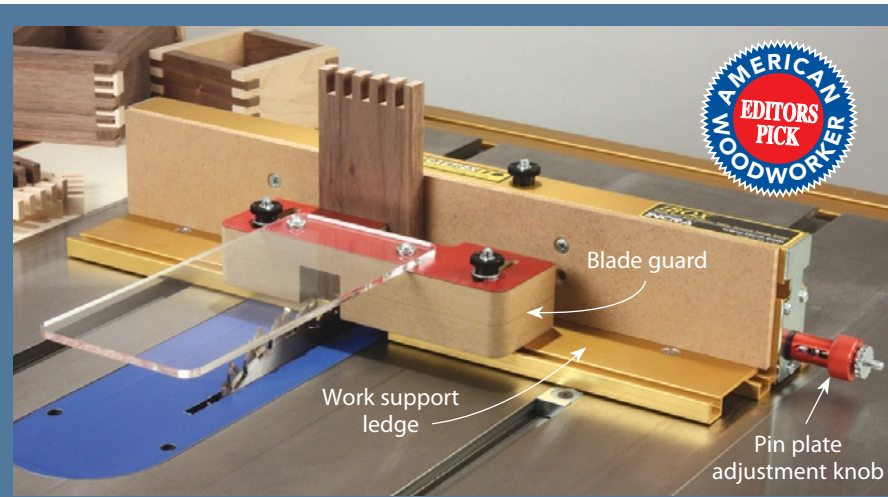


COURTESY OF MANUFACTURER

PRECISION IS THE KEY to a box joint jig, isn't it? If you've ever tried to build one yourself, you know the joints that it makes have to be right on the money—within a few thousandths of an inch—or they won't go together right. Incra's new iBox guarantees that high level of accuracy, and it's very easy to adjust. Anybody can do it.

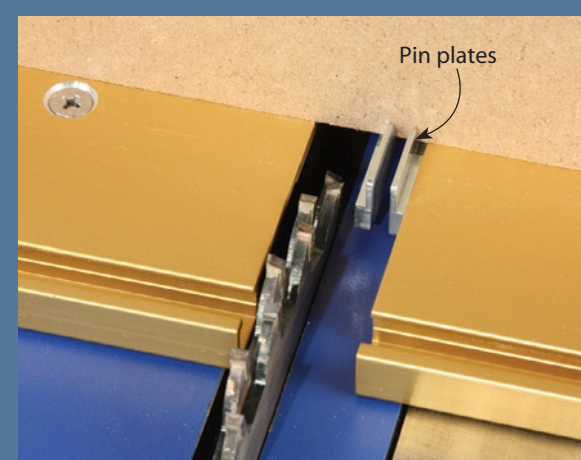
To understand how the thing works, forget about any box joint jig you've seen before. The iBox operates on a completely new system. On most jigs, the key that registers the joint—the doohickey that fits into each slot you cut—is a solid piece of wood, metal or plastic. For 1/4" joints, for example, you'd insert a 1/4" key. Not on the iBox. Here, the key is split into halves (Incra calls them "pin plates"). Turning one of the dials on the jig moves the pin plates closer together or farther apart, so you can precisely fit the key to match the width of the slot made by your dado blades or router bit. If you build up a dado set with shims to cut a slot that's 23/64" wide, for example—no problem.

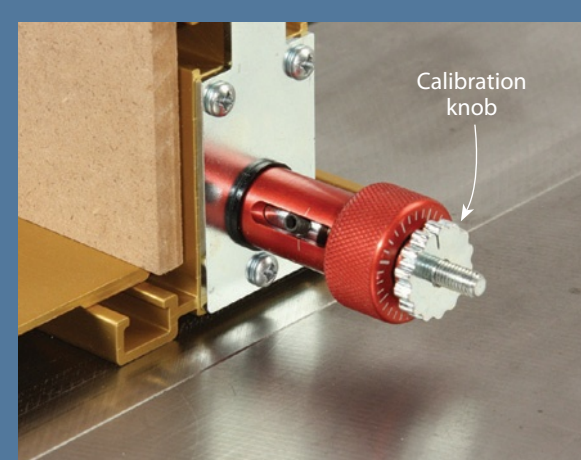
Setting the distance from the key to the blade is the critical part of making joints that fit right. On most jigs, adjusting this distance is a matter of trial and error. But not on the iBox. Once you calibrate the jig for your saw or router table (and I've got to admit that this is a bit fussy), you cut a trial slot and turn a knob a few times until the pin plates fit the slot. The spacing from the blade is set automatically. If the joint doesn't quite fit to your satisfaction, you can a dial a second micrometer-style knob, graduated in thousandths of an inch, to adjust it.

If seeing is believing, check out the iBox video on Incra's website. The iBox system sure worked for me! Once I calibrated the jig for my tablesaw, I was able to make box joints of many different widths simply by turning one dial. It's truly a set-and-go jig.

The iBox is extremely well-engineered. The ledges that support your work can be adjusted side to side to accommodate narrow pieces. The miter bar is adjustable in width to eliminate any wiggling. And the backing board mounts in a T-slot; you can adjust it side to side to get many uses from one piece of material. Safety is built in, with blade guards front and back.

The iBox jig can make pins anywhere from 1/8" to 3/4" wide. It will handle stock from 1/4" to 1" thick, and any width. You can use it on a tablesaw or router table, but your router table must have a miter slot.





SOURCE

Incra Precision Tools, incra.com, 972-242-9975, Incra IBOX, $170.

EDITOR: TOM CASPAR • PHOTOGRAPHY: JASON ZENTNER UNLESS NOTED

'Maxximize' Your Saw

THE WORLD OF 10" SAW BLADES is a pretty crowded place, but one can never have too many choices—especially high-quality choices like the Guhdo Gmaxx series.

Founded in Germany in 1908, Guhdo has been selling industrial blades and tooling in the U.S. for more than 25 years. The Gmaxx line of blades marks their entry into the retail market.

Gmaxx 10" blades cover all the bases: rip, crosscut, general purpose, plywood, particleboard, fine crosscut, laminate, solid surface, thin kerf, scoring, non-ferrous metal and steel. Many of these blades are also available in 7-1/4", 8", 12" and 14" sizes.

The Gmaxx series features a thin, tough protective coating that's applied using an electrostatic process. The coating protects the blade from rust and resin buildup and reduces friction while cutting. Reduced friction results in cleaner cuts and less power draw on your saw's motor.

All of the Gmaxx blades are precision-balanced and have noise-reducing expansion slots.

SOURCE

Guhdo, guhdo-gmaxx.com, 855-624-4297, Guhdo Gmaxx Series 10" circular saw blades, $56-$88.

COURTESY OF MANUFACTURER

Mix, Pour & Store

STIRRING AND POURING FINISHES can be messy business. The new Mixing Mate from Rockler takes care of the mixing and the mess. The Mixing Mate's cam locks form an airtight, leakproof seal on any quart-size can.

To mix, turn the crank handle to rotate the auger-style mixing blade. To dispense, press the spring-loaded thumb lever to open the spout—just like a maple syrup dispenser in a restaurant. Releasing the thumb lever seals the can for storage.

SOURCE

Rockler Woodworking and Hardware, rockler.com, 800-279-4441, Mixing Mate, #44360, $15.

Powerful Pin Nailer

HAVE YOU GRADUATED to air tools yet? If not, it's time you tried out a 23-gauge pin nailer, such as the new FNS 138 from Bosch.

A pin nailer shoots fasteners that are almost invisible on the surface, which is perfect for trim molding. But it's also useful for building jigs, positioning parts before clamping and temporarily holding pieces together. In my shop, a pin nailer is an essential tool.

Weighing in at only 2 lbs. with a svelte, ergonomic design, the FNS 138 is a pleasure to use. According to Bosch, it delivers 10% more power than other 23-gauge nailers. That's important, they say, when your compressor is running low on air. At that point, another nailer might only drive a fastener halfway; Bosch says that the FNS 138 will fully drive fasteners at pressures as low as 70 psi.

This nailer handles fasteners from 1/2" to 1-3/8" long. It features two rubber tips to prevent dents in your work, a stepped magazine for angling into corners and a 130-pin capacity side-load magazine. It also has a zero-lockout mechanism that prevents the nailer from shooting if it's empty. With this tool, you won't find yourself nailing on a piece of trim, only to have it fall to the floor when you let go because you've run out of nails. I have, and it's annoying!

My only complaint about the nailer is its secondary trigger, a small lever behind the main trigger that must be squeezed in order for the nailer to fire. It works fine as a safety measure to prevent accidental firing but, for me, requires an awkward grip.

SOURCE

Bosch, boschtools.com, 877-267-2499, 23 Gauge Pinner, #FNS138-23, $159.

Wide Guide with T-Track

BREAKING DOWN a full sheet of plywood with a circular saw, or cutting a long dado with a router, is much easier when you can guide the tool with a straightedge that clamps directly to the work. There are a number of these products on the market, but Bora has upped the ante.

The new Wide Track has three innovative features: T-tracks on either side for guiding a carriage or mounting a stop, a large paddle for the cam clamp and a significantly wider extrusion, to prevent deflection.

It's the T-track that made me pause and think of other uses for this edge guide. Hmm … if I use it as a fence on a drill press, router table or bandsaw, I could mount stops, featherboards, hold-downs or any number of attachments to it. Gotta try that!

The Wide Track is available in five lengths. Accessories include top-mounted auxiliary clamps and a universal base for circular saws.

SOURCE

Bora, affinitytool.com/bora, 866-588-0395, Wide Track Clamp Edge, 24", 42", 50", 66", or 100", $50-$144.

One Slick Glue Brush

THE LOWLY GLUE BRUSH has been elevated to "actual tool" status. It will still be one of the most neglected tools in your shop—use it, set it aside and forget it. But now you don't have to throw it away.

Rockler's new Silicone Glue Brush is built for neglect. Its soft silicone "bristles" spread glue easily and rinse off in a snap. And if you forget to rinse the brush—not that I've ever done that—there's no problem. The hardened glue pulls right off.

The tail end of the brush has a flat spreader for getting into dovetails and finger joints. I also discovered that it works pretty well for scraping off squeeze-out, as long as the glue hasn't completely hardened.

SOURCE

Rockler Woodworking and Hardware, rockler.com, 800-279-4441, Rockler Silicone Glue Brush, #45624, $4.99.

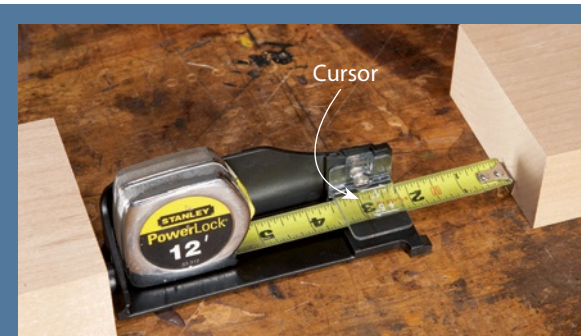
Tape Measure Add-On

FOR INTERIOR MEASUREMENTS, you can bend a tape measure and guess, or, for the truly uninitiated, add the dimension stamped on the body. In most cases, you'll end up cutting a piece two or three times before getting its length right.

The Universal Tape Gauge (UTG) from DowelMax takes the guesswork out of interior measurements. Whether you're measuring inside a cabinet or between two walls, the UTG guarantees accuracy.

The UTG will fit most any tape. Just slide the tape under the UTG's cursor plate and clip the tape's belt hook over its side.

Calibrating the UTG is simple. It has a button on its back end that can be adjusted in or out to fine-tune the measurement. One small hitch, though—the number under the cursor clearly isn't the dimension you're after. For the correct measurement, add 5".



If interior measurements were crucial to your business or hobby, I'd recommend dedicating a tape measure to the UTG so you never have to recalibrate the gauge for a different tape.

SOURCE

Dowelmax, dowelmax.com, 877-986-9400, Universal Tape Gauge, #DMX-UTG, $16.

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Philip Weber

Hi-Res Woodworking in a Box.

by Spike Carlsen

YOU COULD TAKE the entire annual output of Philip Weber's woodworking shop and fit it into the trunk of a VW bug. But oh! What a wondrous load you would have: Ebony, holly and Osage orange; brass, aluminum and copper; influences from Art Noveau, Art Deco and Asia; geometric shapes and others so unique they're nameless. Indeed, Phil's boxes are as rare and intricate as the jewelry and gems they often hold.

Horseshoes and jewelry

Phil, who was born in Queens, New York, attended two years of college and then went to vocational school to learn the farrier's trade. He didn't shoe many horses, but he discovered a love of working with his hands and the "magical material" he's crafted ever since. James Krenov's books and *Fine Woodworking*—an upstart magazine at the time—were other sources of inspiration.

The first few years of Phil's woodworking career were lean. "Initially I used lots of veneers from Constantine's because that's all I could afford," he recalls. Phil and a partner crafted jewelry and other 1970s-type paraphernalia and sold their wares through craft fairs. As his work became more sculptural and collectible, Phil began selling though galleries. But today, things have come full circle: This "almost 60-year-old" craftsman now sells most of his boxes and garners most of his orders by attending a half dozen high-end craft fairs per year. Phil develops about 10 new designs and builds between 100 and 150 boxes per year, most of which sell for between $300 and $1500. He keeps photographs, templates, parts and dimensions of completed works so he can closely replicate them upon request.

Intricate designs

Phil's design process is evolutionary, rather than schematic. "I'm not a great chess player," he explains. "I can't

EDITOR: TIM JOHNSON | PHOTOGRAPHY: COURTESY OF PHIL WEBER

Galaxy
Ebony, yew, holly, brass | 8-1/2" x 2-3/32" x 2-13/32"

Confection
Holly, ebony, silver | 4-13/32" x 1-1/2" x 1-1/2"

Turandot
Ebony, chakte viga
16" x 2-1/2" x 3-3/32"

Lalique
Ebony, Leopardwood, Brass
5-1/2" x 2-1/2" x 2-1/2"

see eight moves ahead, so I design as I go." Sometimes a design starts with a particular joint Phil wants to try or a particular wood he'd like to use. After determining a basic shape and size, he ponders whether the box should stand on legs. Inlays, hinges and pulls evolve along the way. Art Deco and Asian influences pervade much of his work.

Fabulous wood

"If you really love the look and feel of wood, it just might love you back," Phil muses. "At least sometimes." Virtually every box he creates includes ebony as a feature or accent. "Working with ebony is like viewing a computer with a high resolution screen," he explains. "You get amazingly sharp focus." Ebony is so dark it appears to be virtually grainless, according to Phil, so it doesn't compete with curves and other strong design elements. Its intense black color helps to showcase the highly figured woods Phil frequently employs, and the narrow strips of ebony that luthiers use for stringed instrument fingerboards are the ideal size for many of his boxes.

Because of its sharp contrast with ebony, Phil also loves holly. "But holly's so pure," he says, "keeping it white while dealing with ebony's black sawdust can be a hassle." Phil often incorporates quartersawn wood, leopardwood, chakte viga and spalted wood in his boxes. He usually resaws spalted wood into veneer-thick pieces in order to take greatest advantage of its incredible patterns. Metal strips and accent pieces also play important roles in Phil's boxes because of the crisp detailing they afford.

Juan M
Holly, black palm, ebony, silver
8-1/2" x 2-3/4" x 2-1/2"

continued

Working small

Even though Phil's works are petite, his shop is stocked with standard-size bandsaws, tablesaws and router tables. There's also a vintage horizontal belt sander. When asked if he uses special techniques that differ from those used by woodworkers who work on a larger scale, Phil answers, "I don't really know what normal is. I've worked alone for the past 30 years." He commonly uses masking tape as clamps and double-sided tape to affix small parts to sleds or larger pieces of wood for planning or shaping. Indeed, the only assistance he gets is in naming his boxes. Phil and his wife, Klara Borbas, have come up with some descriptive doozies: *Rocket Booster*, *Twilight Zone*, *Inner Wisdom* and *Left of Center* (describing the position of the box's latch, not its political leanings).

The right finish

Phil creates ultra-smooth surfaces using hand scrapers, 400 grit sandpaper and 0000 steel wool. When it comes to finishing—the part of the process Phil admittedly loathes—he employs three approaches.

For boxes dominated by ebony and other such woods that sport an inherent sheen, Phil uses Thompson's Water

Giza
Ebony, chakte viga, Copper
3" x 3" x 6"

Soria
Ebony, copper
2" x 2-1/4" x 4"

Isabelle
Ebony, brass
2" x 2" x 2-3/4"

Spring Fashion
Chakte viga, holly, ebony
2-13/32" x 2" x 1-3/4"

Seal, which highlights the grain without creating a surface film. For boxes featuring holly and other figured woods that look best under a built-up clear finish, Phil concocts a brew that he discovered in one of Krenov's books: blonde shellac flakes dissolved in Behlen's Behkol solvent. For spalted maple—which often rides the line between beauty and decay—he uses super glue as both stabilizer and finish. Phil applies super glue until it puddles on the surface. Then, after letting the glue dry, he uses a scraper to reduce the thickness of the film to the bare minimum.

Though Phil crafts an occasional mirror, shelf or other furniture piece, petite boxes have dominated his life and work. "I've always preferred to work on a small scale and the box is a good vehicle for that," he explains. "Some people simply admire them as a visual or tactile joy. Others store a small treasure inside. Either way, I hope they consider the container a little treasure, too."

Visit **weberboxes.com** to see more of Phil's work.

Spike Carlsen is the author of *Woodworking FAQ*, *A Splintered History of Wood* and *Ridiculously Simple Furniture Projects*. For more information visit **spikecarlsen.com** or follow his Blog at **spikecarlsen.blogspot.com**.

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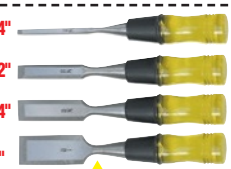

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SUPER COUPON!

CENTRALPNEUMATIC 17 PIECE AIR TOOL ACCESSORY KIT

LOT NO. 68236

SAVE 50%

$4.99 REG. PRICE $9.99

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Bunker Hill Security

36 LED SOLAR SECURITY LIGHT

LOT NO. 98085/69644/69890/60498

Item 98085 shown

SAVE 28%

Includes 1.2 volt, 600mAh/6 volt NiCd rechargeable battery pack.

$17.99 REG. PRICE $24.99

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CENTRAL MACHINERY

4" x 36" BELT/ 6" DISC SANDER

LOT NO. 97181/ 93981

SAVE $45

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$54.99 REG. PRICE $99.99

88980164

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CENTRALPNEUMATIC

21° ANGLE LOT NO. 68028/69927

28° ANGLE LOT NO. 68068/69928

SAVE $30

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YOUR CHOICE!

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53255211

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SUPER COUPON!

CENTRAL MACHINERY

OSCILLATING SPINDLE SANDER

Item 95088 shown

SAVE $60

LOT NO. 95088/69257

$89.99 REG. PRICE $149.99

79392730

HARBOR FREIGHT TOOLS - LIMIT 5

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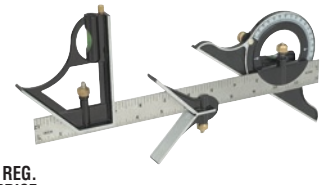
SUPER COUPON

PITTSBURGH

12" COMBINATION SQUARE SET

LOT NO. 92471



SAVE 50%

$4.99 REG. PRICE $9.99

53268822

HARBOR FREIGHT TOOLS - LIMIT 9

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SUPER COUPON

drillmaster

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

LOT NO. 96289

SAVE 60%

$7.99 REG. PRICE $19.99

56528196

HARBOR FREIGHT TOOLS - LIMIT 7

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SUPER COUPON

27 LED PORTABLE WORKLIGHT/FLASHLIGHT

Gordon

LOT NO. 67227/ 60566/69567

SAVE 50%

Requires three AAA batteries (included).

Item 67227 shown

$2.99 REG. PRICE $5.99

91177003

HARBOR FREIGHT TOOLS - LIMIT 8

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SUPER COUPON

18 VOLT CORDLESS 1/2" DRILL/DRIVER WITH KEYLESS CHUCK

CHICAGO ELECTRIC POWER TOOLS

NEW!

LOT NO. 68850

SAVE 33%

Includes 18V NiCd battery and charger.

$39.99 REG. PRICE $59.99

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HARBOR FREIGHT TOOLS - LIMIT 5

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SUPER COUPON

500 LB. CAPACITY DELUXE CARGO CARRIER

Haul Master

LOT NO. 66983/69623

SAVE $50

Item 66983 shown

$49.99 REG. PRICE $99.99

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SUPER COUPON

5 PIECE PLIERS SET

PITTSBURGH

Item 69353 shown

LOT NO. 69353/69350/69351/ 69352/69359

SAVE 55%

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SUPER COUPON

16" VARIABLE SPEED SCROLL SAW

CENTRAL MACHINERY

LOT NO. 93012

SAVE 25%

$59.99 REG. PRICE $79.99

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SUPER COUPON

2.5 HP 12" PLANER WITH DUST COLLECTION

CENTRAL MACHINERY

LOT NO. 95082

SAVE $80

$219.99 REG. PRICE $299.99

26075751

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SUPER COUPON

12" SLIDING COMPOUND MITER SAW WITH LASER GUIDE

CHICAGO ELECTRIC POWER TOOLS

LOT NO. 98194/69684

Laser guide requires two AAA batteries (included).

SAVE $80

Item 98194 shown

$119.99 REG. PRICE $199.99

31188158

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SUPER COUPON

CHICAGO ELECTRIC POWER TOOLS

Item 68861 shown

OSCILLATING MULTIFUNCTION POWER TOOL

LOT NO. 68861/68303/60428

SAVE 73%

8 Functions: Sanding, Cut Flooring, Cut Metal, Scrape Concrete, Remove Grout, Cut Plastic, Scrape Flooring, Plunge Cut

Accessories sold separately.

$15.99 REG. PRICE $59.99

88219760

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SUPER COUPON

LOT NO. 67831

26", 8 DRAWER ROLLER CABINET WITH 8 DRAWER TOP CHEST

US★GENERAL PRO

830 LB. CAPACITY

SAVE $70

$329.99 REG. PRICE $399.99

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SUPER COUPON

CENTRALPNEUMATIC

3 GALLON, 100 PSI OILLESS PANCAKE AIR COMPRESSOR

LOT NO. 95275/69486

SAVE 50%

Item 95275 shown

$39.99 REG. PRICE $79.99

17473461

HARBOR FREIGHT TOOLS - LIMIT 3

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SUPER COUPON

CENTRAL MACHINERY

LOT NO. 97869

2 HP INDUSTRIAL 5 MICRON DUST COLLECTOR

SAVE $100

$149.99 REG. PRICE $249.99

54616986

HARBOR FREIGHT TOOLS - LIMIT 3

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SUPER COUPON

PITTSBURGH AUTOMOTIVE

WEIGHS 74 LBS.

SAVE $70

Item 68048 shown

RAPID PUMP® 3 TON HEAVY DUTY STEEL FLOOR JACK

$69.99 REG. PRICE $139.99

LOT NO. 68048/69227

20667134

HARBOR FREIGHT TOOLS - LIMIT 4

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SUPER COUPON

60" WORKBENCH WITH FOUR DRAWERS

WINDSOR DESIGN

LOT NO. 93454/69054

Item 93454 shown

SAVE $90

$139.99 REG. PRICE $229.99

36007816

HARBOR FREIGHT TOOLS - LIMIT 4

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Down-to-Earth Shop

Where woodworking coexists with the laundry.

I ALWAYS LOOK FORWARD to reading "My Shop." I envy those guys who have woodshops the size of a five-car garage that look more like castles than workshops. Some are heated and air conditioned; others have windows with a spectacular view. My shop in scenic Harrisburg, Pennsylvania, overlooks the hot water tank and laundry tubs, because it's in my basement. Its grand entrance is a cellar door.

The splendid dream shops I see are always loaded with tools. I can imagine the owners calling the woodworking catalog company and saying, "I'll take one of everything from page 3 to 99." I bought my tools the old-fashioned way, one at a time. My dad and my wife taught me everything I needed to know about tool shopping: "If you buy good-quality tools and take care of them, they'll last a lifetime," my dad said. "Never pay full price," my wife insists, "and use a coupon to save even more." I've found many of my tools through classified ads or auctions; brand names, slightly used, but in very good condition. I consider them treasures and treat them like members of the family.

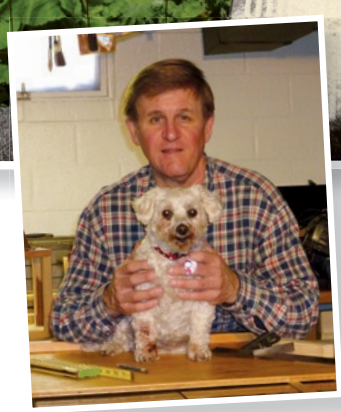
All of those picturesque shops have sophisticated systems to control dust, with silver pipes zigzagging all around. My dust-control system is more modest (see photo, page 31, bottom left). I do all my sanding and routing outside, weather permitting, where the sawdust is free to land where it pleases.

I'm always impressed with the spectacular lumber stored in those royal shops, hand-selected and neatly stacked in racks. My lumber is hand-selected, too (see photo, page 31, bottom right). On trash-collection days, I roam the neighborhood searching for discarded furniture and other wooden gems that I can disassemble, clean and recycle into keepsake projects.

EDITOR: TIM JOHNSON | PHOTOGRAPHY: COURTESY OF M. DAVE DAVIS

My dust-control system

My lumber yard



There's never a speck of dust in those dream shops. I often wonder if anything is made in them, especially since the only wooden items on display are elegant European workbenches. My workbench is less awe-inspiring—a pair of sawhorses with a removable plywood top.

Most of those grand shops are in separate buildings, away from the house. I have to admit that's the way it should be, because I have to run the vacuum in my shop every half-hour, so I don't track sawdust upstairs and across the living room carpet. (Stay-Out-of-the-Doghouse Marriage Tip No. 1: Maintain a clean shop floor.)

I do have a vision of my dream shop: a modest one-car garage nestled at the back of my property—just a few strides from my dream down-to-earth garden. Like other shops, mine will be neat, clean and organized, with a wood-burning stove tucked in one corner to keep it cozy during those frigid winter months. But for now, I look forward every day to spending quality time in my down-to-earth shop. Well, not quite every day, because on Mondays, my wife claims the space for doing the laundry.

M. Dave Davis
Harrisburg, Pennsylvania

Tell Us About Your Shop

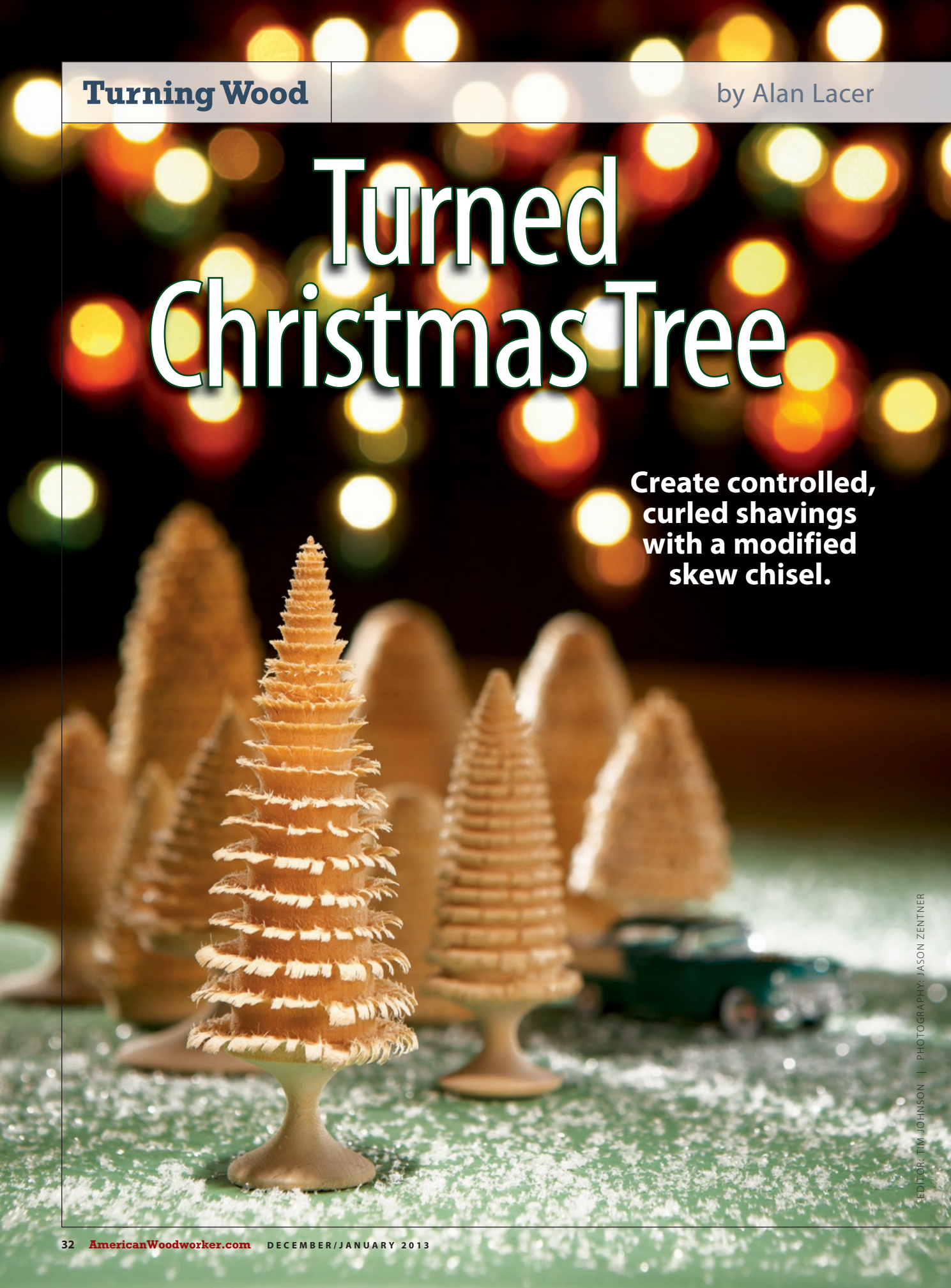
Send us photos of your shop, a layout drawing and a description of what makes your shop interesting. Tell us what you make in it and what makes your shop important to you. If "My Shop" features your shop, you'll receive $100.

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

by Alan Lacer

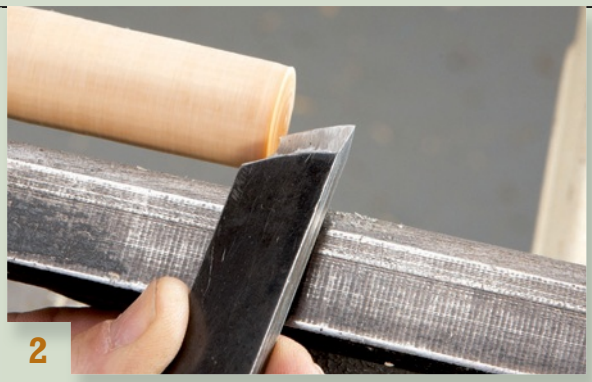
Turned Christmas Tree

Create controlled, curled shavings with a modified skew chisel.

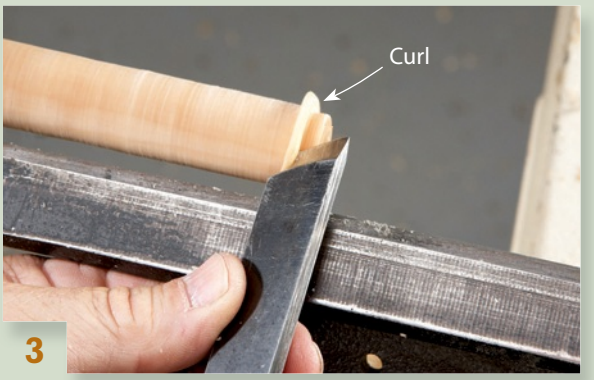


EDITOR: TIM JOHNSON | PHOTOGRAPHY: JASON ZENTNER

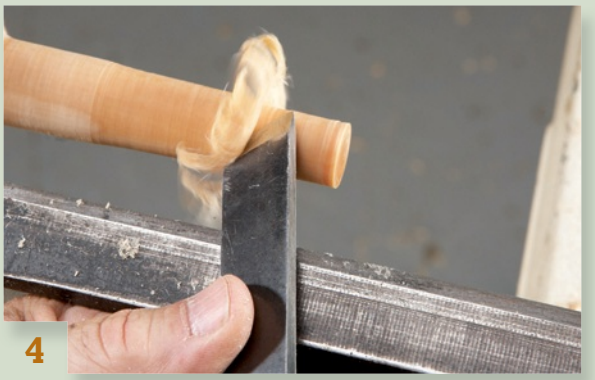
Modify the short point of a skew chisel to create a hook, so you can roll shavings into curls. Round over all the sharp edges on the hook's throat.



Use the modified skew to practice rolling shavings on a scrap block of green wood turned to a cylinder. Start by positioning the point of the hook at a low entry level.



Make a planing cut using only the point, after hooking it into the wood. The hook's curved throat helps to bend the shaving into a curl.



Practice extending the curl by continuing the cut for approximately 1". Experiment with shorter and deeper cuts as well as varying the angle of approach.

THESE TREES come all the way from the Erzgebirge (ʾerts-gə-bir-gə). Actually, I made them in Wisconsin, but the unique curl-turning technique I used evolved in that mountainous region of eastern Germany,* which borders on the Czech Republic. With an understanding of this technique and a bit of practice, you can have some real fun making trees in a variety of shapes and sizes as stand-alone decorations, parts of a scene or hanging ornaments. You can also make flowers (see "Roll a Flower," page 35).

What may look simple, however, is actually a bit tricky. Skills with a skew chisel—and a modified one at that, the right amount of pressure and depth of cut, the right feed rate and just the right wood are all factors in this style of turning. The key to success—being able to consistently turn attractive, lifelike trees—is practice.

Use wet basswood

Basswood is one of the most desirable woods for this method, due to its "stringy" quality. The best stock has straight grain (riven stock is preferred as a rule) and on the wet side—15% to 18% moisture content. Green basswood is an excellent choice. Pine, spruce and fir tend to give a coarser look than basswood, but are certainly worth experimenting with.

Plan to use 5" long blanks that are either 1-3/4" square or 1" square. If only air- or kiln-dried wood is available, soak the blanks in a bucket of water for a day or two, using rocks to keep them submerged.

The completed trees don't require finishing, but they can be colored with spray paints or by dipping in water-based dye. Their exposed trunks and bases can then be hand-painted, for a more realistic appearance.

Modify an old skew

You'll need to grind a hook on a 3/4" or 1" skew chisel to facilitate the process (**Photo 1**). While a "normal" skew will work to some extent, this modification definitely helps to roll the curls into position with more control and less breakage of the fibers. With a normal skew, even when leading with the short point in the wood, it's far too easy to unintentionally cut off the curl.

Of course, this modification dedicates the tool to rolling curls, unless you want to grind away a lot of metal. So, plan to modify an inexpensive skew (or even a woodturning scraper) rather than your pride and joy (see Sources, page 35).

Starting at the bottom of the skew, grind the area behind and below the short point into a slight concave shape (the "hook"). Then soften all of the hook's sharp edges. In German

*HISTORICALLY, THE ERZGEBIRGE (THE ORE MOUNTAINS, IN ENGLISH) WAS RELATIVELY ISOLATED, SO ITS CRAFTSMEN, WHO WERE MAINLY CENTERED AROUND THE TOWN OF SEIFFEN, DEVELOPED A NUMBER OF UNIQUE TECHNIQUES AND PRODUCTS, INCLUDING CURL TURNING (DEMONSTRATED HERE), RING, OR HOOP, TURNING, (WHERE MULTIPLE PIECES—USUALLY SMALL TOY ANIMALS—ARE CUT AS SLICES FROM ONE SINGLE TURNED RING), RAUCHERMEN (SMOKING MEN: FIGURES THAT HOUSE INCENSE, SO THEY APPEAR TO BE SMOKING), AS WELL AS A DISTINCTIVE INTERPRETATION OF THE CLASSIC NUTCRACKER.

Pull another curl. The finished tree consists of multiple curls, so practice controlling the length of each curl while leaving even spacing in between.

Apply your newly learned skills to practice creating long curls on a tapered, cone-shaped blank. Now, you must work from smaller to larger diameter while drawing the tool toward you.

Create a series of evenly spaced curls to perfect your technique. Make each curl slightly shorter than the previous one to mimic a Christmas tree's form and the shape of its branches.

Finish shaping the tree by using successively shorter curls to taper its top end to a point. This is tricky, because you have to leave enough material at the tip to create the last few curls.

this type of turning is referred to as "sharp and soft turning," because the hook's sharp point and softened edges are both used to form and control the curl. So make sure that all of the hook's edges are beveled back and the shape is as smooth and polished as you can make it. After grinding with the round stone, work the hook's edges with a slipstone or round abrasive rod.

Sharpen the skew's remaining edge in the normal fashion—angled approximately 70° from long point to short point, with the bevel's width about 1-1/2 times the thickness of the steel. Be absolutely certain that the short point is razor-sharp.

Outfit your lathe with a scroll chuck with standard jaws for the 1-3/4" blanks or spigot jaws for the 1" blanks (see Sources). You'll also need a few regular spindle turning tools: a roughing gouge, a 1/4" or 3/8" detail/spindle gouge, a 1/2" or larger "normal" skew and a parting tool.

Practice, practice, practice

Start by practicing on 1" diameter round stock, held in the scroll chuck with small jaws. Understanding how to handle a skew chisel—and especially how to make the planing cut—will be essential for learning this process.

Learn how to plane wood with a skew chisel at **AmericanWoodworker.com/WebExtras**

Hook the short point into the wood at a low entry level (**Photo 2**). Then make a planing cut to lightly raise or fluff up the wood into a curl (**Photo 3**). Experiment with the entry angle, depth of cut, feed rate and speed of the lathe. (I run the lathe between 1500 and 2000 rpm for this style of turning.) See how far you can roll the curl without breaking it or cutting it off (**Photo 4**). Roll some curls tight against the preceding ones; roll others leaving a gap of about 1/8" or so between curls (**Photo 5**). Periodically plane off the curls so you can roll new ones.

When you're able to roll curls consistently, move on to the next step. Taper the blank down to a point at the tailstock end, using a roughing gouge or a regular skew chisel. Then, starting about 3" from the tapered point, roll a curl for approximately 1" (**Photo 6**).

During this exercise you'll be doing the opposite of normal practice, which is to "follow the grain" by turning downhill, from a larger to a smaller diameter. In this case, you cut uphill, from a smaller to a larger diameter. Roll a second curl, stopping about 1/8" from the previous curl. Then roll additional progressively shorter curls until you have nothing but a small point.

Showtime

Begin by making a small tree. Plan ahead for the overall height and the

9

Shape the trunk and create the base using the detail/spindle gouge. Then use a parting tool to separate the completed tree from the waste.

10

Turning dry wood creates a different look, because the curls roll under rather than flaring out. You can stack these tight curls right on top of each other or leave spaces between them.

base section—either the curls will go all the way to the bottom, so the trunk doesn't show, or the section below the bottom curl will be turned to form a trunk and base. Much of this will be a repeat of the practice sections, with tight curls that touch each other or looser curls that stand slightly apart. One subtle move is to vary how much you roll over the shape of an individual curl: more for the lower branches and steadily decreasing as you reach the top (**Photo 7**). As you approach the top of the tree you may need to return the taper to maintain the desired shape (**Photo 8**).

If you've decided on an exposed trunk and base, turn it now, using a 1/4" or 3/8" detail/spindle gouge (**Photo 9**). Then use a regular or thin-kerf parting tool to cut the finished tree from the blank.

Curling dry wood

Using dry stock creates an equally attractive but significantly different look because the curls lack the flared, open shape that you can achieve with wet stock (**Photo 10**). Generally speaking, dry stock produces tighter curls, so they must be shorter and more closely spaced.

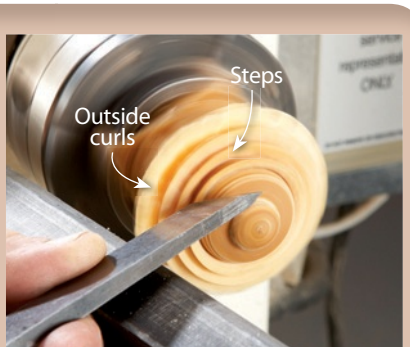
SOURCES

- Oneway Manufacturing, oneway.ca, 800-565-7288, Talon Scroll Chuck with standard jaws, #2985, $232; Spigot Jaws, #3016, $40.95.
- Penn State Industries, pennstateind.com, 800-377-7297, Skew chisel, 1" wide, #LX020, $18.50.

Alan Lacer is a turner, writer and instructor living near River Falls, WI. For more on the turning of the Erzgebirge region and Alan's travels there, visit **alanlacer.com**.

Roll a Flower

Think of a flower as a short, wide tree. Mount a 1-3/4" blank in the chuck and turn it to a cylinder. You don't want the flower to be too long, so work only the very end of the blank (see photo, at right). Start at the outside edge and roll the first curl to the left for about 3/4" to 1". Then, pull up a second curl that just touches the first. Next, use a peeling approach with the long point of the skew to cut shallow steps that incrementally reduce the diameter of the material to the right of the curls. Leave plenty of material to complete the flower's center. Roll four or five short curls on each step. Then complete the flower by shaping its rounded center as a half-bead form, using a normal downhill move with the detail/spindle gouge.



For variations, try pulling the curls on a slight taper or on a slightly domed surface. As with the trees, pulling curls on these shapes requires working from smaller to larger diameters, the opposite of normal turning practice.

Another interesting variation is to insert contrasting wood for the flower's center. Drill out the center with a Jacobs style chuck in the tailstock, followed by inserting a short round section of the contrasting wood. Then finish the center as described earlier.

Create a brooch by gluing a pin or clasp to the back of a flower. Attach metal wires as stems to create a bouquet or place a single flower in a weed pot as a decorative item.

Make a Wooden Sled—the Old-Fashioned Way

An ideal project for working with green wood.

by Brad Holden

THIS LITTLE SLED is a perfect introduction to the age-old tradition of working green wood. Building it is a completely satisfying experience, from beginning to end: You start by cutting down a tree and end by playing with kids in the snow.

Along the way, you'll learn how to split wood along its grain, how to handle a drawknife, how to use a shaving horse, how to steam-bend wood and how to make copper rivets. That's a lot of new skills to learn in one project, but the sled is so small (it's sized for a toddler), and has so few parts, that you can easily afford to mess up now and then, pick up the pieces and keep moving on.

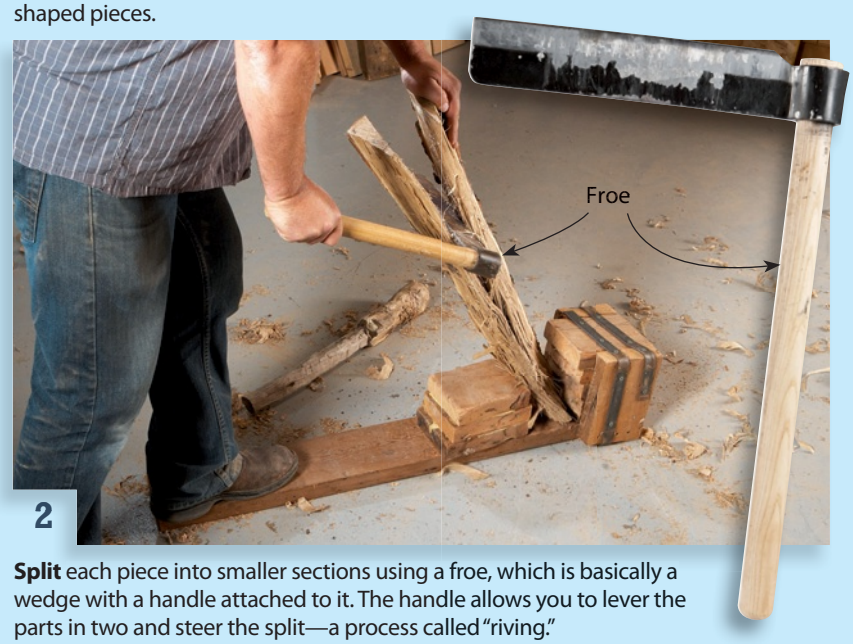
To be honest, I'm new to green woodworking. I started out by building a pair of snowshoes last year, and this was my second project. I still have a long ways to go to master the art, but this project advanced my craftsmanship and taught me a lot about how wood works.

You'll be shaping all the parts by hand, and that's probably what I like best about this sled. For once, the parts of a project don't have to be perfect. Their surfaces can be uneven, their sides can be square-ish and their lengths only have to be somewhat close to the given dimensions. Now, that's freedom! When you're done, your sled will look and feel truly handmade.

EDITOR: TOM CASPAR | PHOTOGRAPHY: JASON ZENTNER | ILLUSTRATION: FRANK ROHRBACH

1

Crack! I built this sled from an oak tree that grew on my family's farm. The first step is to split the wood while it's still green. Oak splits best along radial lines into pie-shaped pieces.



2

Split each piece into smaller sections using a froe, which is basically a wedge with a handle attached to it. The handle allows you to lever the parts in two and steer the split—a process called "riving."

3

Shape all of the sled's parts, while the wood is still green, using a hatchet, a drawknife and a spokeshave. Green wood is much easier to cut than dry wood. Use a shaving horse to hold the work.

Wood and tools

My source of wood was as local as it gets: a white oak tree that died several years ago on my family's farm. Its trunk was about 12" in diameter and quite straight, which is essential for "riving" straight parts.

Riving is a means of breaking down a log into smaller pieces, called billets, by splitting it along its grain. Riven wood is inherently strong and ideal for the thin pieces of this sled, which must be able to withstand a good deal of playful strain.

After cutting your tree into short sections, you'll need wedges, a sledge hammer, a froe and a wooden club to split them. To shape the wood, you'll need a hatchet, a drawknife and a spokeshave. I bought my tools at flea markets for very reasonable prices. You might have trouble finding an old froe and a drawknife in good shape, but these tools are still available new (see Sources, page 43).

You could build most of the parts of this sled from kiln-dried lumber, but there are two important points to consider with this approach. First, kiln-dried wood is much harder to split and shape with the hand tools I used than green wood. If you use kiln-dried wood, work with power tools instead.

Second, the curved pieces should be made in a different way. I'll be showing you how to steam-bend them, but this process generally works well with only freshly cut wood or, second best, lumber that has been air dried. (Air-dried wood has about 12% moisture content whereas kiln-dried wood has about 8%.) In my experience, kiln-dried lumber is prone to cracking when it's bent with steam. If you can't obtain green or air-dried wood, you can make the curved pieces using a bent-lamination technique: gluing and clamping a stack of thin pieces around a form. (See "The Metropolitan Console," page 44.)

Splitting and shaving

Split your log into halves, then quarters, then eighths (**Photo 1**). Determine which sections of the log to use for each of the sled's parts (see Cutting List, page

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40). Cut the sections to rough length, creating a small pile of billets.

Split the billets in half with a froe (**Photo 2**). A froe isn't sharp, like an axe; it's just a wedge with a right-angle handle. Start by scribing the desired split line using a hatchet and club. Drive the froe into the line with the club and start levering the billet in two. A "riving brake" is helpful here—it's just a device that will trap and hold the end of the billet. The brake needn't be fancy; I made one with 2x6 scraps and steel strap.

As the split increases, slide the froe deeper and apply more leverage. If the split drifts to one side or the other, you can alter its direction somewhat by levering the froe's handle towards the fatter side of the billet.

As you're riving, visualize—or draw on the end grain—the cross-sections of the parts, so you know when the billets are thin enough. When the billets are close to the finished dimensions of the parts, remove the bark, sapwood and point of the wedge using the hatchet or froe. As you gain experience, you'll find that it's best to cut the parts as close to final shape as possible using these tools, because they remove waste so fast.

Shape the billets into flat boards using a drawknife and a shaving horse (**Photo 3**). A shaving horse is one of the most efficient and pleasurable tools I've ever used. I could sit in the shade and make shavings all day if only someone would pay me for it! To turn the billet into a flat board, find the best side and shave off the high spots. A drawknife can be used bevel-side up or bevel-side down. You'll quickly find that bevel-side up is best for removing big chunks; bevel-side down is best for thinner shavings. Check often by eye to make sure the workpiece is reasonably flat. For this project, dead flat isn't necessary.

Turn the board over and shave the other side until the board is uniform in thickness. Use your fingers as calipers—you'll be surprised at how accurate they can be. After thicknessing, straighten one edge. A hatchet is often the way to

4

Steam the sled's back slats in a shop-made box, in preparation for bending. Green wood is much easier to bend than kiln-dried wood, particularly when it's split along the grain. These thin parts require only about 15 minutes of steaming.

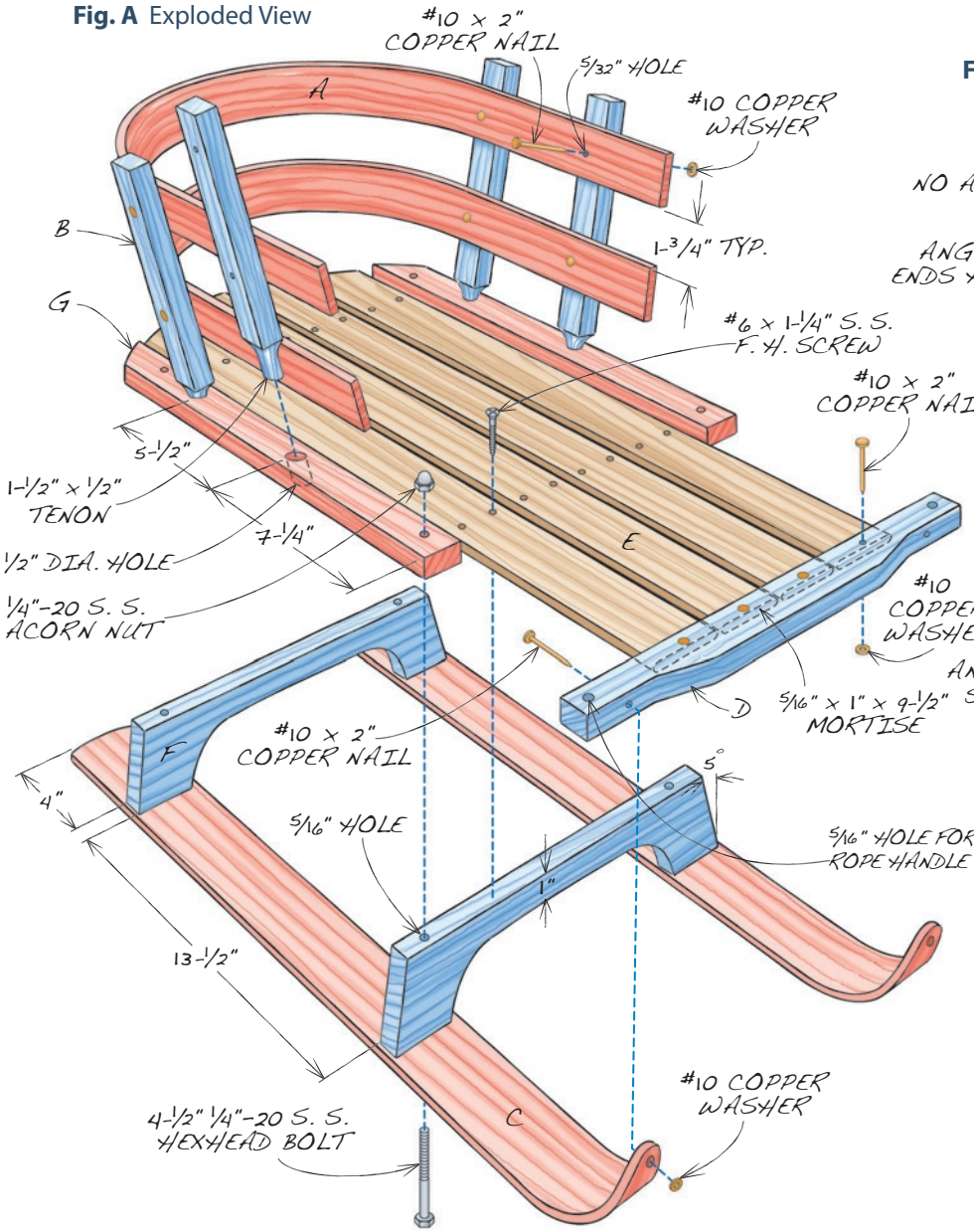
5

Bend each slat, while it's still hot, around a plywood form. You have to work fast—this Quick-Grip clamp allows you to squeeze the slat tight to the form in seconds.

Use a different form to bend the sled's runners. The slat's form had sloped sides, which gave the slats a slight twist; this form has square sides. Butt the ends of the runners against a stop block, which also holds them in place.

6

Fig. A Exploded View



NOTE:
S. S. = STAINLESS STEEL

Fig. B Slat Bending Form

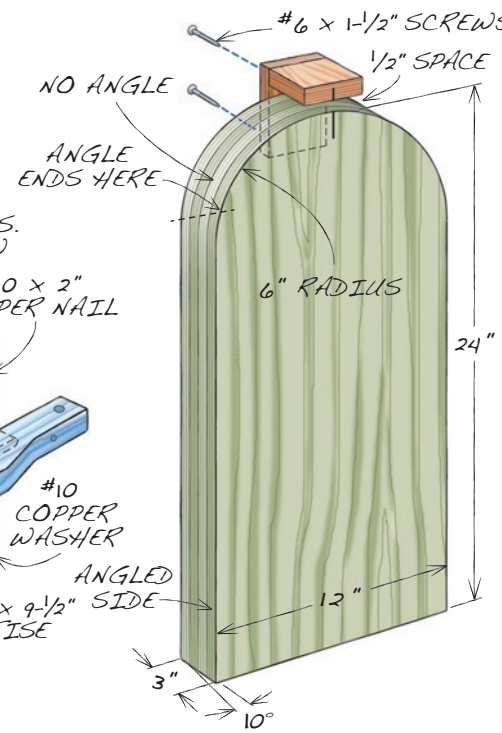
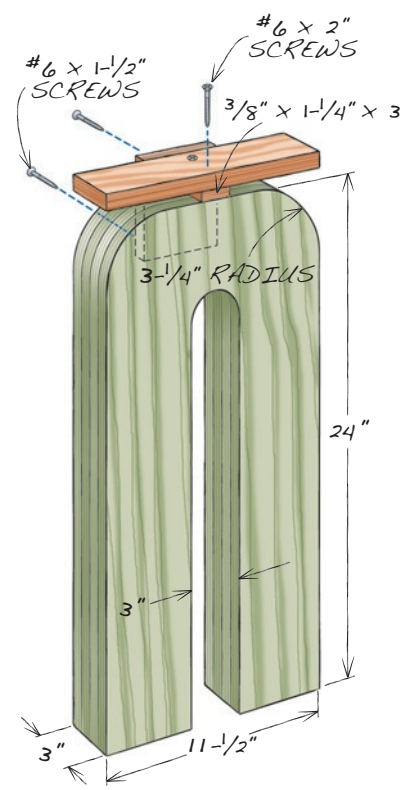


Fig. C Runner Bending Form



Cutting List

Overall Dimensions: 13-1/2" H x 15-1/2" W x 28-1/2" L

Part	Name	Qty.	Th x W x L
A	Back slat	2	5/16" x 2" x 42"
B	Post	4	1" x 1" x 10"(a)
C	Runner	2	3/8" x 2-1/2" x 31"(b)
D	Front rail	1	7/8" x 1-1/2" x 15-1/2"(c)
E	Seat slat	4	5/16" x 2" x 28"
F	Trestle	2	7/8" x 3" x 13-3/4"(d)
G	Side rail	2	7/8" x 1-1/2" x 18"

Notes:
a) Form 1/2" x 1-1/2" tenons on ends. Measure length from where shoulder starts.
b) Trim to length after bending.
c) Make 5/16" x 1" x 9-1/2" mortise for seat slat ends.
d) Angle ends at 5°.

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go here. With a little practice, you'll get good results, fast.

Once you've got one straight edge, rive, hew or shave the other edge to the finished width. The amount of material to be removed determines what tool you'll start with. If I have to remove more than 1", I'll start with the froe; from 1/2" to 1", the hatchet; 1/2" or less, the drawknife.

Steam bending

Bending wood with steam is an inordinately fun experience, like riving billets and riding a shaving horse. You'll need a shop-made box, a hose, an electric teapot or other device for making steam (see Sources) and two plywood bending forms—one for the slats and one for the runners (Figs. B and C).

Both forms have approximately the same radius, but there's a major difference between them. The form for bending the back slats (A) has sloped sides, giving the slats a twist. Notice that the sled's posts (B) lean outward, matching this twist. The form for bending the runners, on the other hand, has square sides. Build both forms by screwing and gluing four layers of 3/4" plywood. You'll need a bandsaw to cut them to final shape.

Steam the back slats, one at a time (**Photo 4**). First, mark each slat's center, so you can quickly center the piece on the form. Heat the water. Open the door from time to time; when steam flows out of it, place a slat in the box. Leave the slat in the box for 15-20 minutes.

Put on some gloves (a must!) to remove the slat from the box—it will be very hot. Work fast to bend the slat around the form (**Photo 5**). It's best to have a helper, but I worked alone using a 36" Quick-Grip clamp (see Sources). I have a new-style clamp, which has pivoting jaws—perfect for the form's sloped sides. For all other clamps, make two angled blocks to squeeze the slat flat to the form's sides. Leave the slat on the form at least twelve hours. Then clamp it onto a 12" long 2x4 to free up the form for the next slat. (Angle the ends of the 2x4, like the sides of the form.) Let both pieces dry at least two days before releasing the clamps.

Next, steam the runners (C). You can clamp both runners on this form, so steam them together. After about 25

7

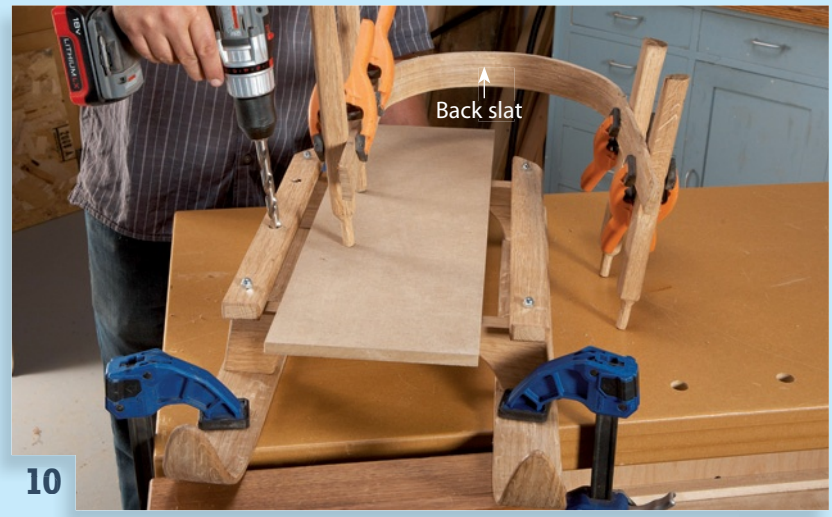
Form round tenons on the ends of the sled's posts using a drawknife. A shaving horse is ideal for this kind of job—it gives you plenty of room to maneuver the drawknife.

8

Drill through the side rails, trestles and runners using an extra-long bit. Clamp the parts to your bench to keep them aligned. Assemble the parts using a bolt and acorn nut.

Recess the bolt's head by scribing around it and chiseling out the waste. The top of the bolt should sit 1/8" below the surface.

9

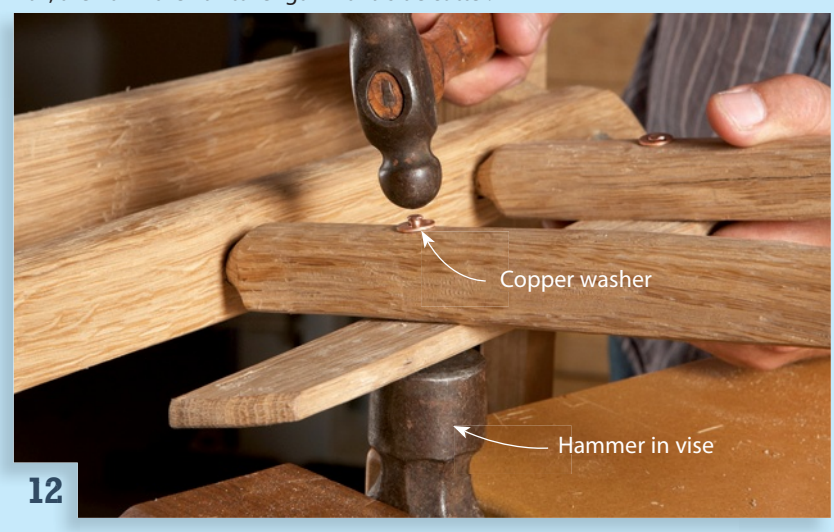


10

Drill angled holes in the side rails to receive the posts. Clamp the posts to one of the back slats to sight the correct angle.

11

Fasten the back slats to the posts with copper rivets. Drill through each post and slat and insert copper nails through the holes. Slip a copper washer over the end of each nail, then trim the nail to length with a side cutter.



12

Peen the cut end of the nail over the washer. Clamp a large hammer in your vise to use as an anvil. I used rivets here, rather than screws, because I like their rustic look.

minutes, remove one runner and shut the door of the steambox. Push the runner's tip into the form up to the stop block, bend and clamp (**Photo 6**). The stop block ensures that the bend will be the same length on both runners.

Seat slats and posts

While your steamed parts are drying, finish shaving other parts to final shape and size. Begin with the front rail (D). Note that it is mortised to receive the seat slats (E). Make the mortise before you shave down the ends of this piece. (I used a plunge router, but you could use a brace and bit to remove most of the waste and chop out the rest.)

Shave the seat slats to final thickness and width, making sure that their front ends fit into the mortise. Cut the back ends of these pieces so, when assembled, their outline follows the radius of the back slats.

Next, work on the posts. You'll be shaping 1/2" round tenons on their ends (**Photo 7**). This may seem difficult, but it's not. You just have to proceed in an orderly way. First, mark the tops of the tenon's shoulders. Start the drawknife on the mark, bevel-side down, and chamfer each corner. Make the same number of cuts on each corner until the tenon is octagonal. Continue chamfering more corners until the tenon is round. Check its final dimension with a block that has a 1/2" hole drilled in it. Round the outside surfaces of the posts, but leave an inside surface flat.

Assemble the base

Finish making the trestles (F) and side rails (G). Once the runners are fully cured, remove them from the bending form and clamp the side rails, trestles and runners to your bench in their assembled position. Drill straight down through the three pieces on one side of the sled (**Photo 8**). Unclamp the sled, run bolts through the holes and tighten hex nuts on the bolts. Repeat the procedure on the other side of the sled.

Recess the heads of the bolts into the runners (**Photo 9**). To do this, turn the sled upside-down and score a line around each bolt's head. Use a 1/4" chisel to chop out a recess deep enough to set each bolt's head 1/8" below the runner's surface. Use acorn nuts to fasten the bolts. (I used acorn nuts because they

have smooth surfaces; clothing won't tear on them.) Cut the bolts to the correct length and install them. Green wood will shrink a little within a year, so check the bolts now and then. You may have to shorten them in order to tighten the nuts after the wood shrinks.

Attach the back

The posts lean outward, following the angle of the back slats. This means that the holes for the posts in the side rails have to be angled, too. I found that the easiest way to sight this angle for drilling was to clamp all four posts to one of the back slats. I lined the drill bit up with the nearest post (**Photo 10**). Start with a 1/4" bit first—a smaller bit is easier to start at an angle. Follow up with a 1/2" bit and drill all the way through the rails. Epoxy the posts in the holes with their flat sides facing inward. Saw the ends of the tenons flush with the bottom of the rails after the glue dries.

Let's move on to the rivets that hold the back slats to the posts (see Sources). Clamp the bottom back slat to the posts, then drill holes through the posts and slat. After drilling each hole, replace the clamp with a copper nail (**Photo 11**). The nail keeps the slat in position.

When all the nails are in place, clamp a hammer in your bench's vise to use as an anvil. A large hammer with a smooth, slightly domed face is best. Balance the sled with the nail's head resting on the hammer's face, then slip a copper washer over the nail.

Clamp the post and slat together, then clip the nail with a side cutter, leaving just over 1/16" above the washer. Mushroom the end of the nail by lightly tapping it with a ball-peen hammer, forming a rivet (**Photo 12**). This is easy to do, because copper is quite soft. Once the rivet is pretty snug, tighten the joint by giving the end of the nail a few good whacks with the hammer's flat face. Repeat the process on the other rivets on the lower slat, then fasten the upper slat in the same manner.

Attach the seat

Insert two seat slats into the front rail's mortise, then clamp the front rail to the runners. Slide in the rest of the seat slats and space them evenly on the trestles.

13

Attach the seat slats to the trestles with stainless steel screws. Countersink the screws so their heads sit well below the surface. Snow pants won't catch on them.

14

Trim the ends of the posts and shape them however you wish. All the surfaces of this sled are shaped with a drawknife or a spokeshave, so it really has a handmade look!

Mark each slat's position on the front rail, then remove the whole slat/rail assembly and rivet the slats to the rail. Reposition the assembly on the sled and rivet the front rail to the runners. Check all the rivet heads and peen any raised edges.

Drill and countersink two screws through each seat slat into the trestles (**Photo 13**). My outer slats ended up slightly narrow, so I used only one screw to fasten them. Drill holes for rope in the front rail; chamfer the edges of the holes so they won't abrade the rope. Trim and shape the post ends (**Photo 14**).

I didn't sand any parts of my sled because I liked the look of their uneven surfaces. Apply an exterior finish if you wish, but plan on recoating it every few years. If you make your sled from a rot-resistant wood—like white oak—you can avoid that hassle altogether and leave it unfinished.

Now, where are those kids?

SOURCES

- Rockler Woodworking and Hardware, rockler.com, 800-279-4441, Steam Bending Kit and Plan, #42826, $75.
- Irwin Tools, irwin.com, 800-464-7946, XP600 Quick-Grip One Handed Bar Clamps/Spreaders, 36", #2021436N, $40 each.
- Lee Valley Tools, leevalley.com, 800-871-8158, Shingle and Riving Froe, #09A09.05, $39; Austrian Drawknife, #64K01.02, $44.
- Jamestown Distributors, jamestowndistributors.com, 800-497-0010, #10 x 2" Copper Slate Nails, $12.44/lb.; #10 Copper Burrs (washers), #NCB10OZ, $3/oz.

The Metropolitan Console

A perfect start for learning three basic woodworking skills.

by Mario Rodriguez

BACK IN THE '50s, traditional cabinetmakers in Scandinavian workshops produced sleek, powerful furniture using the latest materials and modest machines. This project pays homage to those exciting days of mid-century modern furniture.

I designed the Metropolitan Console to function as an end table or a nightstand. Its low profile, streamlined design and light color fits well in small rooms and tight spaces.

The cabinet is made from riftsawn red oak plywood. Its orderly, parallel lines are perfect for mid-century modern, which sought a clean break from the busy look of old-fashioned design.

EDITOR: TOM CASPAR | PHOTOGRAPHY: MARIO RODRIGUEZ | ILLUSTRATION: FRANK ROHRBACH

1

Cut the plywood parts for the console from one long sheet. Later on, you'll arrange the pieces in the same order so the grain flows seamlessly around the console.

2

Set up the saw to cut miters on the ends of the pieces. First, mark the thickness of the plywood on a sacrificial fence.

3

Tilt the blade 45° and raise it to cut a hair below this line. Adjust the fence so the teeth cut all the way into the fence.

4

Saw the plywood. The miters should have a knife edge that leaves each piece at its original length (see inset).

Prepare the plywood

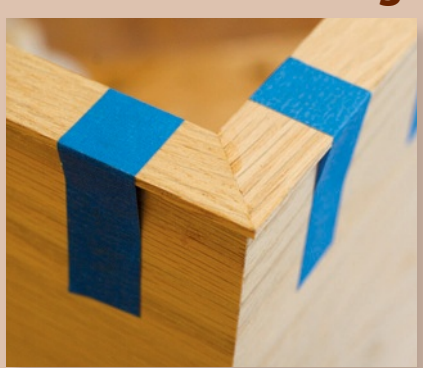
The case is a simple plywood box with a twist: The wood's grain runs seamlessly around the top and sides, as if it were wrapping paper. It's a neat trick.

The secret to pulling this off is to crosscut the sides (A), top and bottom (B) in consecutive order from one sheet of plywood. You'll miter the ends of each piece, then assemble them like a folded cardboard box (Fig. A, page 46).

Begin by cutting a long piece of plywood (Fig. B). (Cut another piece about 15" square from the same sheet for test cuts.) Draw crosscut lines as shown in the diagram. Write the name of each piece on its front edge, and, for insurance, draw a triangle and a circle across the side and top pieces. These marks will help you reassemble the pieces in the same order later on.

Here's how to make a minimum number of cuts, so

Building this project, you'll learn how to:



Make a plywood case with mitered corners …

glue up laminated legs …

and install a side-hung drawer.

Fig. A
Exploded View

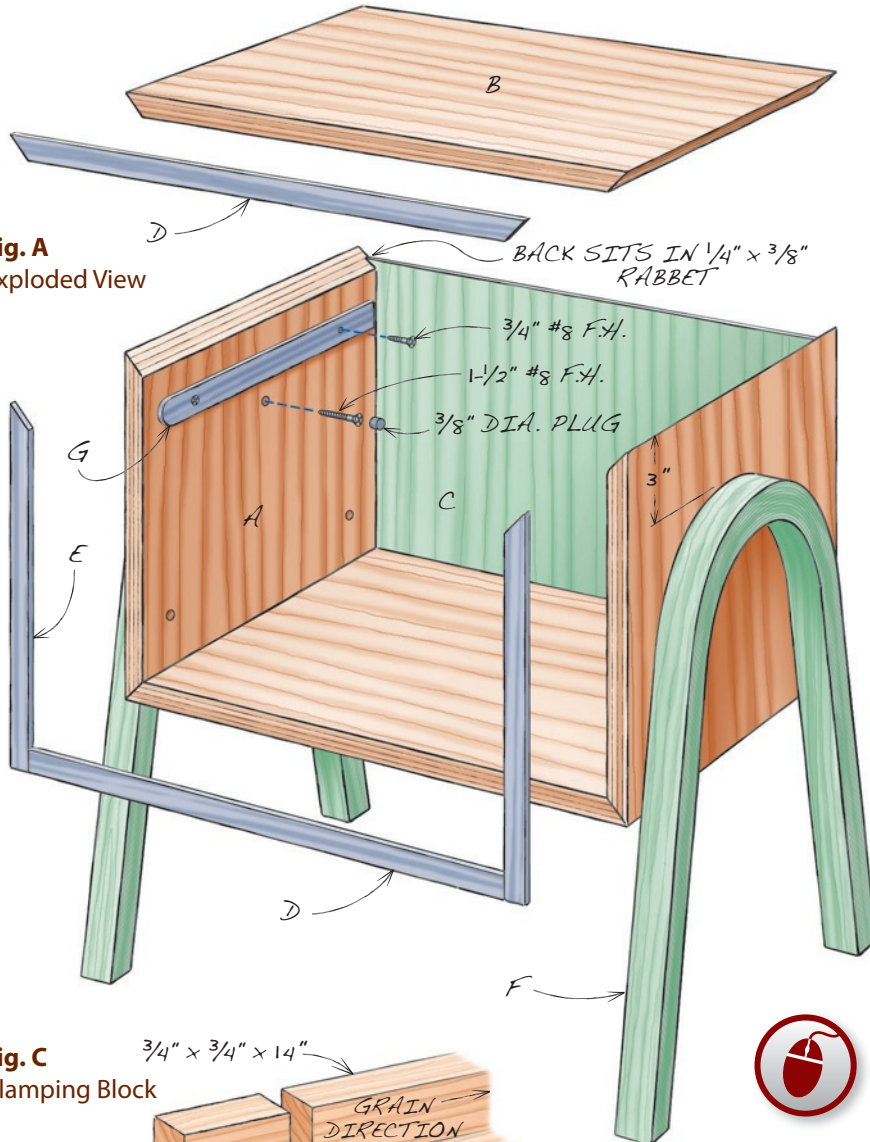


Fig. B Plywood Cutting Diagram

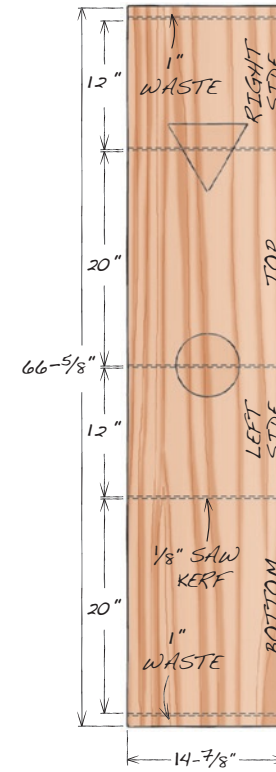
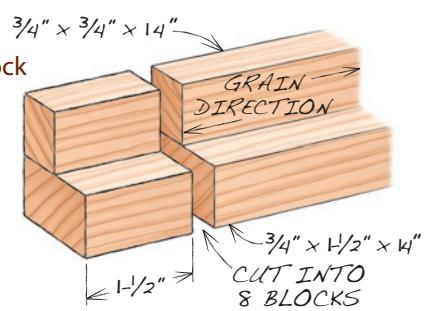


Fig. C
Clamping Block



See how taping miter joints makes assembly easier at **AmericanWoodworker.com/WebExtras**

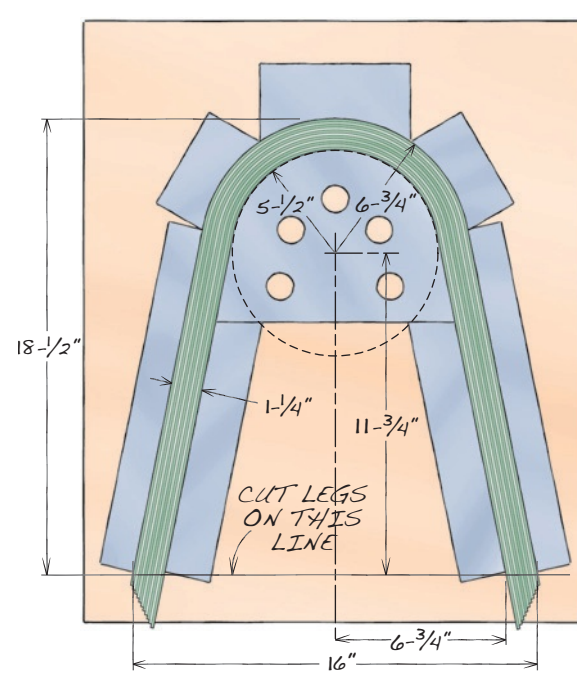
Cutting List

Overall Dimensions: 21-1/2" H x 22-1/2" W x 16" D

Part	Name	Qty.	Material	Th x W x L
A	Side	2	Oak plywood	3/4" x 14-7/8" x 12"
B	Top and bottom	2	Oak plywood	3/4" x 14-7/8" x 20"
C	Back	1	Oak plywood	1/4" x 19-1/4" x 11-1/4"
D	Long edging	2	Solid oak	1/8" x 13/16" x 21" (a)
E	Short edging	2	Solid oak	1/8" x 13/16" x 13" (a)
F	Leg	2	Laminated oak	1-1/4" x 1-1/4" x 18-1/2" (b)
G	Drawer guide	2	Yellow poplar	1/4" x 15/16" x 13"
H	Drawer front	1	Solid oak	3/4" x 3" x 18-1/4" (c)
J	Drawer back	1	Yellow poplar	7/16" x 2-1/4" x 17-7/8"
K	Drawer side	2	Yellow poplar	7/16" x 3" x 14-1/4"
L	Drawer bottom	1	Oak plywood	1/4" x 17-3/4" x 14"

Notes:
a) Cut length to fit; trim to final width after gluing to case.
b) The legs are made from 22 layers of 1/16" veneer, cut into 1-3/8" wide x 50" long strips.
c) The exact length is 1/4" shorter than the cabinet's opening.

Fig.D Bending Form



Glue the case together. You don't need clamps; I use nylon tent cord, which has some stretch, to apply pressure to the joints.

Glue 1/8" thick edging around the front of the case. Clamps aren't necessary here, either; tape provides adequate pressure.

Plane the edging until it's nearly flush with the plywood, then finish up with a scraper, file or sandpaper.

the grain matches as closely as possible from one piece to the next. Begin by cutting off the bottom piece, including the 1" waste shown on the bottom of the diagram. On the piece that remains, cut off the 1" waste shown on the top of the diagram. Cut off both side pieces using a stop block to ensure that they are the same length (**Photo 1**). The top piece will remain; trim the bottom piece to match the length of the top.

Cut a rabbet along the rear edges of all four pieces to receive the back (C).

Miter the plywood

Next, you'll cut miters on the end of each piece—without shortening its length. Set up the saw by clamping on a sacrificial fence. Draw a line on the fence indicating the precise thickness of your plywood (**Photo 2**).

If you cut each miter in one shot, the offcut will be trapped between the blade and fence. It might shoot back at you. I use a backer board to prevent this, but you could also batch all of the boards and nibble away at the miters in stages, raising the blade about 1/8" at a time. This method avoids creating offcuts; all the waste is reduced to dust.

Setting up the final cut is fussy (**Photo 3**). You'll only want to do this once, so each piece should be ready to go. Your goal is to cut a miter that leaves behind only a whisker of the board's original end (**Photo 4**). You'll probably need to make a number of test cuts to adjust the height of the blade and position of the fence. When you're set, it's a good idea to cut every end twice to make sure the mitered edges are straight. If your setup is correct, and that whisper of the original edge remains, you can't take off too much—no matter how many times you pass the edge over the blade.

Glue the case

I don't use splines to reinforce the miters; the joints are strong enough without them. I don't use clamps for the glue-up, either. Instead, I pull the assembly tight with stretchable nylon tent cord (**Photo 5**; see Sources, page 50). Blocks placed at all four corners help square the box and keep the cord from digging into the miters. Glue up and cut a set of these blocks before assembling the case (Fig. C).

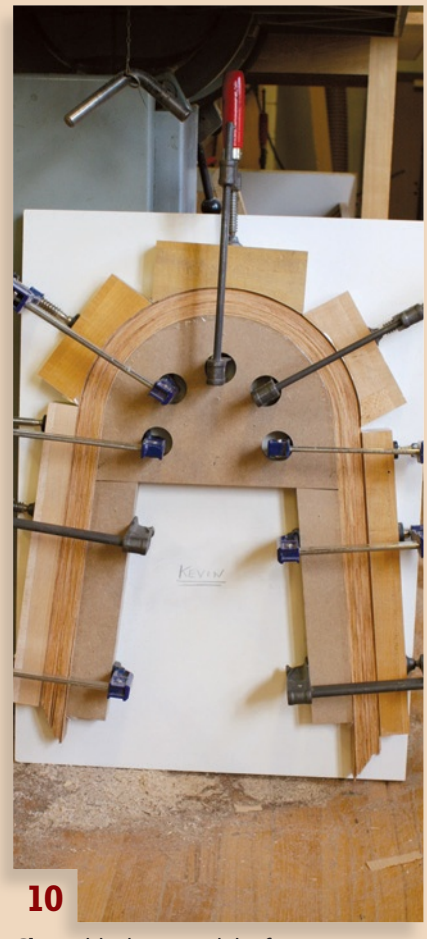
You'll probably want a helper to hold the case together while you position the blocks, pass the cord around them and knot it tight. If you're working alone, tape the joints together before you apply the glue. To do this, place all the parts face up on a long bench and butt them end-to-end. Stretch a half-dozen pieces of tape across each joint and flip the entire assembly over. Apply the glue, then fold the

8

Make the legs by gluing and stacking strips of 1/16" thick veneer. You have to work fast, so apply the glue with a roller.

9

Bend the stack of laminations around a form.



10

Clamp blocks around the form to squeeze the laminations together. This process creates a very stiff pair of legs.

pieces together and apply more tape across the last joint.

After tightening the cords, check the case to be sure it's square. You may have to nudge it one way or another to get it right. If any of the miters have small gaps, try closing them up by gently rubbing them with a burnisher or the round shaft of a screwdriver. Wait overnight to let the glue dry hard before continuing to work on the case.

Apply the edging

Saw 1/8" strips (D and E) to use as edging. Note that the edging isn't mitered at all four corners; the bottom corners are butt joints. Start with the long piece for the top. Miter both ends, apply glue and tape the piece to the plywood (**Photo 6**). Make sure the edging overhangs both sides. Miter the short pieces for the case's sides and glue them; finish up with the butted piece, along the case's bottom.

Remove the tape after 30 minutes or so, before the glue fully cures. Scrape off any squeeze-out with a putty knife. The next day, plane the edging close to the plywood (**Photo 7**). Level it flush with a scraper or sandpaper. (You could also use a flush-trim router bit for the whole process.) Use a file to level the inside corners; neither a plane nor a router will work here.

Laminate the legs

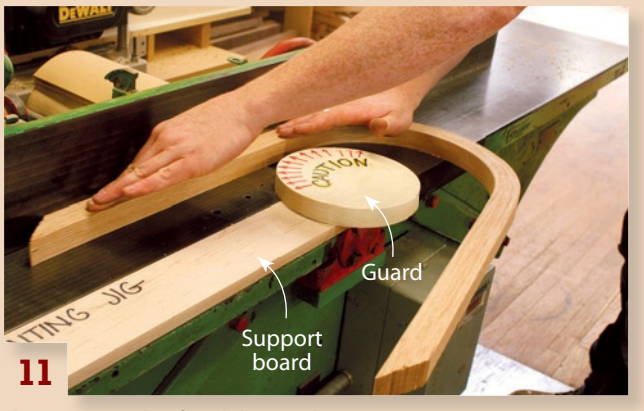
The legs are composed of 22 layers of 1/16" thick wood glued together. Rather than resaw all these pieces, make them from extra-thick quartersawn red oak veneer (see Sources). To rip the veneer, make a bundle of 10 or so pieces and cut them into 1-3/8" wide strips on the bandsaw.

You'll bend and clamp these strips around a form (Fig. D). Build the form from two layers of 3/4" MDF or plywood and screw the pieces to 3/4" melamine or plywood. Run packing tape around the form to keep glue from sticking to it. You'll also need to make three curved blocks to squeeze the laminations to the form. The radius of these blocks should exactly match the outside radius of the leg, as shown in the diagram. Put packing tape on these blocks, too.

It's a good idea to have help during the glue-up. One person can bend the laminations around the form, while the other can put the blocks in place and tighten the clamps.

The whole process starts by rolling a thin layer of yellow glue on one side of all the strips and piling them in a stack (**Photo 8**).

Place the stack on the form, centered on the arch (**Photo 9**). Clamp the middle curved block first, then work your way down both sides (**Photo 10**). Before clamping each section, you'll probably have to smack the laminations



11

Flatten one side of each leg on the jointer.

Safety caution: You must use a shop-made guard and a support board.

13

Cut the leg to length. Place the leg back on the gluing form to hold it in the correct position.

12

Rip the leg on the tablesaw. Newer saws have riving knives, which help prevent kickback when you can't use a standard guard.

Safety caution: You must use a tall fence and clamp a guard board to the saw.

14

Mount each leg to the case. Clamp a guide board to the leg to make sure it's even. Fasten the leg with screws.

a few times with a mallet to force them flush. Leave the laminations clamped in the form overnight.

Mount the legs

Your next task is to flatten one side of the legs. I'll show you how I use a jointer to do this (**Photo 11**), but I'd like to caution you that this method requires a steady hand and a special jig. You must always keep your fingers on top of the wood, never on the sides. Alternatively, you could use a plane or perhaps a belt sander to level both sides of the legs.

The jig consists of a support board and a round guard. The support board is clamped to the jointer's rabbeting ledge and widens the jointer's bed. The guard is elevated 1/16" above the support board to clear the knives and is fastened to it. Position the jointer's fence about 2" away from the guard. The guard's round shape allows you to flatten the entire side of a leg in one pass by rotating the leg as you go.

Rip the legs to final width on the tablesaw (**Photo 12**). This operation also takes a steady hand and an auxiliary guard. Position the end of the guard near the blade and clamp it to the top of your saw. Install a tall auxiliary fence to steady the leg as you cut. Raise the blade about 1-1/2" high, but no more. Push the leg straight through the saw, as shown in the photo, then turn the leg over, end for end, and repeat the operation. Plane the uncut portion, on the curve, by hand.

Use the bending form as a jig to cut the legs to length (**Photo 13**). To align the legs on the case, cut a board 9" wide and clamp it even to the ends of one of the legs (**Photo 14**). Center the leg on the case, then trace around it with a pencil. You'll be fastening the leg to the case with screws, from the inside (Fig. A). Remove the leg and mark where the screws will go on the outside of the case. Drill 1/8" pilot holes through the case, from the outside. On the inside of the case, counterbore these holes to receive wood plugs. Enlarge the pilot holes so your screws slip through.

Sand the entire case and both sets of legs. Clamp the legs back to the 9" board and fasten them to the case. Glue plugs on top of the screws and level them.

Add a drawer

The drawer runs on guides (G) that are screwed to the side of the case (Fig. F, page XX). On the drawing, note that there's a 1/8" gap between the drawer and the case, all around.

Mill the wood for the drawer front (H), back (J) and sides (K). Rip the front and back to final width. Trim the front exactly 1/4" less than the distance between the two

15

Fasten the drawer supports inside the case. Use a gauge block to position the supports.

16

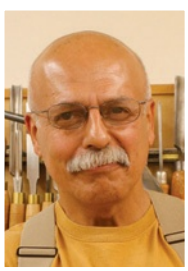
Slide in the drawer. The sides of the drawer ride against the drawer support, not the case. If the fit is too tight side to side, remove one support and plane it thinner.

sides of your case. Cut the sides to width and length, then rout half-blind dovetails to join the sides to the front (Fig. E). (I used a Porter-Cable 4210 jig, which spaces the dovetails 1" apart.) Rout grooves for the drawer bottom (L) in all three pieces. Cut dadoes across the rear ends of the sides to receive the back, then temporarily assemble the front and sides. Trim the back piece to the correct length and cut the bottom to size. Glue the drawer together. Rout stopped grooves in both sides of the drawer.

Make the drawer guides. Drill and countersink two holes in each guide for mounting them to the case. You'll need to make a gauge (Fig. G) for locating the guides. Fasten the guides to the case (**Photo 15**) and slide in the drawer (**Photo 16**). If the drawer fits too tight between the drawer supports, remove one support and plane it thinner. If the drawer is too loose, remove one support and substitute a thicker one. Add the back to the case and you're ready for finishing.

SOURCES

- Home Depot, homedepot.com, Everbilt 5/32" Diamond-Braid Poly Cord , 75 ft., $2.98.
- Certainly Wood, certainlywood.com, 716-655-0206, 1/16" quartered red oak veneer, #1/16 QT Oak 1102, $1.95 per sq. ft.



Mario Rodriguez has taught woodworking restoration in New York City, run a small school of his own in Warwick, NY, written two books and restored an 18th century farmhouse. He's now teaching at the Philadelphia Furniture Workshop, philadelphiafurnitureworkshop.org.

Fig. E Drawer

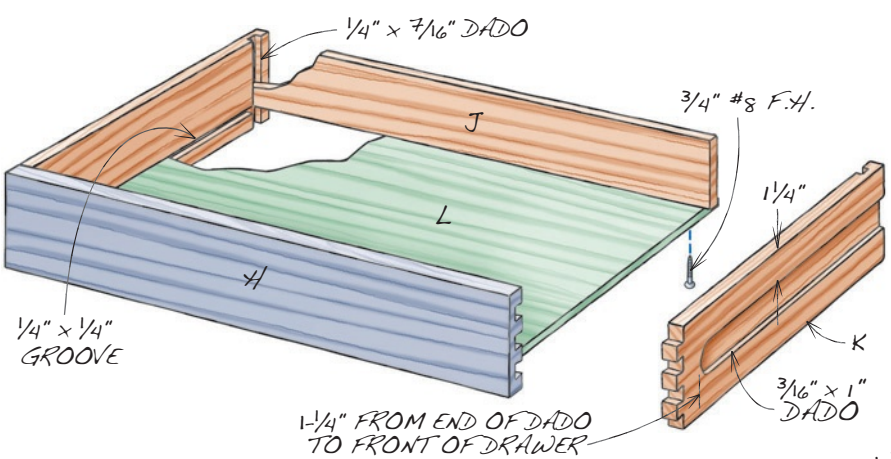


Fig. F Drawer and Case Cross Section

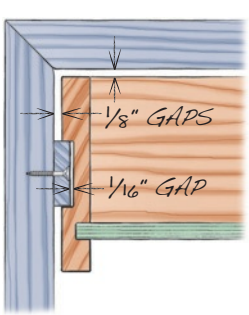
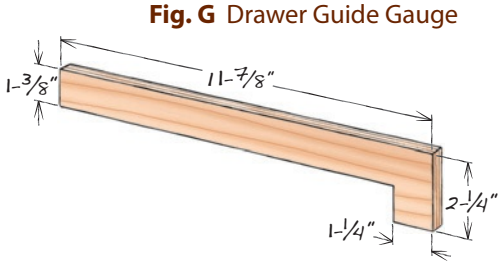


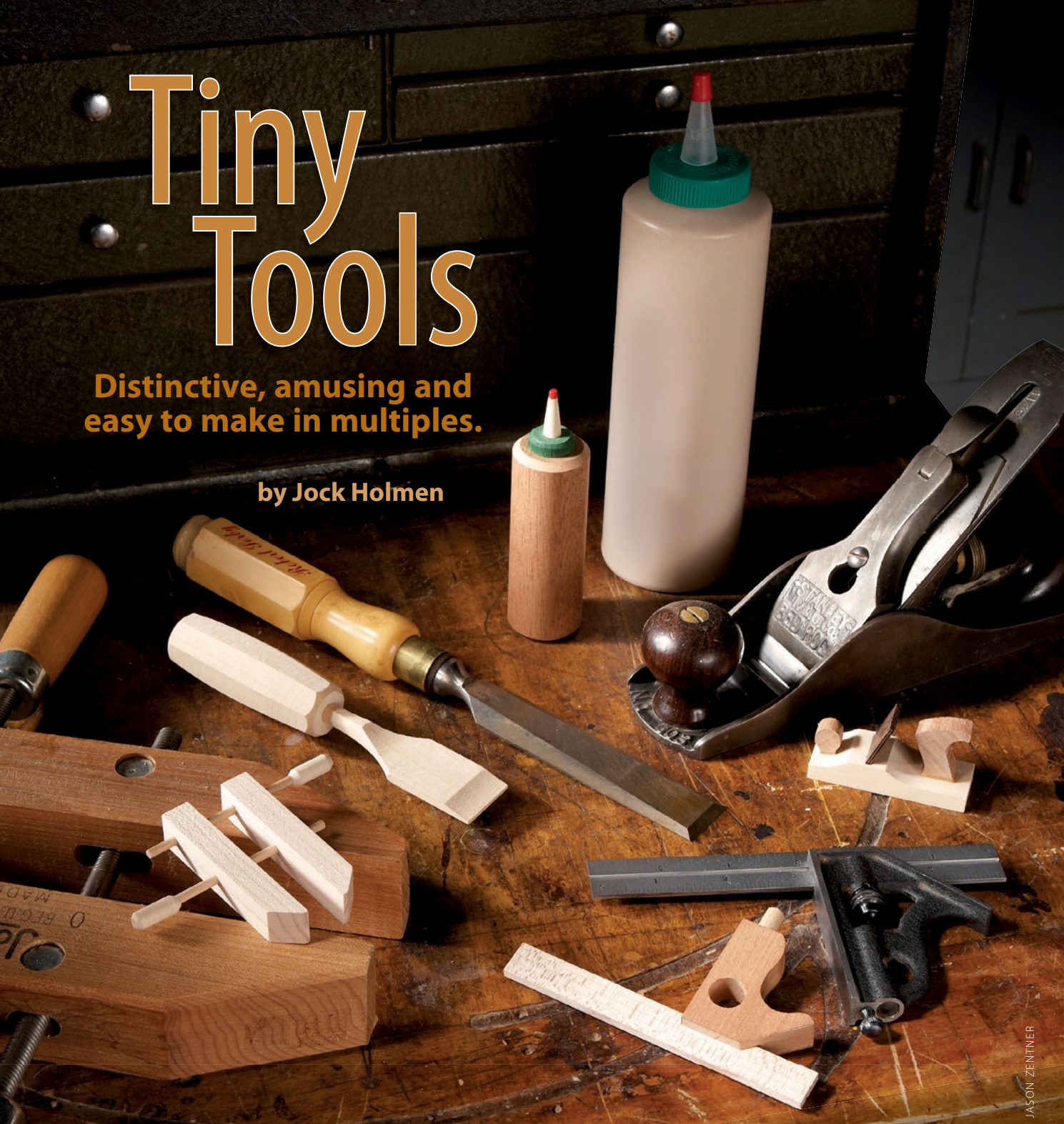
Fig. G Drawer Guide Gauge



Tiny Tools

Distinctive, amusing and easy to make in multiples.

by Jock Holmen



HERE'S A CLEVER WAY to give all your friends genuine handmade woodworking tools. The materials for these little gems cost next to nothing and they don't take long to make, because they're designed for producing in small production runs.

Working with small pieces can be tricky, so it's a good idea to follow the methods and use the jigs shown here. The same jigs and methods are used to make several of the tools, so the instructions are ordered to show each jig or method only once. That means if you decide to make the hand plane, you'll still have to read about the handscrew. So, you might as well make a batch of handscrews, too.

One more thing: It's easy to transform these tools into ornaments. A loop of ribbon is all you need for the handscrew and combination square; the chisel, hand plane and glue bottle may require drilling a hole. Be careful when you drill the glue bottle, so the glue doesn't drain out.

EDITOR: TIM JOHNSON | PHOTOGRAPHY: JASON ZENTNER

Handscrew

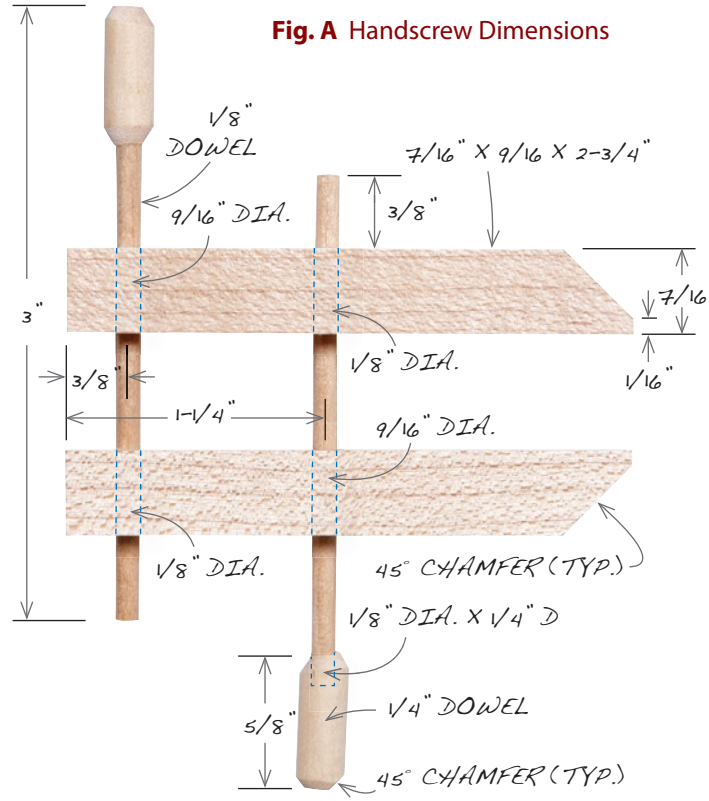
Jaws

1. Cut a 3/8" x 1/2" x 12" hard maple blank into 2-3/4" long jaws using a pull saw and a miter box (**Photo 1**; Fig. A). To make the miter box, cut a hardwood block at 90° and 45° and then glue the three pieces onto a hardwood base, using a piece of 1/4" MDF as a temporary fence and a spacer that's exactly the same thickness as the pull saw—such as a playing card—to create super-thin kerfs.
   - Start by cutting a 1" x 8-1/2" notch in the back of a 1-3/4" x 3-1/2" x 16" hardwood block. Then use a tablesaw or miter saw to cut the block at 45° and 90°.
   - Clamp or nail a 1/4" x 2-1/2" x 16" temporary fence on top of a 3/4" x 6" x 16" base, flush at the front. Position the first 90° block against the fence and fasten it to the base with glue and brad nails.
   - Position the second 90° block against the first, with the spacer in between to create the 90° kerf. Make sure the second block is flush against the fence; then fasten it. Repeat the process to install the remaining block and create the 45° kerf. Remove the fence and check to make sure the front faces of all three blocks are flush.
2. Use the pull saw and miter box to chamfer one end of each maple blank at 45°.
3. Drill centered 1/8" dia. and 9/16" dia. holes in opposite locations to create the top and bottom jaws.

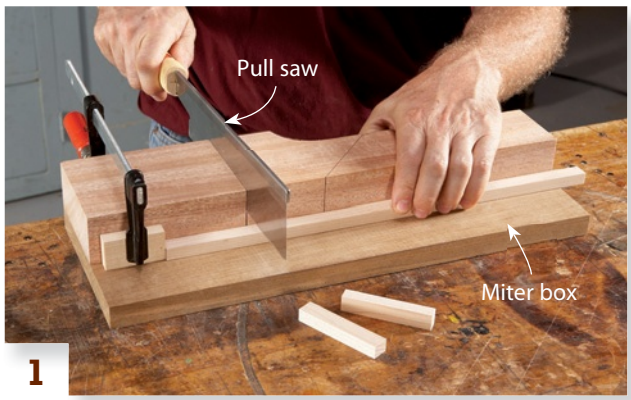
Handles

4. Chamfer the end of a 1/4" birch dowel freehand, using a disc sander.
5. Cut a 5/8" long handle from the chamfered end of the dowel, using the pull saw and miter box. Repeat the process to create a second handle.
6. Drill a 1/8" dia. x 1/4" deep hole in the chamfered end of each handle (**Photo 2**). Make a jig to hold the parts for drilling, by milling a pair of 3/8" x 3/8" sticks and chopping a shallow V-groove in each one. Glue one stick on a 1/2" x 5" x 12" base and fasten the other next to it with a screw at one end to form pincers.
7. Glue a 1/8" birch dowel into each handle to simulate its threaded shaft. Cut each assembly 3" long and then use the disc sander to chamfer the top end of each handle.
8. Clamp together the jaws. Then install each handle by passing it through the larger hole and pressing it through the 1/8" hole until it protrudes by 3/8". Gluing isn't necessary, but you may need a hammer to tap the dowels home. When both handles are installed, the handscrew will open and close.

Fig. A Handscrew Dimensions



Learn how to make real wooden handscrews at **AmericanWoodworker.com/WebExtras**



Cut blanks for the handscrews' jaws, using a pull saw and a shop-made miter box.

Drill a centered hole in the chamfered end of each handle, using a jig with a pincer and a brad point drill bit.

Glue Bottle

Fig. B Glue Bottle Dimensions

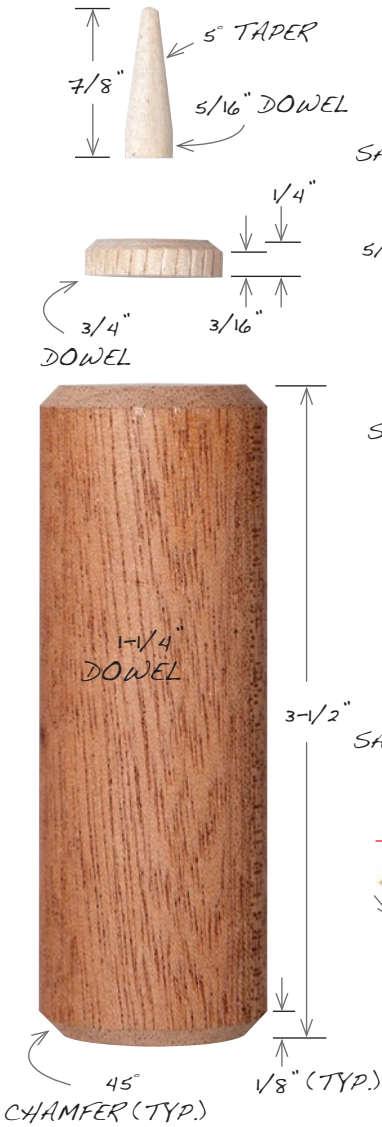
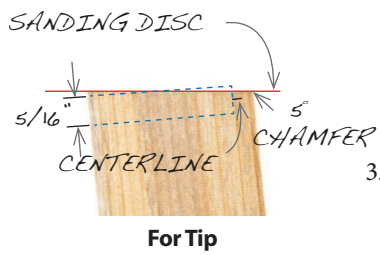
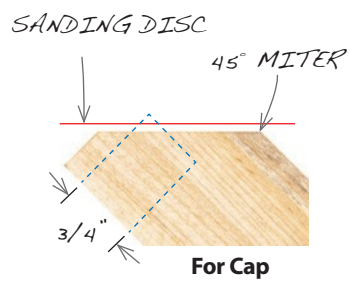


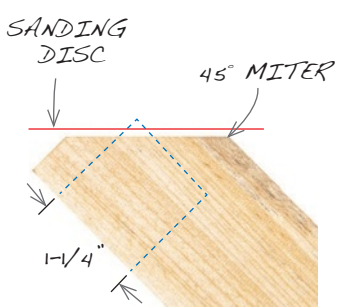
Fig. C Chamfering Jigs



For Tip



For Cap



For Bottle

Bottle

1. Cut a 1-1/4" mahogany or cherry dowel into 3-1/2" lengths (Fig. B) using the pull saw and miter box.
2. Chamfer both ends of the dowel, using a disc sander and a chamfering jig (**Photo 3**; Fig. C), To make the jig, drill a 1-1/4" dia. stopped hole near one end of a 1-3/4" x 1-3/4" x 12" block. Miter the end of the block at 45° to expose the corner of the dowel. Use a dowel that spins freely in the jig—dowel diameters aren't consistent, and 1-1/4" dowels are often undersize, so take the jig along when you shop for dowels and test-fit each one.
3. Clamp the jig to the sander with its mitered end parallel to the disc and spaced to create a 1/8" chamfer on the bottle. Make sure the disc rotates down toward the jig.

Cap

4. Chamfer the end of a 3/4" birch dowel using another jig. Then use the pull saw and miter box to cut off 1/4" thick slices.
5. Use a milled-tooth flat file and a board with a 1/4" wide x 5/8" deep groove to cut ribs into the edge of each cap (**Photo 4**; see Source, below). Insert the cap in the groove and run the file over its edge.
6. Glue the cap on the bottle.

Tip

7. Taper a 5/16" birch dowel using the disc sander and a third jig (**Photo 5**). This time, miter the jig's corner at 5°. Be sure to leave the center of the stopped hole, so the point of the dowel has a bearing surface on which to rotate while it's being tapered.
8. Cut off the dowel's tapered end to create the 7/8" long tip, using the pull saw and miter box. Glue the tip on the cap.

SOURCE

Lee Valley & Veritas, leevalley.com, 800-871-8158,
Milled-Tooth Flat File, 8", #62W14.02, $30.50.

3

Chamfer both ends of the bottle, using a disc sander and a shop-made chamfering jig.

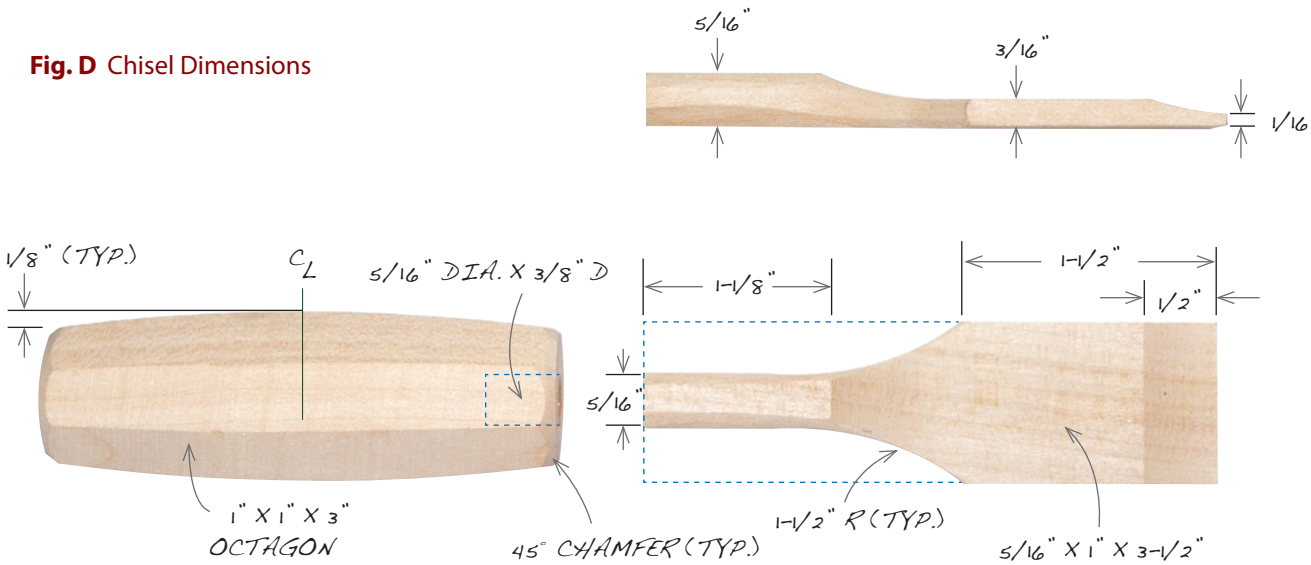
4

Cut ribs in the edge of the cap by rolling it one full revolution with a milled-tooth file.

5

Create the bottle's tip by tapering the end of a birch dowel, using a shop-made jig that creates a 5° taper.

Fig. D Chisel Dimensions



Handle

1. Create an octagon from a 1" x 1" x 12" basswood blank on the router table, using a chamfer bit.
2. Using the pull saw and miter box, cut a 3" long section from the blank to make the handle (Fig. D). Drill a centered 5/16" dia. x 3/8" deep hole in one end for the blade.
3. Create the handle's bowed shape on a disc sander (**Photo 6**). Draw guide lines 1/8" in from the edge on both ends of the blank. Then rock the handle on each facet to remove the waste.
4. Slightly chamfer both ends of the handle by rotating it while holding it at 45° to the sanding disc.

Blade

5. Create the blade by shaping a 5/16" x 1" x 3-1/2" basswood blank on an oscillating spindle sander outfitted with a 3" drum (**Photo 7**). Clamp a board with a 1/4" deep notch in position to sand the blank to the blade's 3/16" thickness and 2-3/8" length.
6. Shape the blade's bevel after moving the board closer, so it's only 1/16" from the drum. Don't use the stop; just sand until the bevel is 1/2" long.
7. Shape the blade's tang (**Photo 8**). Lay the blank flat and use a board with a 5/8" deep notch, positioned to remove 11/32", so one pass on each side will create the 5/16" square tang.
8. Chamfer the edges of the tang so you can press it into the hole in the handle, creating a tight fit that doesn't require glue.

Create the handle's bowed shape by rocking it from the center to the ends on each octagonal edge. Marks drawn on each end show how much to remove.

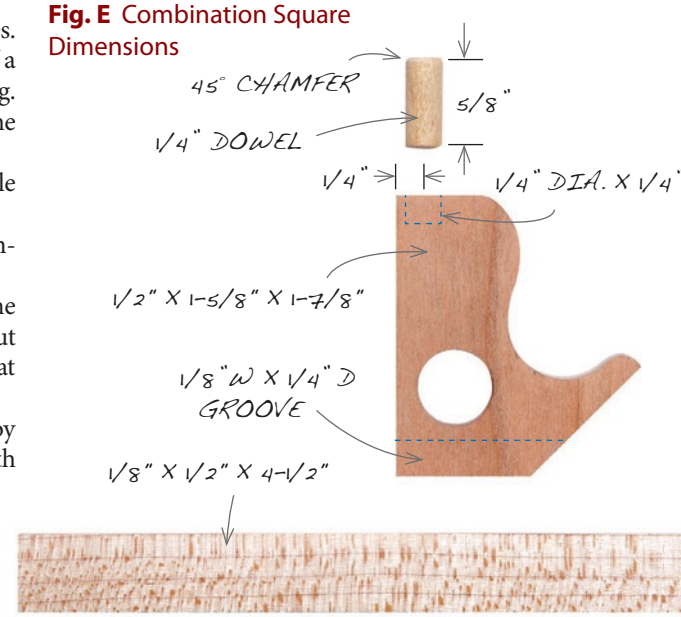
Shape the top of the blade, using an oscillating spindle sander and a notched board that acts as both a fence and a stop.

Lay the blank flat to shape the blade's square tang. Use a deeper notch and make one pass on each side.

Head

1. It's easiest to make the head profiles (Fig. E) in multiples. Rout or saw a 1/8" wide x 1/4" deep slot in one edge of a 1/2" x 1-7/8" x 12" cherry blank. Then use a pattern (Fig. F) to lay out several head profiles on the blank. Orient the heads so the slot is at the bottom.
2. Drill a 1/4" dia. x 1/4" deep hole in the top of each profile and a 1/2" dia. hole through each face.
3. Drill a 3/4" dia. hole through the blank to define the contoured profile of each head (**Photo 9**).
4. Use the pull saw and miter box to cut each head from the blank. Start by cutting the end profile's 45° edge. Then cut that head's 90° edge to separate it from the blank. Repeat the process to cut out each remaining head.
5. Remove the waste on the outside corner of each blank by making pull saw cuts into the drilled hole. Then smooth the contours, using an oscillating spindle sander. Keep your fingers out of harm's way by using a small handscrew to hold each head.

Fig. E Combination Square Dimensions



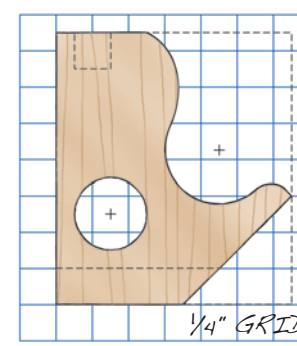
Ruler

6. Quartersawn hard maple makes the most realistic rulers, because its vertical figure simulates rule marks. Mill a 1/8" x 1/2" x 12" blank to snugly fit the combination heads' slots (**Photo 10**). Make an auxiliary bed that hooks over the planer's infeed table and extends onto its outfeed table to plane this super-thin stock. This bed shields the thin blank from the pressure exerted by the planer's feed rollers and cutterhead, so it doesn't flex and shatter. Be sure to orient the blank's grain direction properly during this operation and prepare extra blanks—even with an auxiliary bed, successfully planing super-thin stock is difficult.
7. Cut the milled blank to 4-1/2" lengths using the pull saw and miter box.
8. Press-fit the ruler into the handle. Gluing isn't necessary.

Adjustment Screw

9. Use a coarse double-cut flat file to roll texture onto the end of a 1/4" dowel (**Photo 11**).

Fig. F Head Pattern



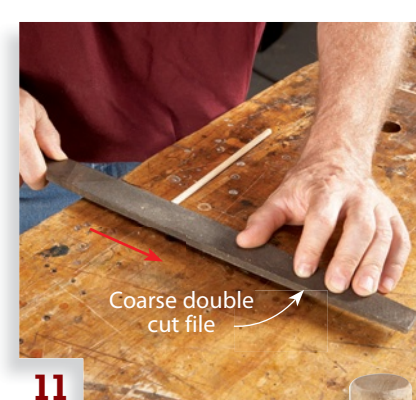
10. Cut the dowel to 5/8" lengths, using the pull saw and miter box. Chamfer the top of each piece and then glue the unchamfered bottom in the hole drilled in the handle.

9

Drill 3/4" dia. holes to define the heads' contoured profiles. It's easiest to make these small, complex parts in multiples.

10

Mill the blanks for the squares' rulers using an auxiliary bed that makes it possible to plane super-thin stock.



11

Roll texture onto the end of a 1/4" dowel. Then cut off the textured end to create the square's adjustment knob.

Pommel

1. Shape the pommel (Fig. G; Fig. H) on the router table, using a 3/8" x 3" x12" mahogany blank (**Photo 12**).
2. Round one edge, using a 3/16" roundover bit and the fence. Make two passes, one on each face.
3. Create the neck by making two passes using a 3/8" core box bit.
4. Rip the profiled section from the blank as a 1/2" x 12" offcut, using the tablesaw with the blade tilted 7°.
5. Cut the 5/16" wide pommels from the profiled section, using the pull saw and miter box.

Blade

6. Mill a 3/32" x 11/16" x 12" wenge blank, using the planer and auxiliary bed.
7. Cut the milled blank into 7/8" long blades, using the pull saw and miter box.

Handle

8. Transfer the handle profile (Fig. J) to the end of a 13/16" x 3" x 12" mahogany blank.
9. Cut the profile's two coves on the router table. Use a 3/8" core box bit to shape the partial cove at the base of the front. Make several passes to complete the cut, raising the bit incrementally to its final 1/4" height.
10. Use a 1/2" core box bit to shape the handle's back edge. As before, raise the bit incrementally to complete the cut.
11. Cut a groove to define the handle's top profile, using the tablesaw. Tilt the blade to 22-1/2°. Set the fence and cut the groove slightly outside the lined profile.
12. Rip the profiled section from the blank as an offcut.
13. Finish shaping the section with a block plane (**Photo 13**).
14. Cut the 5/16" wide handles using the pull saw and miter box.

Body

15. Cut a 1/2" x 7/8" x 12" basswood blank into 2-3/8" lengths, using the pull saw and miter box.
16. Shape the top of the body on a spindle sander, as shown earlier, using a notched board as a fence.
17. Cut a 3/16" deep x 3/4" wide notch for the blade at a 30° angle in the top face (**Photo 14**). Start by making a shallow 90° cut with the bevel facing the back end of the body. Then angle the blade 30° and make a second cut into the first to create a notch. Repeat these two cuts to deepen the notch.
18. Glue on the handle and pommel.Then glue the blade into the notch.

Fig. G Hand Plane Dimensions

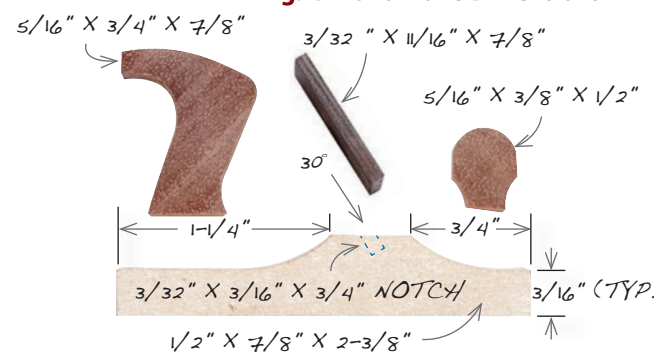


Fig. H Pommel

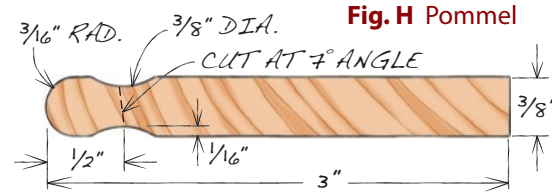
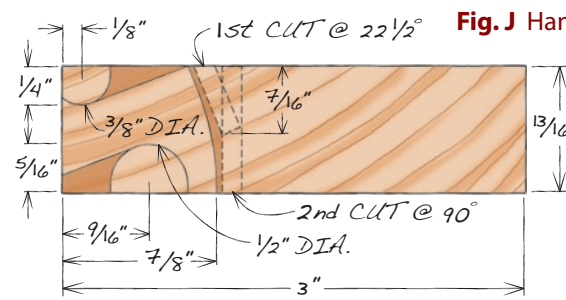


Fig. J Handle

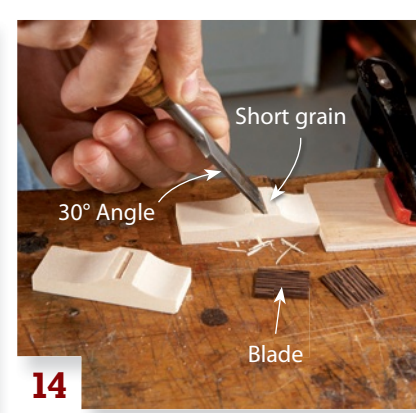


12

Shape the pommels on a wide blank. Use a roundover bit to shape the top and a core box bit to create the neck. Then rip the profiled section from the blank.

13

Use a block plane to finish shaping the handle section after machining it on a wide blank and then cutting it free.



14

Cut an angled notch for the blade in the body's raised center. Take care not to blow out the center's short-grained front edge .

How to Build a Tenoning Sled

A foolproof way to make a handy accessory for your tablesaw.

by Tom Caspar

PHOTOGRAPHY: JASON ZENTNER | ILLUSTRATION: FRANK ROHRBACH

WHENEVER I MAKE A RIGHT-ANGLE CUT on my tablesaw, I use a sled. If I'm cutting large panels, I use a big, deep sled. If I'm crosscutting rails or legs, I pull out a small, shallow sled. I use a third sled to cut tenons with a dado blade—it's small, too, but this one has a 3/4" wide slot cut into it.

Why rely so much on a sled? It's a no-brainer. Unlike using a miter gauge, you don't have to adjust anything. Once the sled is dialed in to make a perfect 90° cut (and I'll show you a foolproof way of doing this), you're set. Forever.

This precision is essential when you use a dado blade to cut tenons. You probably know the drill: First, you cut one face of a tenon, then flip the piece over and cut the second face. Each cut creates a shoulder, and both shoulders must be exactly parallel. You're in trouble if those cuts aren't precisely 90° because flipping the workpiece doubles any error in nailing that angle. When the stakes are this high, it makes sense to use the most accurate and reliable device on hand—a sled.

The directions I'll be giving you will work for a sled of any size, built for any purpose. You won't need any exotic materials. Before you begin, make sure that the blade and fence of your saw are perfectly parallel to the miter slots.

If your saw needs a tune-up, check out our method for aligning the blade at **AmericanWoodworker.com/WebExtras**

Make the runners

To make accurate crosscuts, a sled can't wiggle in your saw's miter slots. Its runners must fit the slots just so—if they're too tight, the sled will be hard to push; if they're too

Make the runners first. Cut them from a piece of 1/4" hardboard.

Adjust the setting of your rip fence until the runners precisely fit your saw's miter slots.

Place the runners in the miter slots, on top of 1/4" thick pieces of wood. Protect the saw's cast iron top with tape, then brush glue on the runners.

Glue the sled's base to the runners. Butt the base up to the saw's fence and apply weight directly over the runners.

loose, the slid will wiggle and the cut won't be straight. The difference between too tight and too loose is a few thousandths of an inch, so it pays to make the runners as carefully as possible.

I use 1/4" tempered hardboard (A; Fig. A, page 60). I made runners from solid wood years ago, but I've found that it expands and contracts too much in my Midwestern shop. Here, solid runners are too loose in winter and too tight in summer. Hardboard is much less susceptible to this problem. (Baltic birch plywood would work, too.)

Getting the perfect fit will require a number of trial and error cuts. You'll probably toss out a number of bum runners along the way, so it's best to start out with a large piece of hardboard. The runners for this sled are 15" long, so start with a piece that's 15" square.

Joint two opposing sides of the hardboard to make sure they're absolutely straight. If you don't have a jointer, you could tape a piece of 100 grit sandpaper to the top of your saw and use this to straighten the hardboard's edges.

To learn more about solid wood that's been engineered to stay flat—perfect for jigs—go to **AmericanWoodworker.com/WebExtras**

Before you start cutting, make a 15" long push stick with a hook on its rear end. This will keep your hands out of harm's way and prevent the hardboard from vibrating while it is sawn.

Install a crosscut blade in your saw (a combination or general purpose blade is OK, but the cut won't be as smooth). Set the fence 3/4" away from the blade and cut one runner (**Photo 1**). Test it in a miter slot (**Photo 2**). Adjust the fence as necessary and cut another runner from the other side of the board. Chances are that you won't get the width right quite yet, so here are a few rules to follow as you cut more pieces:

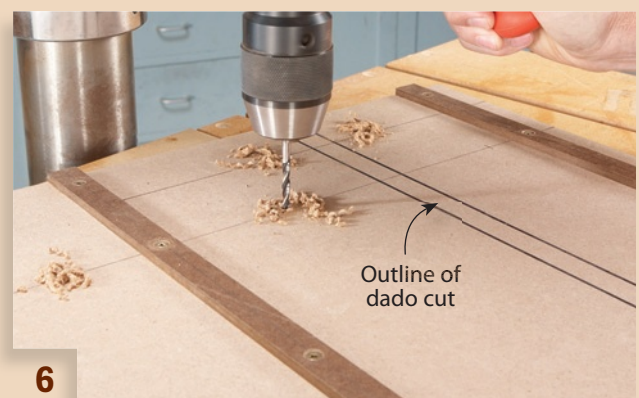
1) Discard the pieces that don't fit. Don't re-cut ones that are too tight.
2) Joint the blank each time before you saw.
3) If a runner is too tight in just one area, use sandpaper or a block plane to take down the high spot.

Prepare the base

Cut the base (B) to final size. Any plywood that's flat will do—I prefer MDF, which is sure to be flat. In addition, make some pieces of wood to place under the runners when you glue the runners to the base (**Photo 3**). These pieces should be thick enough to raise the runners about 1/16" above the saw's top. Place them in the miter slots, and put the runners on top.

5

After the glue dries, turn over the base and run a few short screws through the runners.



6

Drill holes through the base for fastening the sled's fence. Mark the base to indicate where the saw will cut through it later on. Don't drill any screw holes here!

7

Build the fence assembly. Make sure the pieces are flush at the top. Just use hand pressure—you don't need clamps, which can cause the pieces to slide up or down.

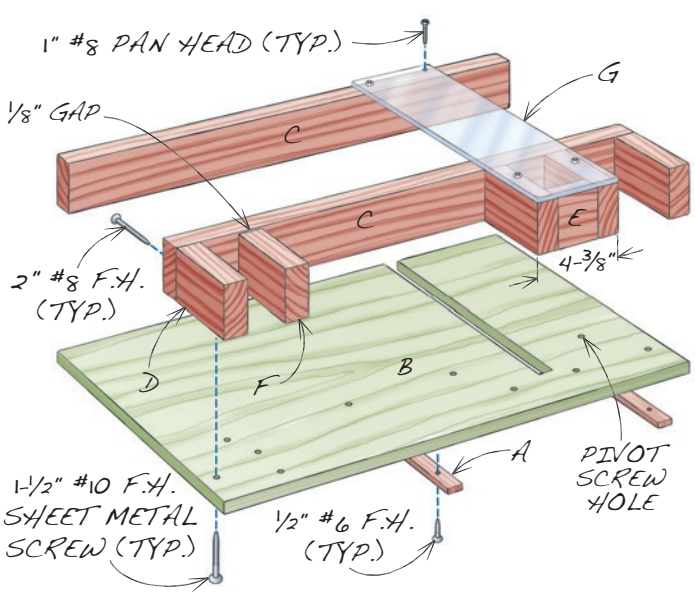
Brush a thin layer of glue on the runners, then position the saw's fence 1" from the right runner. Hold the base against the fence and lower the base onto the runners. Add weight directly above the runners (**Photo 4**).

After the glue dries, remove the assembly from the saw, turn it over and drill pilot holes through the runners. Add screws (**Photo 5**).

Place the assembly back on the saw and mark the base to indicate where a 3/4" wide dado set will cut through it. Draw this area on the bottom of the base, then lay out the holes for the screws that will be used to fasten the fence to the base (Fig. B). This drawing is just a guide; the distances between the miter slots and saw blade vary from saw to saw.

Predrill and countersink the screw holes (**Photo 6**). The diameter of these holes should exactly match the outside diameter of the screws you'll use. Basically, you'll want the screws to slip through the holes with no wobble. I use sheet metal screws because they're threaded down their whole length. (Wood screws have a shaft that's smaller in diameter than the threads.) Flip over the base and slightly countersink the top sides of the holes, too. This depression will catch any wood that mounds up around a screw when it's driven into the fence.

Fig. A Exploded View

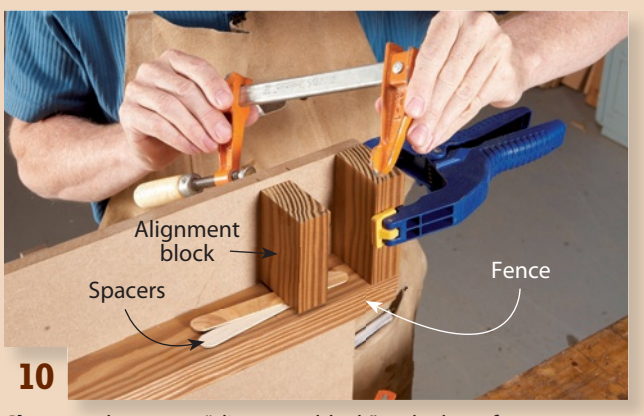


8

Add screws to the fence assembly, after the glue dries.

9

Fasten the fence assembly to the base with only one screw. This screw will allow the fence to rotate, like the head of a miter gauge, when you adjust it square to the saw blade.



10

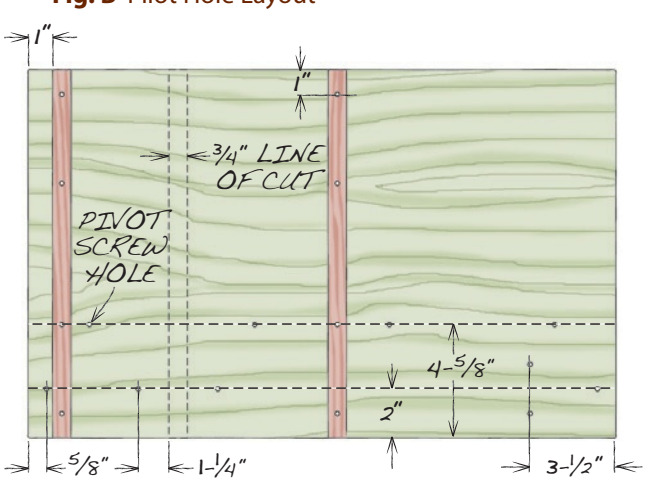
Clamp and screw an "alignment block" to the base for temporarily securing the fence. Place spacers under the block to create a 1/8" gap between the block and the fence. Remove the spacers after fastening the block.

Add the fence

Make the fence and back brace (C), and all the other parts that go on top of the sled (D, E and F), from well-seasoned, straight-grained wood that is free of knots.

Mill the wood to final thickness and width in stages over the course of a week or so; this is the best way to guarantee that it will stay straight and flat for years to come. You could also make these pieces by laminating solid wood (like a butcher block), or use Baltic birch plywood. Both of these alternatives will also ensure that your sled's parts stay straight and flat.

Fig. B Pilot Hole Layout



For this sled, I lucked into some wood that is exceptionally stable: thermally modified Douglas fir. In case you were wondering about its color, the wood turns chocolate-brown when it's dried in a super-hot kiln.

Cut all of the pieces to final length—save one, the short piece (E) that goes between two braces. Turn the base face up and mark the locations of the front braces on the fence (use the screw holes in the base as centerlines). Glue the braces (D) to the fence (**Photo 7**). This may seem weird, but I don't use clamps. Clamps can cause pieces to slip out of alignment, so I use hand pressure instead. I just brush glue on the ends of the braces, push them up tight against the fence until most of the glue squeezes out, then let go. The point of this method is to make sure that the braces and fence are flush, top and bottom. (If they aren't flush, the fence assembly may become twisted or out of square.)

After the glue dries, reinforce the joints with screws (**Photo 8**). Cut piece E to final length (it should be a tight fit) and glue it in place. (Don't use any screws here, however; your saw blade could accidentally hit them.) Glue the back brace (C) to the sled.

Clamp the fence assembly to the base (**Photo 9**). Drill

11

Place a few playing cards between the alignment block and the fence. Clamp a stop block to the back of the saw and make a test cut with a crosscut blade. Check the piece you've cut with a square.

12

Add or subtract playing cards to rotate the fence as needed. Continue making test cuts and adjusting the number of shims until the fence is square to the blade.

13

Add the rest of the screws through the base to lock the fence in place.

Cutting List

Overall Dimensions: 2-3/4" x 15" x 24"

Part	Name	Qty.	Material	Th x W x L
A	Runner	2	1/4" Hardboard	1/4" x 3/4" x 15"
B	Base	1	1/2" MDF	1/2" x 15" x 24"
C	Fence and back brace	2		1-1/8" x 2-1/4" x 24"
D	Front brace	4		1-1/8" x 2-1/4" x 4"
E	End	1		1-1/8" x 2-1/4" x 2-1/8"
F	Alignment block	1		1-1/8" x 2-1/4" x 3-1/2"
G	Shield	1	1/4" Plexiglass	1/4" x 4-3/8" x 15"

just one pilot hole—the one marked "Pivot Hole" in Fig. B. This hole, and all the other pilot holes you'll drill into the fence assembly later on, must be perfectly centered so that running in the screws doesn't shift the fence one way or another. I know this is picky, but it does matter. Your best bet is to start by using the same bit you used to drill the holes through the base. (It should be a twist bit, too—not a brad point.) Drill about 1/4" deep into the fence, then follow up with a smaller bit that matches the screw's root diameter. Install the pivot-hole screw.

Clamp and screw the alignment block (F) to the base (**Photo 10**). Note that there should be a gap approximately 1/8" wide between this piece and the fence. After the block is fastened, insert a stack of shims into the gap—I use playing cards—and clamp the fence to the block. Remove all other clamps and place the sled on your saw.

Align the fence

Before you make any cuts, clamp a stop block to the back of your saw, or to the saw's fence, to prevent your pushing the sled too far forward. You don't want the blade to cut all the way through the sled, where it will be exposed near your hands. The cut should stop about 1-1/2" shy of the short block (E) that spans the middle two braces.

Make a test cut with the sled using a crosscut blade (**Photo 11**). Check the cut with a precision square or use the "flip the board" method (see "Miter Gauge Geometry," Workshop Tips, page 10). The cut's accuracy will probably be off a bit, but that's easy to remedy. Just add or subtract a shim or two (**Photo 12**), reclamp the fence to the adjustment block and try again. This is a very precise method of adjustment, and foolproof as well. Take your time and get it right.

Once you're sure the fence is in the right position, remove the sled from the saw and drill the rest of the pilot holes for fastening the fence assembly (**Photo 13**). Run in the screws, then turn over the sled and add a plastic shield (G) over the path of the saw blade. The shield deflects dust and reminds you not to place your fingers near the blade. Round over all sharp corners and edges with coarse sandpaper. Install a dado set to widen the slot in the sled and you're good to go.

Finish the sled with a couple of coats of poly. (If you want to use a water-based finish, apply a coat of shellac first.) MDF can expand and contract with changes in humidity, causing the sled to bind. Sealing the MDF with a finish will minimize the amount that it moves. A finish will also help your sled glide easier on the saw. After the finish dries, scrape off any residue on the sides of the runners, so they fit perfectly again.

The New Legacy School of Woodworking

Restoring the balance between hand and machine woodworking.

by John Kelsey

OPENING THE NEW LEGACY SCHOOL of Woodworking in Greenwich, New York, marks another step in Paul Sellers' mission to release woodworkers from the tyranny of the machine. Make no mistake, this 62-year-old Briton has nothing against machine woodworking. "I use woodworking machines every day," he says. But Paul truly believes in the importance of maintaining a balance between using power tools and hand tools. Why? "Woodworkers who rely on machines for every procedure," he says, "rob themselves of woodworking's greatest pleasure—working with hand tools."

By offering courses and workshops to teach hand-tool woodworking, from basic skills to advanced techniques, Paul's New Legacy School seeks to restore that balance. He even has the perfect invitation for curious power tool devotees. "Think of hand tools as power tools," he says. "You're the motor. From the tips of your toes to the tips of your fingers, your body supplies the power."

An old idea

Paul advocates using machines for what they do best (preparing and dimensioning rough stock) and hand tools for what they do best (joinery, detailing, finishing and pretty much everything when making solid-wood furniture). This point of view—the basic perspective of the British Arts and Crafts movement and of the Craftsman movement in America—has been with us since the rise of woodworking machines early in the 20th century. Recently, however, it has been overwhelmed by an explosion of routers and other powered joinery tools and an avalanche of jig merchandising.

As an example, Paul refers to a recent magazine article that promised

EDITOR: TIM JOHNSON | PHOTOGRAPHY: COURTESY OF PAUL SELLERS

to cut in half the time you would spend making half-blind dovetails using an advanced router jig. "I tried it their way and it took an hour and three-quarters to set up the jig and cut the first joint," he says. "Then I tried it my way, with chisels and saws, and it took less than eight minutes." He quickly adds, "It's just not true that machines are faster for joinery, or that they can do a better job."

Great performances

Paul has dozens of similar stories, all told with the infectious enthusiasm that has helped him attract and teach 3,500 Americans over the past 20 years. He built this following by diligently appearing at The Woodworking Shows, weekend events that feature merchants and demonstrators in a state-fair atmosphere. In 2012 he participated in four of the shows, and in 2013, he plans to attend all 12. "It's been a very successful way of promoting our classes," he says. It's also grueling. Paul performs 10 times during each three-day show, and each demo is a chatty tour de force of efficient, effective hand-tool woodworking that he makes look effortless. He may raise a panel using a smoothing plane, saw a rabbet and plough a groove, chop a through mortise and tenon joint, or cut and fit a dovetailed corner without any measuring. Whatever the demo, Paul dazzles the crowd, and New Legacy School course registrations spike. "We're on a campaign to reintroduce these techniques to woodworkers and get them all fired up," he says with visionary zeal.

A master teacher

"I knew I wanted to be a woodworker by the time I was 14," Paul recalls. He was apprenticed to a craftsman who made shop fittings and household furniture. The apprenticeship lasted five years and Paul stayed on for five more years before setting out on his own. Along the way he developed the habit of studying furniture primarily through restoration work on genuine old pieces rather than from books. "I learned from the pieces on the workbench," he says, "and by taking a microscope to old tools to see how they were sharpened, and for what purposes."

"Everything I've learned is from my work, and a lot of what I teach is

The New Legacy School's three-part foundation course teaches basic hand woodworking skills. In each part, students learn to use the necessary tools to build a project designed around one or more essential joints.

Learning "at the bench" from a master craftsman is a hallmark of New Legacy School classes.

Wood shavings replace sawdust at the New Legacy School, and the workshop buzzes with energy rather than machine noise.

controversial, because it goes against what's become conventional wisdom," Paul says. "For example, we sharpen our chisels and planes with a continuously curved camber, not a hollow grind tipped by a micro-bevel." Why use such an old-fashioned method? "It's surprisingly simple," he replies. "The natural motion of your arms puts a long elliptical bevel on the tool with the exact geometry you want right at the cutting edge, and a lot more strength behind it. In the rush to modernity, we sometimes throw out the baby with the bath water."

Paul hardly pauses for breath, and it's easy to see why his students like him so much. "I still sharpen all the saws for school and teach the students how to do it by hand. On saws, we do use a micro-bevel—it's very fast to do." Micro-bevel? On handsaws? You'll have to take Paul's courses to find out.

Paul began teaching in 1989, after migrating from England to Texas in 1987 to start his own furniture making business. "It all started by accident at the Texas Arts and Crafts Foundation," he says. "I developed a three-day class where the students learned three basic joints using ten basic hand tools."

You can get a good sense of Paul's approach from the three joints (housed dado, through dovetail, mortise and tenon) and the ten tools (tape measure, combination square, layout knife, tenon saw, chisel, chisel hammer, marking gauge, mortise gauge, router plane and smoothing plane). "You really don't need much more for projects of any complexity," Paul says.

Paul's time in Texas turned out to be the incubator for his mission. "I could only teach a handful of students at a time and I had no curricular materials, so I started to write my first book and make my first DVDs," he explains. Several years ago, Paul moved to northern Wales, UK, to start the New Legacy program at Penrhyn Castle. The New York school began to take shape in 2011, with classes starting in January 2012. By the summer's end, Paul had taught eight three-day weekend courses and one four-week intensive course. "We had to add extra classes to meet the demand," he notes.

During a month-long summer workshop, New Legacy students build a dovetailed chest, a coffee table and a rocking chair. "People who have only had machines don't believe they can do this," founder Paul Sellers says. "But they discover they can."

Paul Sellers builds every project along with his students. "It encourages a congenial atmosphere," he says, "and I'm always well ahead, so I can stop and coach them individually."

The lure of craftmanship

In fact, there's nothing magical about Paul's approach to woodworking. He teaches the standard, time-tested methods of British-trained craftsmen, with a few idiosyncrasies perhaps characteristic of his native English Midlands. For example, he chops mortises with a regular bevel-edge chisel and not a straight-sided mortise chisel, which he says is too heavy. He holds the workpiece in the vise, where others would plant it on the bench top. But whatever the tradition, you only have only to watch Paul caress the wood with his tenon saw to witness the skill of a true craftsman. He doesn't think about it, he just does it, as easy as breathing.

That confident ease is the charm. It's what many amateur woodworkers crave, and what Paul promises to deliver. "The New Legacy School caters to a new genre of woodworker," he says. "Rather than learning a trade to make

a living, our students study hand-tool woodworking to experience the satisfaction that comes from mastering the craft. I measure my success by helping these people become true craftsmen."

The school's three-part foundation course breaks down hand-tool woodworking into short lists of basic techniques executed with a few basic tools. Each three-day session revolves around a project: students build a dovetailed Shaker candle box in part 1, a Craftsman-style bookshelf in part 2 and a small chair-side table in part 3. Tuition ranges from $335 to $385 per session.

For those who seek more advanced and intensive hand-tool instruction, the school offers a month-long summer workshop during which students build three projects: a dovetailed tool chest, a Craftsman-style rocking chair and an oak coffee table. "People who have only had machines don't believe they can do this, but they quickly discover that they can." Paul says. "I like Jim Krenov's slow approach to woodworking. Many students join our four-week course with no skills at all and they successfully build all three projects. It's amazing."

Spreading the gospel

A new series of DVDs "will cover the complete course that I teach," Paul says. He also plans to offer videos of actual classes on his website. With curricular materials in hand, and with teaching facilities established in upstate New York in a new, light-filled timber-frame building, and in northern Wales in an ancient castle, Paul is on a roll. By the end of 2013 he plans to establish a third campus in California, and he says there's interest in bringing his program to countries as diverse as Nigeria and Argentina.

Paul plans to make his New Legacy concept totally portable, so he can work with other organizations, guilds, and universities to bring his courses anywhere in the world. "They provide the facility, we bring the benches, tools and equipment. My goal is to go into a region, start the program and then have students I train take over the courses and continue to teach while I go on to plant the seeds elsewhere. We don't want it to be location specific. We can teach these courses wherever there is interest."

"I don't do it for the money," Paul reflects. "I'd be just as happy making furniture and I'd probably earn more. I do it because I've been given a gift and I want to give it back. How do we keep the best of the past, marry it with the present and preserve it for the future? That's what the New Legacy School is all about."

John Kelsey is a woodworker and writer living in Lancaster, PA.

Learn more about the New Legacy School at **newlegacywoodworking.com**.

Paul Sellers' Artisan Collection Books and DVDs are available at **awbookstore.com**.

Get a taste of Paul Sellers' engaging and informative teaching style at **AmericanWoodworker.com/WebExtras**

The New Legacy School caters to a new genre of woodworker, according to Paul. "Rather than learning a trade, our students study hand-tool woodworking to experience the satisfaction that comes from mastering the craft."

10 Tips for Working with End Grain

It burns and chips. It's hard to smooth and turns dark under a finish. Here are some practical solutions to all of these problems.

by Tom Caspar

Scraping is Quicker than Sanding

No matter what grit sandpaper you use on end grain, there's one hand tool that can get the job done faster: the No. 80 scraper.

The No. 80 is a very simple tool. Although it looks like an oversized spokeshave, it's completely different. It cuts like a scraper, with the blade leaning forward. The depth of cut is regulated by a thumbscrew, which springs the blade into a curve.

Although you can also use a plain card scraper on end grain, a No. 80 has three big advantages:

- It has a 2-3/4" long sole to guide the blade and prevent it from digging in. You can inadvertently make a ripply surface with a card scraper because it's not guided by a sole.
- Your hands won't get scorched, because they don't touch the blade. As you may know, a scraper blade can get very hot!
- Holding the tool's gull-wing handles, your hands are in a better position to push harder, and cut deeper, in order to remove larger shavings.

The harder the wood, the better this tool works. For softer woods, such as pine and basswood, use a low-angle block plane or a bevel-up plane. These woods fuzz up when you try to scrape them.

After scraping with the No. 80, go directly to 150 grit or 180 grit sandpaper. Once you've learned how to sharpen and handle the No. 80, smoothing end grain will still be a chore, but you'll be done much sooner.

To learn how to sharpen and use a No. 80 scraper, go to **AmericanWoodworker.com/WebExtras**

SOURCE

Lee Valley, leevalley.com, 800-871-8158, Veritas Cabinet Scraper, 05P32.05, $59.

PHOTOGRAPHY: JASON ZENTNER

Take Small Bites

You've seen "Maintain Speed" signs on highways and in tunnels, right? Well, you might as well have one posted on your router, too. If you slow way down or stop while routing end grain, there's a good chance the bit will burn the wood.

Some species of wood are more prone to this problem than others. Cherry—one of our premier hardwoods—is notoriously susceptible to burning.

By maintaining speed, I don't mean that you have to move your router at a fast clip. Slow and steady is fine—but not too slow.

The best way to maintain a steady rate of feed is to avoid hogging off too much wood in one pass. Rather than rout a full profile in a single pass, take it in stages. If you're using a handheld router and a bit with a bearing, adjust the height of the bit so your first pass doesn't take off too much wood.

Rout all the way around your workpiece, then lower the bit 1/32" or 1/16". Rout all the way around again and repeat the procedure until you're within 1/64" or so of the full profile. Make the final adjustment and take a light cut all around. Spending a little more time routing will save a lot of time sanding.

Start With 80 Grit

Shift mental gears when it comes to sanding end grain. It's tougher to cut than side grain—and the marks left in it by a saw blade usually run deeper—so it's best to start out with coarse 80 grit paper.

Once the machining marks are gone, switch to 100 grit, then move on to 120 grit. You may have to sand with even finer paper for the stain or finish you'll be applying, but the point is to avoid the temptation of skipping grits. Coarse paper leaves pretty deep scratches, and you don't want to leave a few of those behind. It's best to go up the grit ladder one rung at a time.

Back Up A Rail

When you're making a door or frame with cope and stick router bits, you have to rout all the way across both ends of each rail. The simplest way to prevent tearout—and to steady the workpiece—is to clamp a large piece of hardwood to the rail.

This piece should be milled perfectly flat and square. (Here's a reason for hanging on to the offcuts of wide boards!) You can re-use it over and over for the same set of rails; when you're done, cut off the end you've routed into and set the board aside, ready for the next project.

Check Blade Alignment

Do you get burn marks when you crosscut a board? If so, your blade may be dull, you may be feeding too slow or—keep your fingers crossed that this ain't so—your blade may not be parallel with the saw's miter slots.

If your blade is out of parallel, the sides of the blade's teeth or the body of the blade itself will rub against the end grain. This creates friction and heat, resulting in burn marks that are very hard to remove.

To check your blade's alignment, you'll need a combination square and a piece of notebook paper. First, unplug your saw, then raise the blade to full height. Place the square in one of the miter slots, holding its base tight against the side of the slot. Adjust the square so that the end of the rule touches the body of the blade—it doesn't matter if this is the front or back of the blade. Don't tighten the rule.

Slide the rule back and forth along the miter slot a few times and watch what happens. If you see a gap open up between the end of the rule and the blade, then the blade isn't parallel to the miter slot. (If you don't see any gaps, then your alignment is OK.)

Should you see a gap, the next step is to check its size. Use a piece of notebook paper (or, ideally, a feeler gauge). This paper is about .003" thick—if the gap is larger than this, your saw definitely needs to be re-aligned. (Refer to your saw's manual for instructions.) If the gap is less than .003", the next step depends on what kind of saw you have. If it's a cabinet saw, proceed with the re-alignment. If it's a contractors saw or a hybrid saw, leave well enough alone. While not impossible, it's very difficult to align this type of saw to a tolerance of less than .003".

Learn how to align your tablesaw at **AmericanWoodworker.com/WebExtras**

Seal with Waterproof Glue

Where does outdoor furniture rot first? On the end grain, of course, since its thirsty nature makes it the perfect breeding ground for fungi. Every area of exposed end grain is susceptible to rot, but the ends of legs have it the worst.

The best way to prevent legs from rotting is to seal their ends with glue. Epoxy works well, but new waterproof glues, such as Titebond III, are easier to use and clean up. Dribble a puddle of glue on the end of each leg, let the glue soak in for five minutes or so, then wipe off the excess. Repeat the procedure in an hour, and your legs will last much longer.

Brush End Grain First

Make a habit of applying finish to end grain first. Why? It's all about avoiding drip shadows.

Sounds creepy, doesn't it? Here's the deal: Let's say you're finishing a top. You're merrily brushing the first coat of finish back and forth on the top's surface, and some finish happens to drip down an edge, which you haven't gotten to yet. If this edge is end grain, the finish will soak into the wood quite fast. If you don't wipe off the drip right away, the finish that soaks in will darken that area. After you finish the entire edge, the original drip will still be visible as a dark shadow.

If you finish the end grain first, drips aren't a problem, because they won't soak in.

Shellac Lightens End Grain

End grain is thirsty stuff. It soaks up water, oil and varnish much faster than side grain. When you're applying a finish, it may soak up so much material that the surface turns quite dark.

In some cases, such as the end of through tenons or the ends of a dovetailed drawer front, that may not be such a bad thing. Contrast is good. But it's not desirable on the ends of a top, so it's often a good idea to seal the end grain first before applying a finish—particularly an oil finish.

The easiest sealer to use is shellac. You don't need a very thick coat. If you're using shellac from a can, mix a small batch with an equal amount of denatured alcohol. Apply the shellac with a small brush, but only on the end grain.

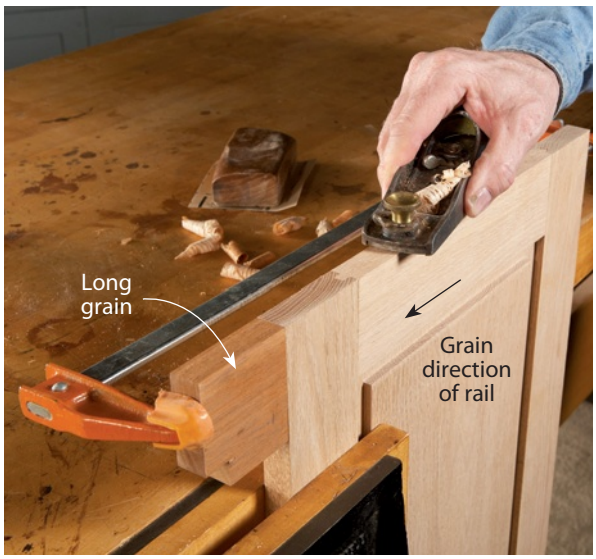
In the photo above, you can clearly see the difference shellac can make. Some finishes won't require this extra step, though—it's best to experiment on scrap first to see if it's necessary.

A Backer Board Prevents Chip-Out

Chip-out is always an issue when you even up the stiles and rails of a door with a plane. If you plane all the way across the door from one end to the other, you're bound to chip out the outside edge of the stile. That damage is not easy to repair, so it pays to avoid any risk of it happening.

There are two strategies you can use. First, try to plane from both outside edges of the door and stop in the middle of the rail. This method works well when the grain of the rail runs fairly straight.

If the rail has a very pronounced grain direction, and planing against the grain produces tearout, go to Plan B: the backer board. Clamp a small block flush with the stile. Orient the block so its long grain faces up—there's no need to plane more end grain than you have to! Plane all the way across the rail and off the end of the backer board.



Bevel-Up Planes Cut Better

When you've got a lot of end grain to remove, say, from a very rough saw cut, the fastest way to get to straight and smooth is to use a plane.

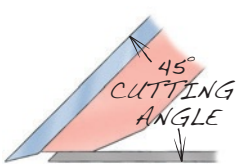
Large planes are better than small planes, because they have more mass to carry you through the cut. (End grain requires about twice as much force to cut as long grain.) A new group of tools—bevel-up planes—are better than standard planes. They cut at a lower angle (thus requiring less force) and are less prone to chatter.

In a regular plane, the blade's bevel faces down. The effective cutting angle of the blade is 45°, the same angle as the plane's frog (see below). The bevel hangs over the edge of the frog, unsupported, so the blade may chatter if it meets a lot of resistance.

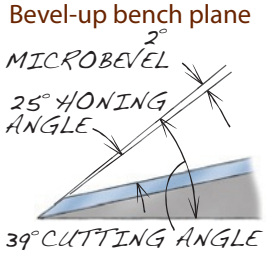
In a bevel-up plane, the blade's bevel faces up, just like in a block plane. The effective cutting angle of the blade is the sum of the blade's honing angle (usually 26°-27°, which includes a 1° or 2° microbevel) plus the frog's angle (usually 12°). The sum is 38°-39°. This lower cutting angle noticeably reduces the amount of force required to cut end grain. The bevel of this blade is supported by the frog right down to the cutting edge, so chatter is much less of a problem.

Bevel-up jack planes are available from Stanley, Lie-Nielsen and Lee Valley.

Standard bench plane



Bevel-up bench plane



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American Woodworker

MARKETPLACE

Index to Advertisers

Oops! Crazy Mistakes Woodworkers Make

Router Bit Launch

I'M ONLY A HOBBYIST, but I'm "the woodworker" to all of my friends. Recently, one of them asked me to rabbet the edges of several pine boards so he could use them to replace the missing back on an old cupboard.

I headed to my garage shop and pulled out my router table, which hadn't been used for several months. Unfortunately, I hadn't removed the bit after the last use, and it was now rusted in place. I managed to free it, but when I attempted to install a rabbeting bit, the rusted collet wouldn't open wide enough. Trying to work quickly (Mistake #1), I shoved down on the bit (Mistake #2), managing only to wedge it further into the collet and gouging my finger in the process. After bandaging my wound, I returned to the project, fired up the router and started routing the first board (I have patience issues—Mistake #3).

The bit wasn't cutting very smoothly, but rather than stopping (Mistake #4), I shoved harder (Mistake #5). After about an inch of tortured cutting, the bit emitted a high-pitched whine and burst through the top of the board amidst a spray of sawdust. It hung in mid-air for a second and then dropped. The collet nut followed, springing up through the same hole before falling and skittering across the floor. Shaken, but unhurt (except for my previously-wounded finger), I switched to the tablesaw to finish cutting the rabbets. Then I got out the rust remover and headed back to the router table.

Jim Reed

The Kindest Cut

MY WIFE AND I sell granite and marble counter tops though our tile store. One day a lady came in wanting to replace the top on a vintage walnut dresser. Her husband, she explained, had left an unsightly kerf in the middle of the top while using the dresser as an impromptu workbench to cut a board. Shortly thereafter, he had unexpectedly passed away.

I may run a tile store, I thought, but I'm also a woodworker. We all make little goofs like this one. "You don't have a ruined piece of furniture," I told the lady. "You have a family treasure that's a testament to your husband's humanity and the pastime he enjoyed. Clean up the top and apply a nice coat of finish. Tell your children the story, and their children, too. In fact, tell anyone you can get to stand still long enough. You'll be surprised how many 'wood people' are out there, and they'll all appreciate the story."

She looked at me in silence for a moment and then, with tears welling in her eyes, gave me a hug and left the store. OK, I blew a sale … but it sure felt good.

Art Spellenberg

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