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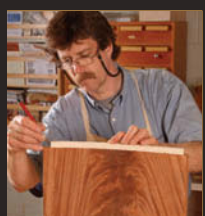
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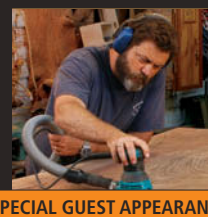
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editor's letter



QUICK, EASY, AND BEAUTIFUL

Not too long ago, when I first took up woodworking, I was struck by how hard it was to find great-looking furniture projects that I could handle. Now, after building a few respectable-looking projects and cobbling together an adequate garage shop, I'm still struck by how hard it is for a time-strapped hobbyist like myself to find attractive projects I actually have the time to build. Most woodworkers face those dilemmas at one point or another, searching for that sweet spot between birdhouse and highboy. This collection of projects lives right in that magic zone.

You don't need a giant shop, formal training, or tons of free time to build the useful, attractive pieces in this special issue. All you need are basic woodworking tools and skills. These pages will take care of the inspiration and the basic plans. Plus, we've included a lot of extra advice, companion videos, and project ideas at FineWoodworking.com/quickprojects.

Whether you're making a box, bench, bookcase, lamp, wall shelf, chest, or something else, these approachable projects are designed to last a lifetime and look good in almost any room of your home. They also reflect a wide variety of furniture-making styles and traditions, including Shaker, Arts and Crafts, Chippendale, and contemporary.

When you complete a project, I'd love to hear from you. Send along comments, photos, and questions to fw@taunton.com, and mention "Quick and Easy Projects" in your email.

—Ken St. Onge,
Quick and Easy Projects editor



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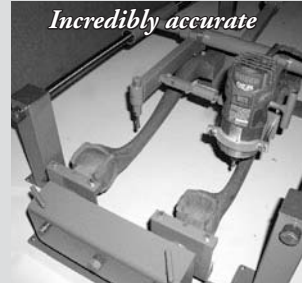
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More Box-Making Basics

See a variety of additional techniques for building beautiful boxes—from joinery and finishing choices to outfitting the interiors.

Doug Stowe takes you through every step, including how to:

- resaw lumber for perfect grain matches,
- use simple tablesaw sleds for beautiful exposed joinery, and
- pop the grain of figured woods using a simple oil finish.



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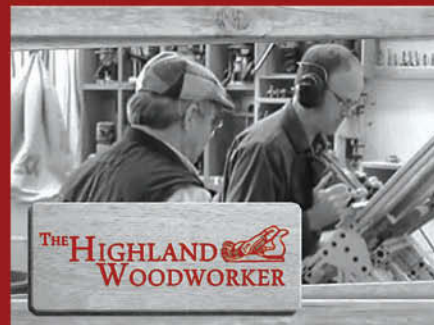


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Set up shop on a budget

HOW TO GET STARTED
BUILDING FURNITURE

BY MIKE BIELSKI

Sticker shock squashes the hopes of too many aspiring woodworkers looking to set up their first shops. Although it's hard to get started in woodworking without any tools, it often feels like the initial cost of buying those tools is too massive an obstacle to overcome. Woodworking is not an inexpensive hobby, but you can chop the price tag way down by being careful about what you buy, and how you buy it. Buying used machinery is a great way to save, although buying good used tools can be more difficult than buying new from a dealer. With a bit of guile and a good plan, however, the payoff can be worth it. In other cases, I've found that new tools end up being a better investment—and often are easier to find. Through careful choices and good fortune, I was able to outfit an extremely capable shop with a blend of new and used tools for around \$2,000, a price tag that I was OK with.

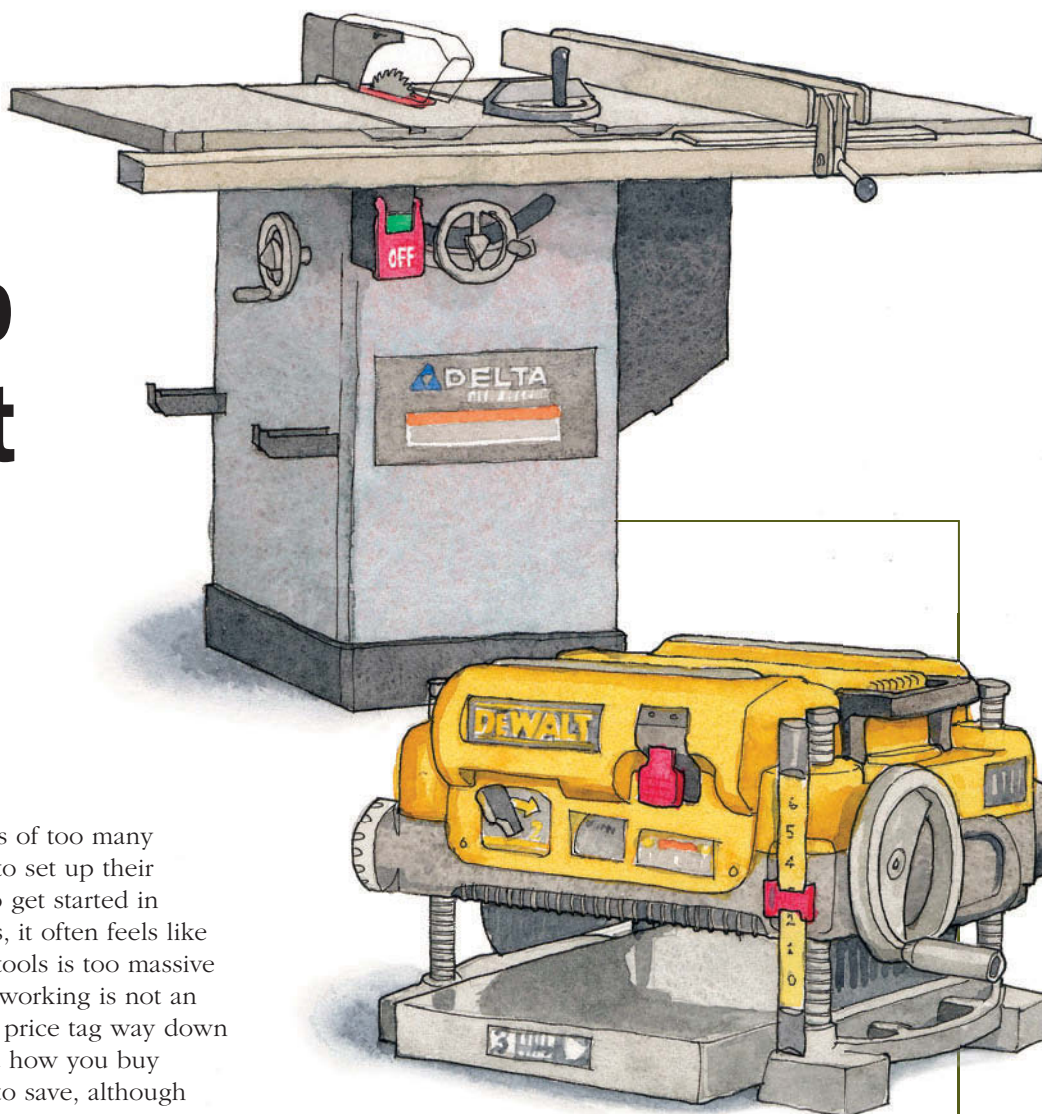
A shopping strategy: foundation before frills

My approach wasn't about buying cheap tools. Buying on price alone often costs more in the long run when a cheap tool doesn't perform or fails and must be replaced with one that works. The trick is finding quality tools at an affordable price, and knowing how to make the most of them.

My strategy was to buy the most basic and versatile tools before adding specialized ones, no matter how low the price. This led me to start with a tablesaw, a thickness planer, and a router.

The tablesaw—This tool is the backbone of nearly every shop, and for good reason. It allows unmatched precision in ripping parallel edges and crosscutting at a variety of angles. Most woodworkers find it crucial for the basic milling of stock. It is also suited to many joinery tasks, easily producing tenons, box joints, and—with a reground blade—the tails for dovetail joints.

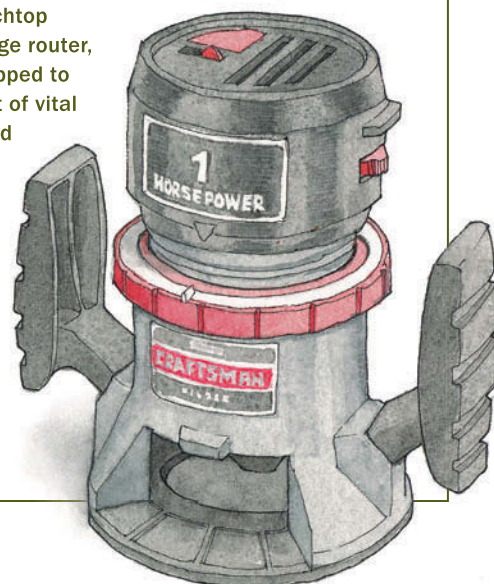
Through my cabinet-shop connections, I managed a snappy



A working shop has three hearts

Start woodworking with a tablesaw, a benchtop planer, and a plunge router, and you'll be equipped to perform a core set of vital milling, joinery, and shaping tasks.

Plan on spending \$600 to \$1,200 for a used cabinet saw or new hybrid, \$400 for a planer, and \$200 for a plunge router or router combo kit



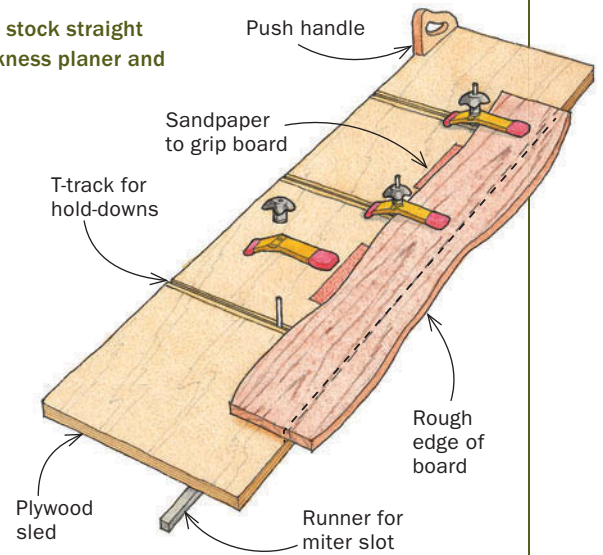
Jointing without a jointer



A pair of jigs lets you mill stock straight and flat using only a thickness planer and a tablesaw.

EDGE-JOINTING

Use the tablesaw to straighten a wavy edge. The jig's plywood sled rides on a long runner that sits in the miter slot. Make sure the blade is parallel to the slot. Secure the rough lumber with hold-downs so that the rough edge overhangs the sled slightly along its length.



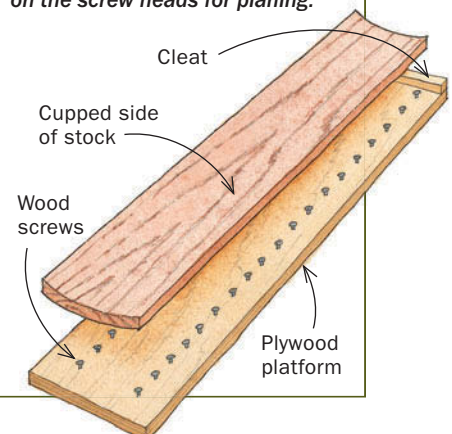
deal (\$200) on a used cabinet saw with a 54-in. commercial rip fence. That price would be hard to match, but it is possible to find a hybrid or used cabinet saw with a high-quality fence for \$600 to \$1,200. Some will run on 120-volt household current, meaning you won't have to rewire your shop for 240-volt service, but be sure to check for compatibility before you buy.

This style of saw will provide more power than a contractor-type saw and have the high-quality rip fence you need to do good work. However, because they are favored by professionals and serious amateurs, cabinet saws are harder to find on the used market. Scour the classifieds and online sales (be sure to check industrial auction sites as well), and do some networking. Check the bulletin board at your hardwood supplier and ask the proprietors if they know of anyone selling a saw. Also call local cabinet shops. They sometimes have a surplus tool sitting idle that they'd be willing to sell. Take your time in this step. A careful investment will pay dividends in the long run, but a well-intentioned compromise can cause long-term frustration.

The thickness planer—A thickness planer will significantly expand the creativity and craftsmanship of your work by allowing you to buy roughsawn stock and use wood of any thickness

FACE-JOINTING

The thickness planer can joint a board's face. On this simple jig, the stock is supported by twin rows of wood screws driven into a platform and adjusted to meet the varying clearances on the underside of the board. The stock rides the sled cup side up. Slide the board slightly sideways to adjust the screws, then seat it firmly on the screw heads for planing.

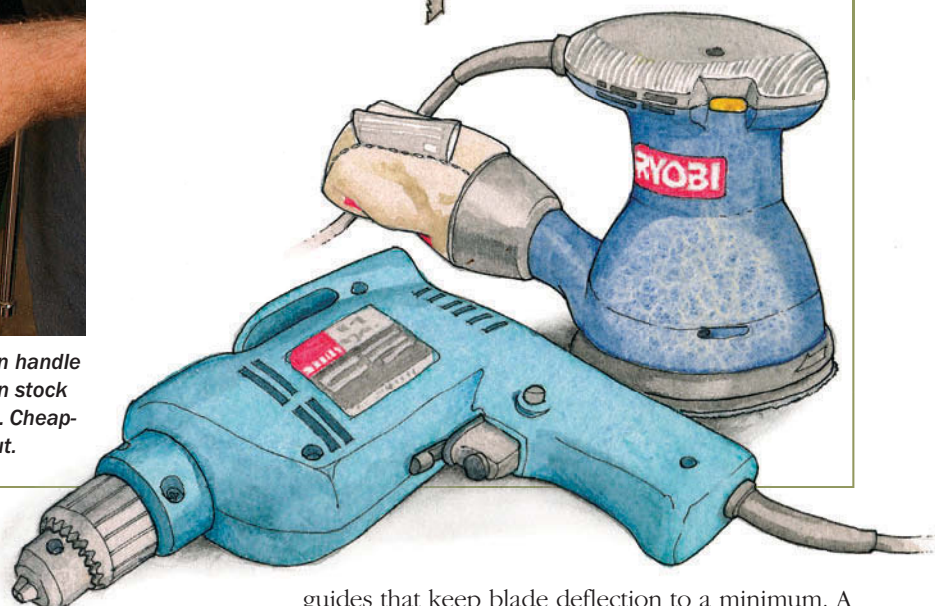
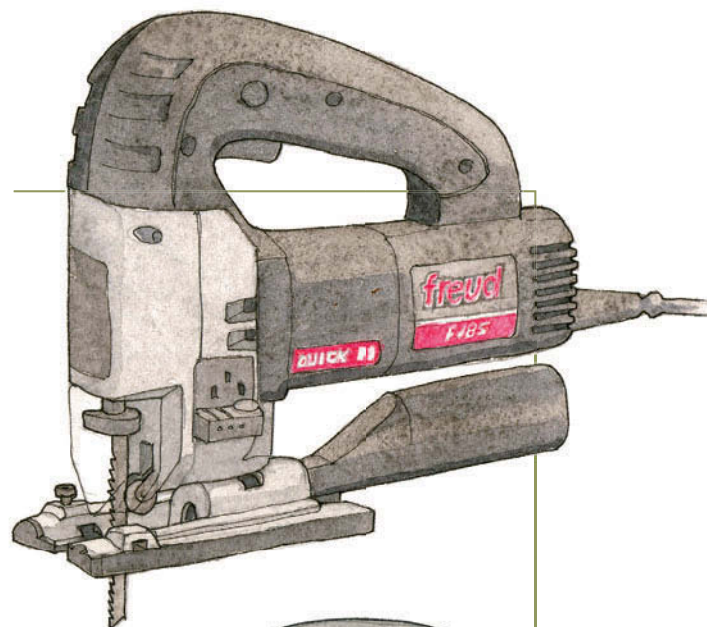


Put the right power in your hands



Cut curves without a bandsaw. A jigsaw can often handle the task, even on thick stock like this 8/4 maple. On stock this thick, premium blades are worth the extra cost. Cheaper versions can deflect, creating an out-of-square cut.

There's a universe of handheld power tools, but a handful pay the largest dividends. Start with a jigsaw, a corded drill, and a random-orbit sander. Reconditioned tools are often a bargain.



in your designs. Nowadays, a new planer often represents a better value than a used model. Many of the inexpensive portable planers have chip-ejection fans, which work as a built-in dust collector. Dust collection is important for all tools, but essential for thickness planers. This feature can help delay the expense of a dust collector and thus reduce the overall cost of a planer. Speaking of dust collection, I should mention that I don't use a dedicated dust collector in my shop. I use a shop vac with a small hose for my sanders and a larger-diameter hose for the tablesaw and router table, and I depend on the built-in chip-ejection fan for my thickness planer.

The router—The router is the master when it comes to flexibility. Its potential far exceeds trimming and decorative edge treatments. A router will cut mortises, rabbets, and dadoes, and adding a router table builds in even more versatility, including biscuit joinery and raised-panel doors. But where the router distinguishes itself from all other tools is in its ability to produce identical parts using a pattern.

Other important power tools—A good jigsaw will help get you through many tasks, particularly cutting curves, that would otherwise require a bandsaw. Look for one with blade

guides that keep blade deflection to a minimum. A handheld drill is also essential. A quality corded drill is much less expensive than a cordless one, and will never leave you without a charge. Also look for a quality random-orbit sander with a provision for dust collection.

One of the best deals on portable power tools, including routers and sometimes planers, comes in the form of factory-reconditioned tools. These are primarily tools that have been repaired at the factory after failing quality inspections or being returned by customers. While they cannot be sold as new, they are identical to new tools in quality and appearance and usually have the same warranty (be sure to check). Typical savings are from 15% to 30%, though you sometimes can find even bigger bargains. These tools can be found at Amazon.com and other online tool sellers. It is also possible to buy them through retail stores and, in some cases, from the manufacturer's website.

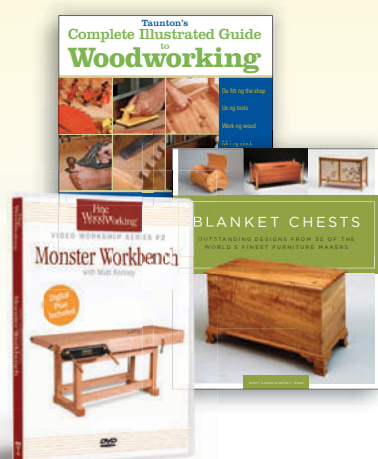
Used hand tools are plentiful

Hand tools offer your best chance of finding a real bargain. Until the early 20th century, nearly all woodworking was done with hand tools, and their designs and uses have changed little. Most of the high-end planes on today's market, for example, are just

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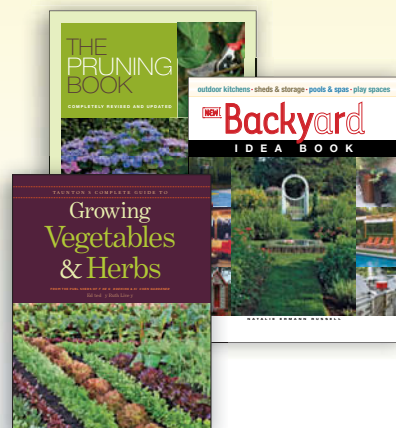
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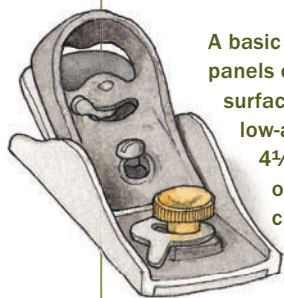
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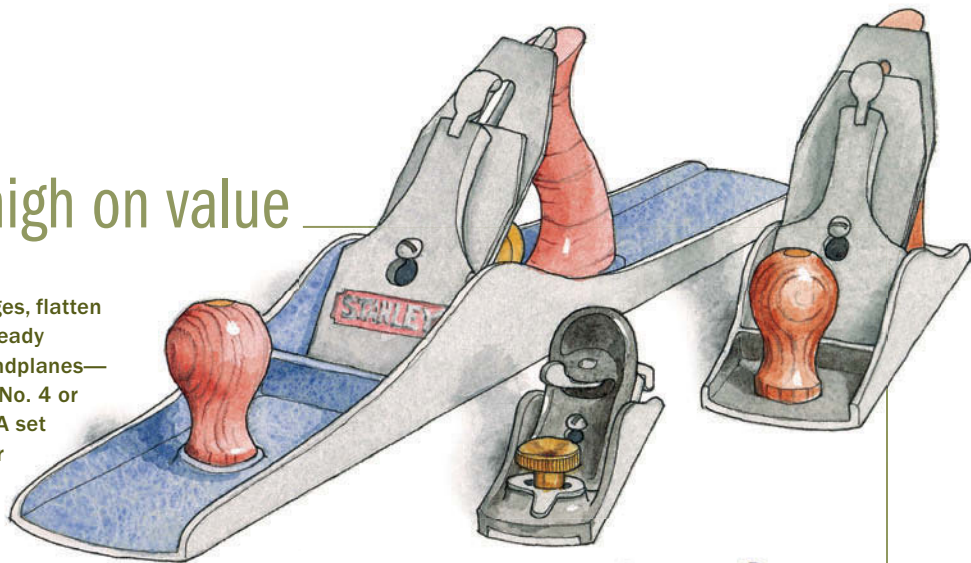
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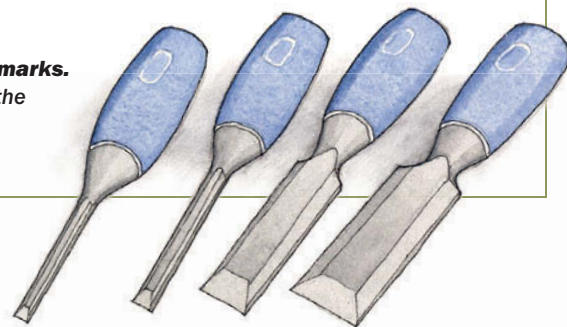
Low-tech tools are high on value



A basic set of handplanes lets you true edges, flatten panels or wide boards, and achieve finish-ready surfaces. Start with a small cluster of handplanes—low-angle and standard block planes, a No. 4 or 4½ bench plane, and a jointer plane. A set of inexpensive chisels is essential for chopping, paring, and trimming.



Clean up the sawmarks.
A few passes with the jointer plane leave a surface ready for gluing.



reproductions of the original designs. And because the originals were mass-produced, they are fairly easy to find at rummage sales and antiques stores.

Plan to invest in a set of bench chisels, both standard and low-angle block planes, a No. 4 or 4½ smoothing plane, and a No. 6 jack or No. 7 jointer. Between them, these planes will true edges, flatten glue-ups that are wider than your thickness planer, and tame tricky grain that would tear out with a mechanized planer. They also do fine trimming better than any other tools. □

Mike Bielski is a woodworker in Waterville, Ohio.

A FEW WORDS ABOUT AUCTIONS

For any auction, live or online, make sure you know the current retail price of tools like the one you are bidding on. Then set your price and stick to it.

Before you bid in an online auction, check the site's rules of operation. At some sites, a winning bid is a binding contract, which can be a problem if you can't inspect the tool before you purchase it. Don't forget shipping costs. In some cases they can exceed the cost of the tool. Also, make sure the tool you're buying will run on the power you have in your shop. Many former industrial tools run on 240-volt single-phase power. If your shop doesn't have 240-volt service, factor in the cost of upgrading before you decide to buy. You don't want to saddle yourself with a tool you can't use, no matter how good the price.

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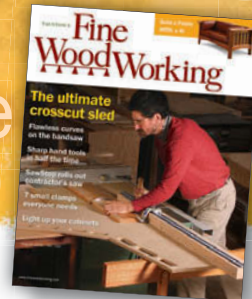


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Keyed, Mitered Boxes



A pro's tricks make
these fast and foolproof

BY DOUG STOWE

STURDY AND STRIKING

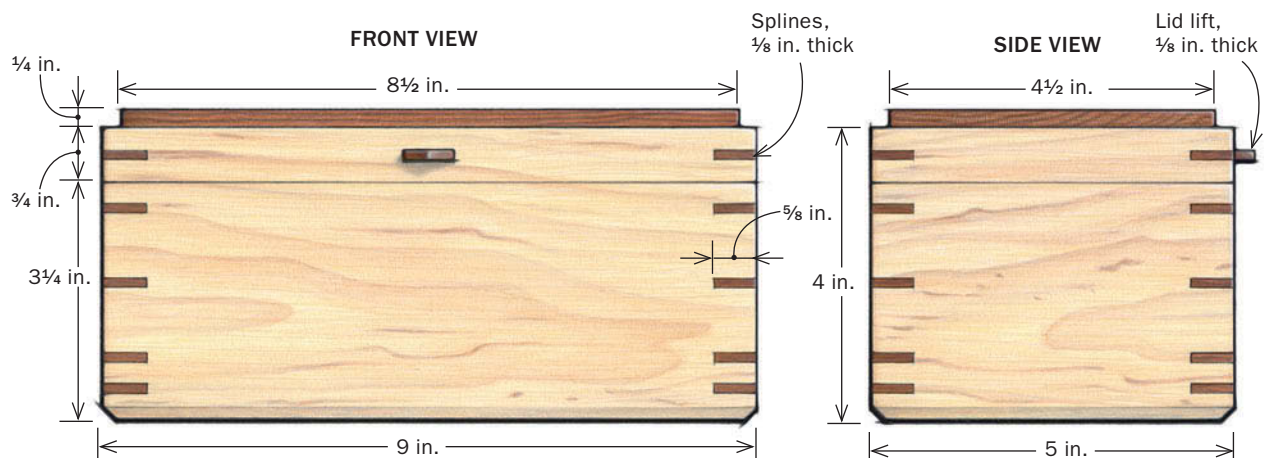
A great box gets its cachet from several sources: beautiful woods, the right proportions, and attractive joinery.

I began making and selling boxes in the 1970s, and I've made them in all sorts of sizes, shapes, and styles. This one, though, has always been a favorite. I've made it in a variety of woods, and I like how the sides create a visual contrast with the top and miter splines. I also like the top: It's a floating panel but that's not obvious at first. The secret is a groove in both the top and sides. When they come together, the top and sides seem thinner than they are and the gap for expansion and contraction is hidden.

The sides have continuous grain

The sides are made from $\frac{3}{8}$ -in. stock, a suitable thickness for a small box. Because I like the appearance of the grain running continuously around all four sides, I add a few extra steps when preparing the stock. A continuous-grain look requires resawing, so start with stock milled flat to at least $1\frac{1}{8}$ in. thick. It should be about $4\frac{1}{2}$ in. wide and at least 16 in. long, a little longer than the length of the box front and one side.

Using a bandsaw, resaw the stock into two pieces, each just over $\frac{1}{2}$ in. thick. Then move to the thickness planer to smooth and flatten the resawn side of each piece. Make light cuts until each piece is the same $\frac{3}{8}$ -in. thickness.



Tablesaw magic



MAKE THE SIDES



Sled adds precision. With the tablesaw blade at 45°, Stowe uses a crosscut sled to trim one end of each resawn piece (left), ensuring that the ends are square to the edge. With a stop block clamped to the fence of the sled (right), the opposite sides of the box are sure to end up the same length.



Groove the sides. Using the tablesaw rip fence to guide the stock, cut a shallow groove along the top and bottom edges of the four sides to accept the top and bottom of the box. For safety's sake, use a push stick.

Lay out for continuous grain—Reassemble the sawn halves so the grain is arranged as it was before resawing. Then, open the halves like a book, with one end of the resawn board serving as the spine.

As you look at the two boards lying end-to-end, each with the resawn side facing up, keep in mind that each half must yield one front or back and one end. If an area of grain is especially striking, choose that section as the front and mark it in pencil. It doesn't matter where the front falls on either

half; as long as there's room on each piece for one of the ends.

Once the location of the front is decided, mark out the location of the back and ends (see

the Online Extra). I also mark each side with an arrow pointing to the top edge of the box.

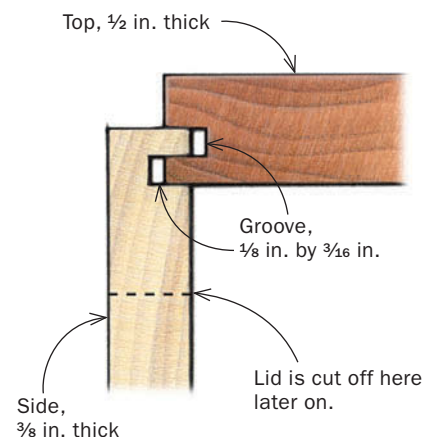
Sled and stop blocks ensure tight miters—

Now you can cut the front, back, and ends to final length. I use a miter sled on the tablesaw with the blade tilted to 45° for all the mitering cuts. The procedure shown is for a left-tilt saw; for a right-tilt saw, make all the cuts from the opposite side of the blade.

With the outside face of one of the resawn halves against the sled table and the top edge against the sled fence, position the stock to trim about 1/8 in. or so off one end. This cut also squares the end. Repeat on the other resawn half.

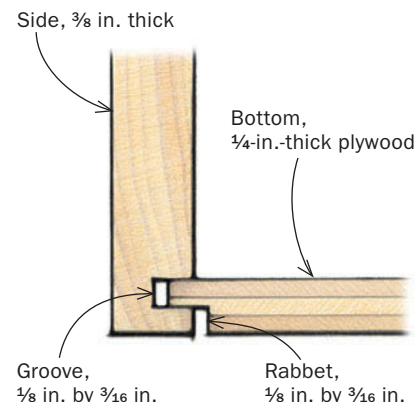
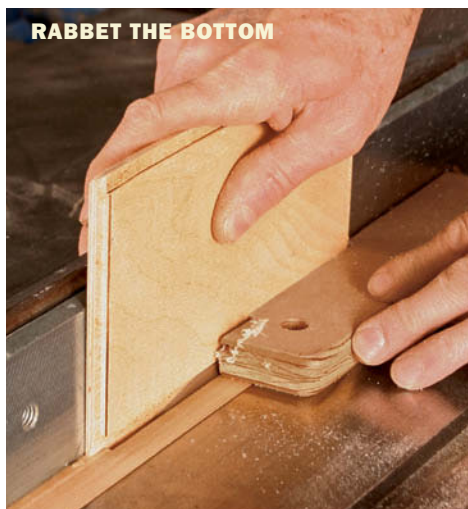
Now add a stop block to establish the length of the part. Turn the stock over, slide the freshly trimmed end of the resawn half against the stop block, and make a cut to create the first side

GROOVE THE TOP



Same setup, different part. Without changing the tablesaw setup used for the side grooves, cut a groove on all four edges of the top.

RABBET THE BOTTOM



Still the same. Without touching the tablesaw setup, you can cut the rabbet on all four edges of the bottom.

Online Extra

For continuous-grain layout options, go to FineWoodworking.com/quickprojects.

No-clamp assembly

Tape the sides. Butt the ends of the side pieces together so the grain flows continuously from one piece to another, then use packaging tape to hold the four parts together. A single piece of tape will do at each joint.



Add glue and wrap it up. Apply yellow glue to each miter (above), making sure all the surfaces are covered. Slip the top and bottom pieces into the grooves in one of the face pieces (below), then wrap the other sides around them.

piece. Repeat on the second resawn half. Finally, reposition the stop block and cut the two remaining side pieces.

A groovy trick for top and bottom

For this box, I made the top from 1/2-in.-thick mesquite and the bottom from 1/4-in.-thick Baltic-birch plywood. To get the size of these parts, temporarily tape together the box, measure the interior length and width, and add 1/4 in. Fitting the top and bottom is an easy tablesaw operation. First, for safety's sake, make sure you have a zero-clearance insert in the saw. Then adjust the blade height to 3/16 in. Now here's the key: Set the distance between the blade and rip fence to the thickness of your sawblade.

Pass the box sides across the tablesaw, inside face down, and with each bottom edge against the fence in turn. Repeat with the top edge against the fence. Next, cut the top and bottom pieces to fit the grooves in the sides. These are cut standing up on edge along the fence. Cut along the end grain first. This way, when the lengthwise cuts are made, any resulting tearout of the end grain will be removed in the final cuts. The top panel partly overlaps the sides, hiding the expansion gap.

Assemble the box

Once the box is assembled, it's a big chore to sand the inside. So it's best to sand the inside surfaces of the sides, top, and bottom before assembly. Now, arrange the sides—end-to-end and in the order they will wrap around the box—on a flat surface, outside face up. Apply a strip of tape to join the four parts together. I prefer clear packaging tape, as it gets a good grip and allows me to see how the corners fit. With the tape in place, acting like a hinge, you can temporarily assemble the sides, top, and bottom to form the box and make sure everything looks OK.

Reopen the box, and start assembly by spreading glue (I use yellow glue) on the mitered surfaces. Miters absorb a lot of glue, so apply an even coat to both sides of the joint. Don't use too much glue, however, or you'll make a mess on the inside of the box.

Once you've added glue to all the joints, it's just a matter of rolling the taped sides around the top and bottom. In the process,

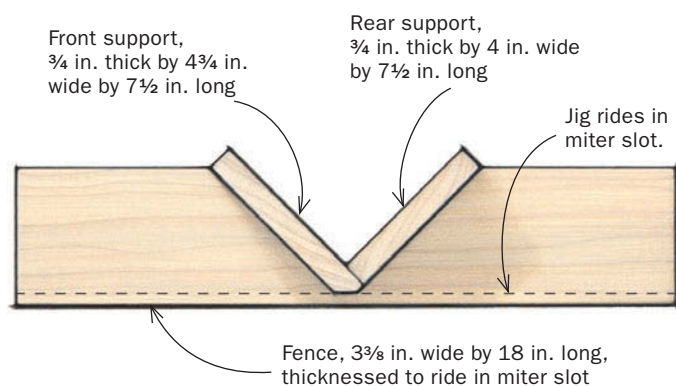


Close the deal. Stowe stretches additional pieces of tape across the joints to close any gaps.

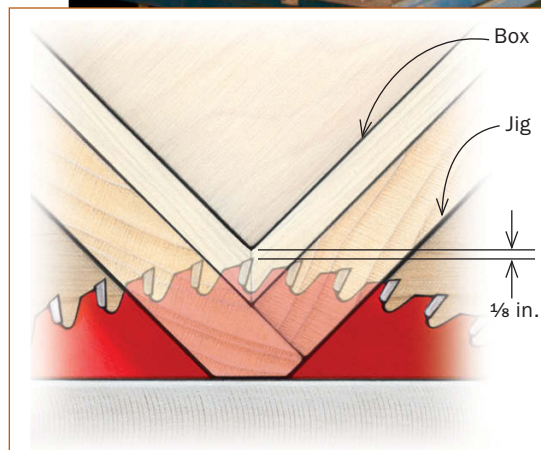
Splines add strength and style

MORE TABLESAW MAGIC

A slot-cutting jig makes it easy to run the assembled box over the blade at a perfect 45° angle.



Story stick dials in setup. Use a pencil to mark the slot locations on one corner of the box, then transfer the locations from the box to a thin, narrow stick. After that, use the stick to position a stop block on the jig.



Cut the slots. With the jig riding in the miter slot, make the first cut. Slot all four corners before moving the stop block for the next spline location.

four flat sides transform into a box. To me, it's the magic moment in box making. Now add more tape, as needed, to pull each of the corners tight. Check to make sure the box is square and that each edge is perfectly aligned. Also make sure the top panel and the bottom are centered in the sides. Let the glue dry overnight.

Another simple sled for the splines

Splines add strength and they look good, too. To cut the slots for the splines, I use the tablesaw with a rip blade that cuts a 1/8-in.-wide kerf. This blade produces a kerf with a flat bottom that fits the square shape of the splines better than the shallow V-shape you get from typical crosscut or combination blades.

I use a jig to support the box at 45° to the table. To create the most glue area for the splines, set the blade to a height that cuts the slot just short of the inside corner of the box.

With the slots cut, you can move along to making the miter splines. To make the spline stock, I simply thickness-plane material down to the width required and then use the tablesaw to rip 1/8-in.-thick slices from the stock.

I precut the spline stock to approximate size. This eliminates having to use a saw to trim the splines after the glue dries. Add a coat of glue to each spline and slot, then slip in the splines. Make sure that each one is fully seated at the bottom of the slot. A few



Slip in the splines. After planing the spline stock to fit and cutting out little triangles, add glue to the slots and splines and slide them into place.



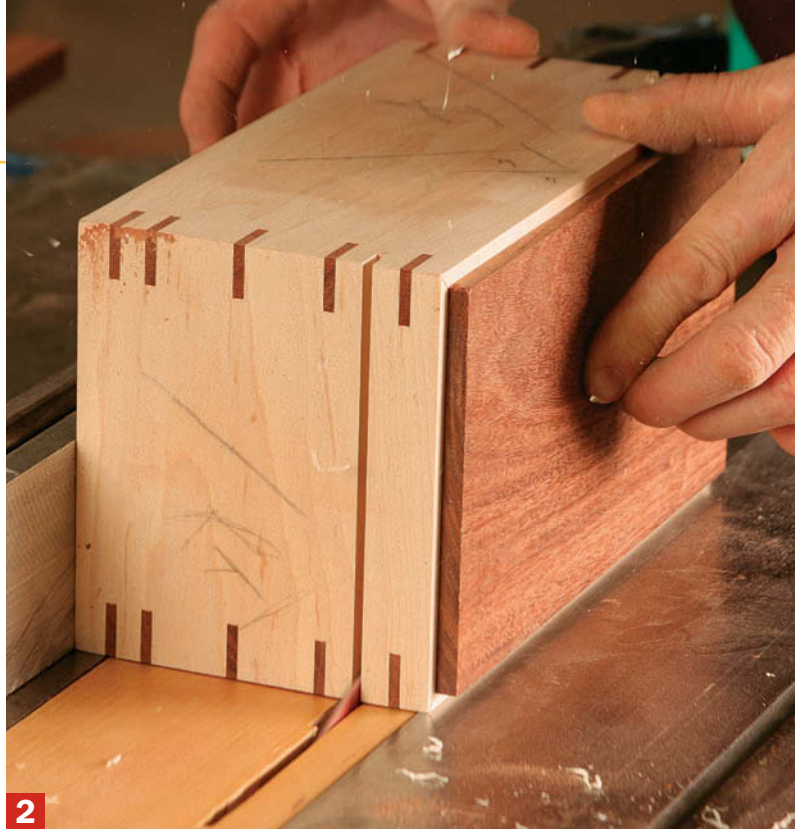
Sand the splines flush. Stowe uses a stationary belt sander to quickly sand the splines flush to the sides of the box. A block plane would also work.

Safe separation



1

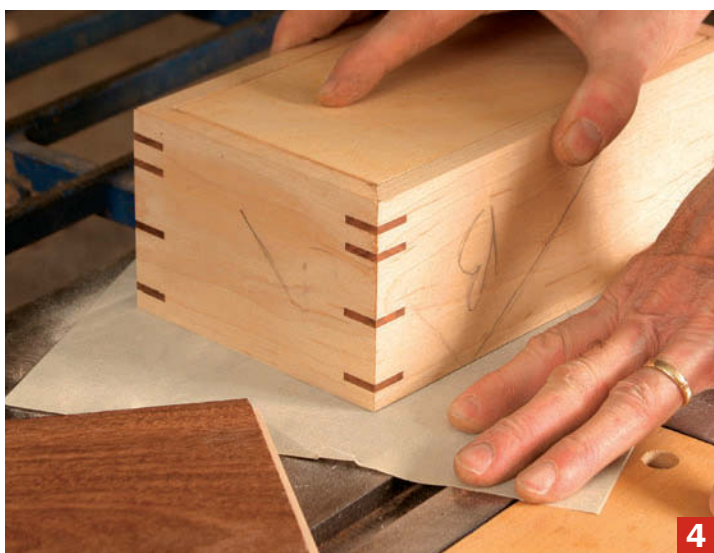
Cut the lid from the box in four steps. Raise the blade to a height that's $\frac{1}{32}$ in. less than the thickness of the stock (1). With the bottom against the rip fence, cut a groove all around the box (2). Use a sharp knife to cut through the thin web of stock that remains, separating the two parts (3). Once the lid is free, sand away the remainder of the web (4).



2



3



4

light taps with a mallet can help. When the glue dries, I use a stationary belt sander to sand the splines flush to the box.

Instant lid on the tablesaw

I use the tablesaw to cut the lid from the box. The trick is to keep the lid connected to the box after making the cut on all four sides. A lid that breaks free could tip into the blade. If that happens, you will get a scored surface that requires extra sanding.

I solve this problem by leaving a thin web of material to keep the lid in place. To measure the blade height, position the box adjacent to the sawblade, then raise the blade to a height that's about $\frac{1}{32}$ in. less than the thickness of the sides.

Before cutting, position the rip fence so the blade establishes the correct thickness of the lid. Make a cut while holding the bottom of the box against the rip fence as you pass the box over the blade. Then make the three remaining cuts all around the box.

Finishing touches make a big difference

Use a knife to separate the lid from the base, then sand away the material that remains. With a sanding block, apply a light chamfer around the perimeter of the lid and along all sharp corners of the sides. For uniform results, use the same number of strokes on each chamfer. To chamfer the bottom edges for an elevated look, I use a 45° chamfering bit in the router table, set for a $\frac{1}{8}$ -in.-deep cut.

For the lid lift, I use the router table and a $\frac{1}{8}$ -in. straight bit to rout a $\frac{1}{8}$ -in.-deep by $\frac{1}{2}$ -in.-long groove in the front face of the lid. Then, I use a dovetail saw to cut the lift to size and shape. Round the edges with sandpaper to match the radius of the router bit, then glue the lid lift into the groove.

After adding the hinges (see the facing page), I gave the piece a final light sanding with 320-grit sandpaper and finished it with three coats of Deft Danish Oil Finish. □

Doug Stowe builds furniture and boxes in Eureka Springs, Ark.

Flip stick is secret to perfect-fitting hinges



I discovered a simple way to use a router table to create perfect-fitting hinges. The secret is a notched stick—I call it a flip stick—that positions the router-table fence and stop blocks.

Make the stick about $\frac{1}{4}$ in. thick, roughly double the width of the hinge leaf, and the same length as the box. Decide where the hinges will go and mark that distance on the stick. Only one hinge location needs to be marked.

Raise the tablesaw blade so it's just slightly below the barrel of a hinge. Standard butt hinges typically require the mid-point of the barrel to be on the edge of the stick, but the hinges I use have built-in stops, so the entire barrel must be outside the stick. Now, make a series of cuts to create a notch. Install a $\frac{3}{16}$ -in.-dia. straight bit in the router. Adjust the bit height to just under half the thickness of the closed hinge. Now, butt the edge of the flip stick against the fence and position the stop blocks as shown.

Rout the hinge mortises, first on the lid, then the box. Now, flip the stick end over end and reclamp the stop blocks. Cut the second mortise in the lid and box.

—D.S.

1. MAKE THE FLIP STICK

Cut the stick to length. The stick is cut to the same length as the box; use the box as a template to mark the length.



Notch the stick. Stowe uses his table-saw to cut a precise notch to accept the leaves of the hinge.



A perfect fit. Nibble away slowly until the hinge leaf fits snugly in the notch.

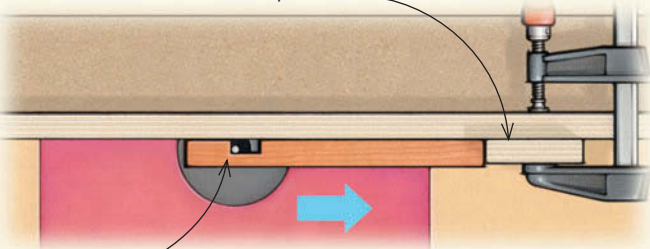


2. USE THE STICK TO SET UP THE ROUTER TABLE

Position the stop blocks. With the flip stick serving as a template, clamp a pair of stop blocks to the router fence.



1. Slide the flip stick to the right to locate the first stop block.



$\frac{3}{16}$ -in.-dia. straight bit

2. Slide the flip stick to the left to locate the second stop block.



3. ROUT THE HINGE MORTISES

Mortise in two steps. With the stop blocks in place, cut one mortise in the lid and a second on the box. Flip the stick and reposition the stop blocks; then cut the remaining mortises on the lid and box.



Square the corners and install the hinges. The router bit leaves rounded corners, so you'll need to square them with a chisel. The fit will be perfect.

3 Low-Tech Boxes

No-hinge lids are easier and just as refined

BY MATT KENNEY

Boxes are fun to make and can be a pleasant diversion between larger projects. With a bit of nice wood and a clever design, you can turn out a beautiful box in just a few hours. But there is one part of making a box that is never fun: installing high-quality hinges and getting them just right. And don't forget that you also have to buy them, for a box that might otherwise cost you nothing more than some leftover cutoffs.

You can avoid that hassle by making a box without hinges. Of course, you'll need another way to keep the top on, but the challenge of figuring out how to do that can lead to elegant and unique designs. Here are three great ways to do it. One is from me, and two are from *Fine Woodworking's* art director and most prolific woodworker, Michael Pekovich.

Matt Kenney is a senior editor at Fine Woodworking.

1 INSERTS HOLD THE TOP IN PLACE



They're fitted to the inside after the top is cut free from the bottom.

2 ONE BOX TOPS ANOTHER



Make the lid and then build the bottom to fit inside it.

3 DROP THE TOP INTO A RABBIT

The sides do all the work and hold the lid securely in place.



Online Extra

To see how to make a bird's-mouth joint like the one on Matt Kenney's box, go to FineWoodworking.com/quickprojects.

1

Inserts hold the top in place

One of my favorite ways to make a box is to glue up the sides, top, and bottom as a single unit. Once the box is assembled, I simply slice it in two. One half becomes the box, the other, the lid. To avoid hinges, you need some way to align the lid with the box. The answer is a handsome liner that extends above the edge of the box and keeps the lid snugly in place.

—Michael Pekovich

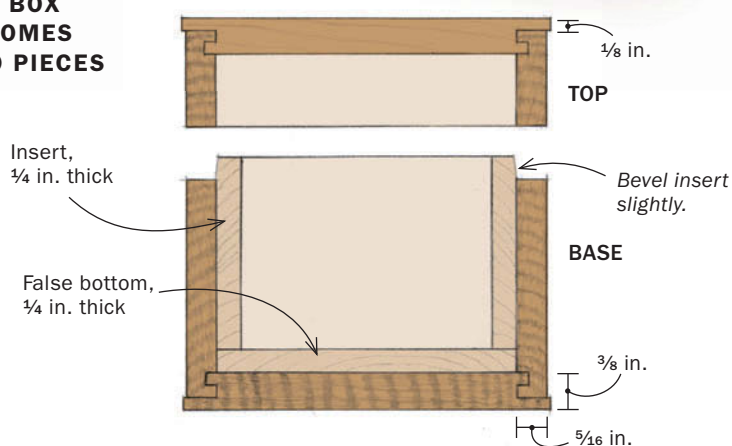


Cut off the top on the bandsaw. All four edges end up level—something that never seems to happen at the table saw, where you cut into one side at a time. To smooth the bandsaw cuts, just rub the parts on a sheet of sandpaper stuck to a flat surface, like your table saw's table.



Fit the inserts. Do the two ends first and then the front and back. For each side, miter one end at the table saw, mark the length directly from the box, and then miter the second end. The goal is a snug fit, so no glue is needed.

ONE BOX BECOMES TWO PIECES



TIP

DESIGN INSERT FOR GREATER FUNCTION



This box was made to hold tea packets. The cutouts position your fingers for easy retrieval.



Bevel their top edges. Otherwise, the top won't fit easily over them. Mark the inserts so that you know how wide to make the bevels. The only practical way to do the job is with a block plane, because the inserts are small and the bevels are shallow.

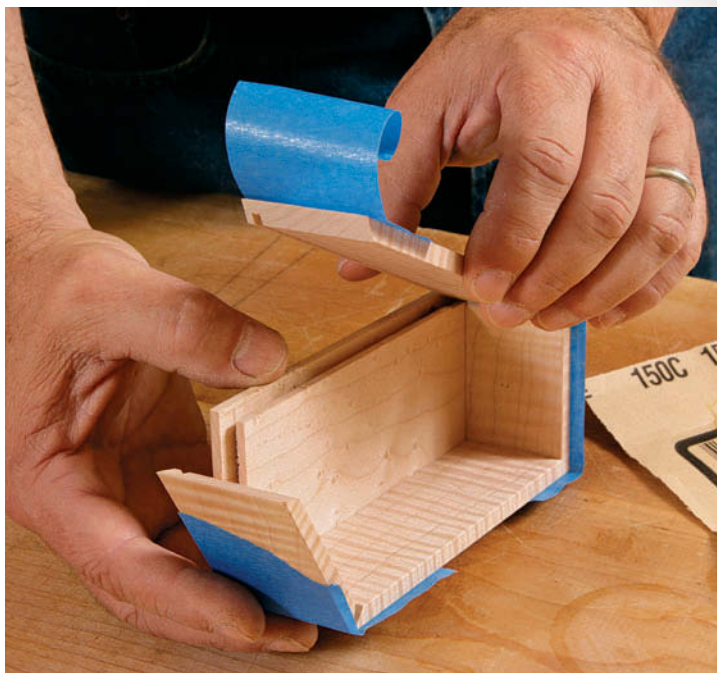


2

One box tops another

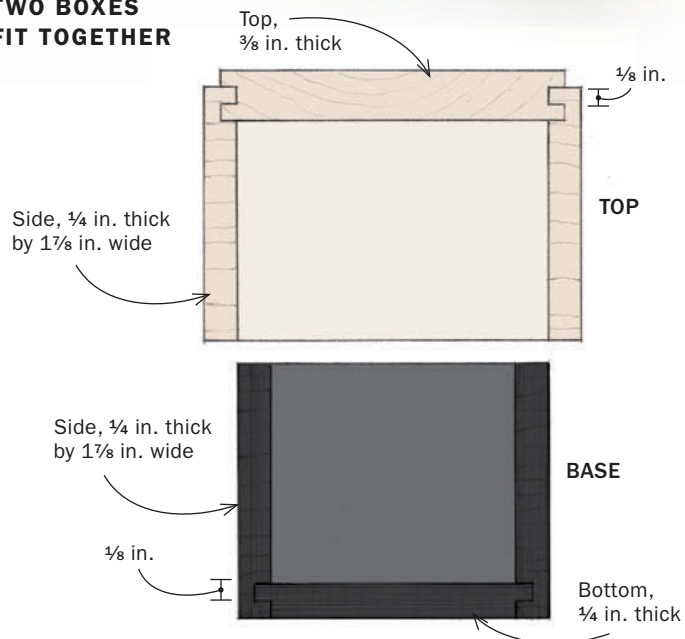
See this box as a stripped-down version of box No. 1. Here, the bottom of the box acts like its own box liner. The lid nests over it almost completely, so lifting it off is like revealing a hidden box. Make the two out of contrasting woods for a more surprising revelation.

—M.P.

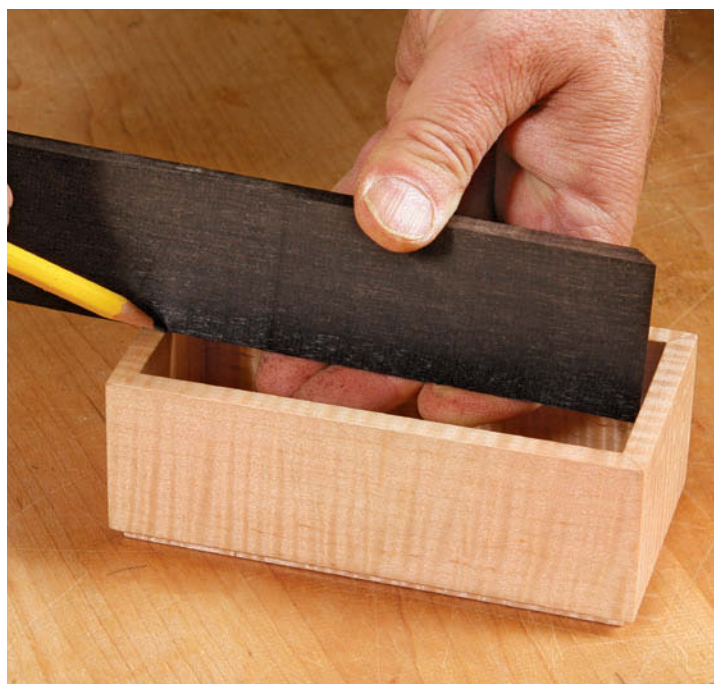


Glue up the top first. Treat it like a box without a bottom, using blue tape at the corners to create clamping pressure on the miter joints.

TWO BOXES FIT TOGETHER



How to make the bottom box. Attach an L-shaped fence to a miter gauge to prevent tearout. Start with pieces that are longer than the side's final dimension and make the first miter cut on each one (above). Then mark each side for final length by putting the mitered end inside the larger box and marking directly from it at the opposite end (right). To cut it to length accurately, line up the mark with the miter cut in the L-shaped fence on the miter gauge.



3 Drop the top into a rabbet

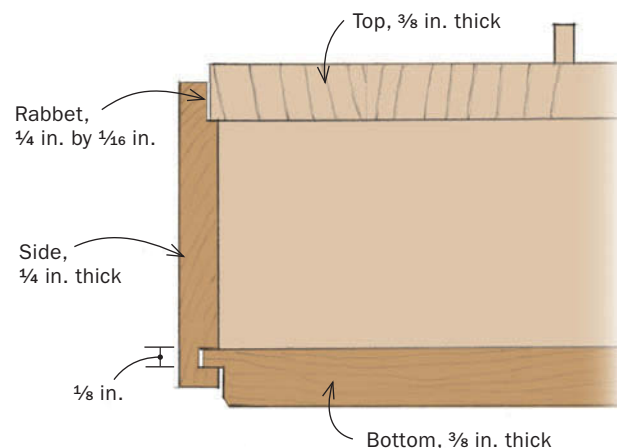
I wanted a box with a modern look and a thin top. So I gave a contemporary turn to the old trick of holding the top in a rabbet, putting in a full-height divider that splits the top in two (something that would have required four hinges in a traditional box). By the way, the lifts are attached with cyanoacrylate glue.

—M.K.



ROUT THE RABBETS

Align the router table's fence with the bit's bearing. Keep the side pressed down firmly; small deviations in the rabbet's depth are noticeable on a little box. (The groove is for the box's bottom.)



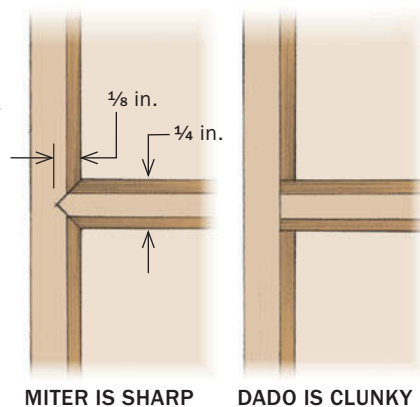
V-GROOVE BIT DIVIDES BOX



It should be as wide as the divider is thick and set up to cut its full width. Use a large backer board to keep the side square to the bit, and stop the cuts when they reach the bottom groove.

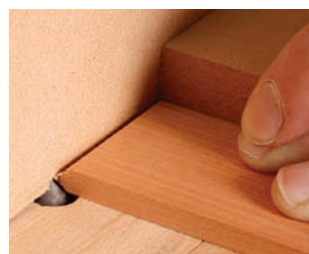


You could leave the divider inside the box, but it looks better full-height, separating the top into two parts. To join the divider to the sides, the best choice is a bird's-mouth joint, because it has a cleaner look that echoes the mitered corner joints.



MITER IS SHARP

DADO IS CLUNKY



The same bit shapes the divider's ends. Attach a zero-clearance face to your fence and align it with the middle of the bit. You shouldn't need to adjust the bit's height.



Fit the divider. Do it after gluing up the box (use blue tape in place of clamps). If the divider is long, plane a shaving or two from one tip and re-route it.



Cut the two-panel top. Square one end of your lid stock, mark and cut the longer side to length, and then mark, cut, and fit the shorter one from the adjacent section.

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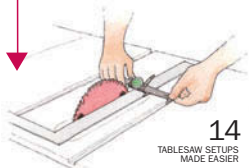
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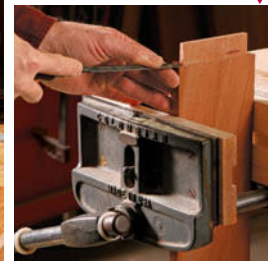
Today's furniture makers breathe new life into an old leg

BY JONATHAN BINZEN

Cover photo: Michael Pektivich



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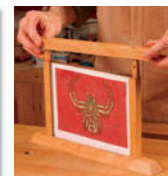
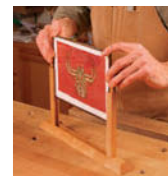
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—R.W., WA

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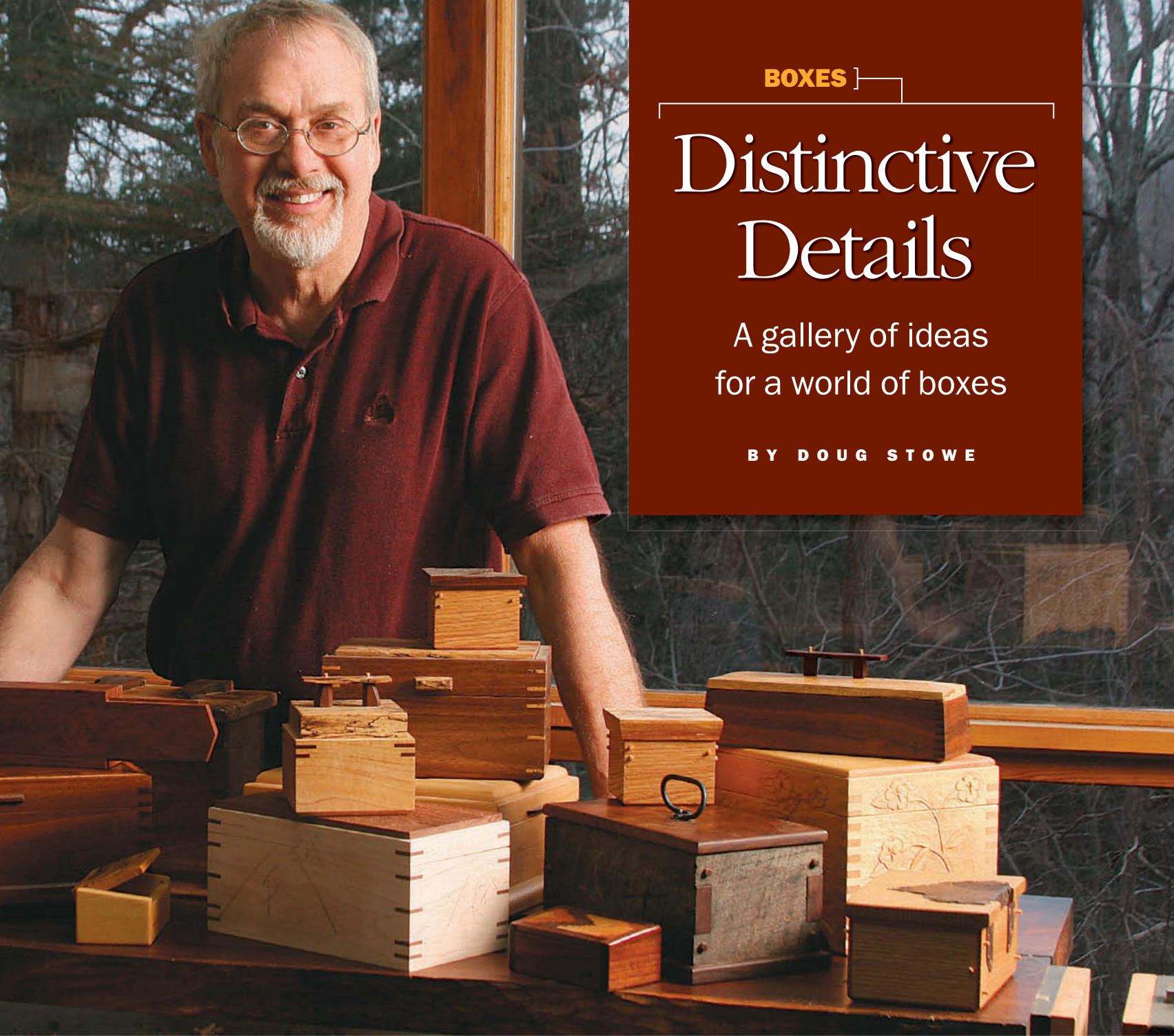
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Expert Know-How



Tas



BOXES

Distinctive Details

A gallery of ideas
for a world of boxes

BY DOUG STOWE

I've been making boxes for over 30 years. Indeed, I've made thousands of them and I hope to make a few thousand more in the years to come.

I can't cover decades of box-making knowledge in a single article, but I can share some of the things I consider when designing a box—wood, corner joints, lid, bottom, feet, pulls, and dividers. Armed with a few good options for each element, you'll have no trouble designing all sorts of beautiful boxes on your own.

Box making appeals to me for many reasons. I enjoy the process of design. And because boxes come together more quickly than many other woodworking projects, I have more

opportunities to try new designs and learn new woodworking techniques. Consider, too, that you can make a box from bits of lumber left over from your larger projects, so wood costs are minimal.

Not only can they be beautiful to look at—masterpieces in miniature—but boxes are perfect for storing everything from jewelry to stamps, and keepsakes to odd change.

*Doug Stowe
builds furniture
and boxes in
Eureka Springs, Ark.*

Online Extra

Watch a video of Stowe resawing and mitering wood at **FineWoodworking.com/quickprojects**.



Mix the woods. Stowe often makes the sides and top from two different woods, playing with the contrast in color and grain.

Vary the texture. Don't be afraid to explore different textures. Knots, knotholes, and live edges accentuate the natural look of the wood. Rough-carved surfaces encourage both looking and touching. Roughsawn sides married to finished tops and bottoms create interesting visual conflicts.

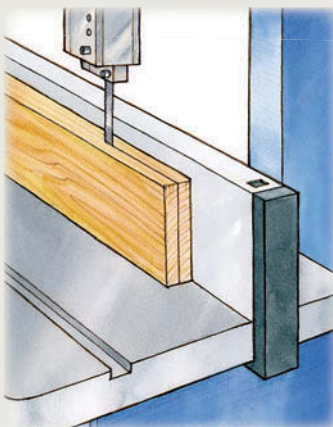


Contrast adds interest

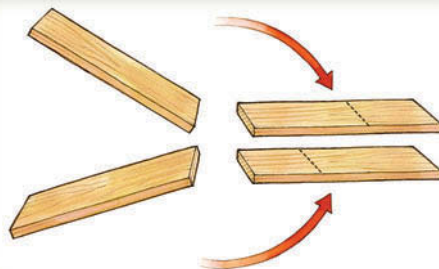
Unlimited design possibilities open up when you vary the texture and color of the wood or introduce contrasting materials such as stone, metal, or fiber.

Resaw for continuous grain

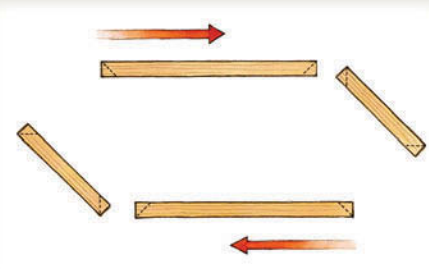
I like small boxes to have thin sides, in proportion with the overall scale. Rather than running stock through a thickness planer and wasting a lot of beautiful wood, I get thinner stock by resawing. Resawing also means I can get all of the parts for a box from a single board, with matching grain at all four corners (see "Keyed, Mitered Boxes," p. 16).



1. On the bandsaw, resaw stock to produce a pair of book-matched halves.



2. Open the halves to put the resawn surfaces on the outside of the box. Cut at the dotted lines to create four sides.

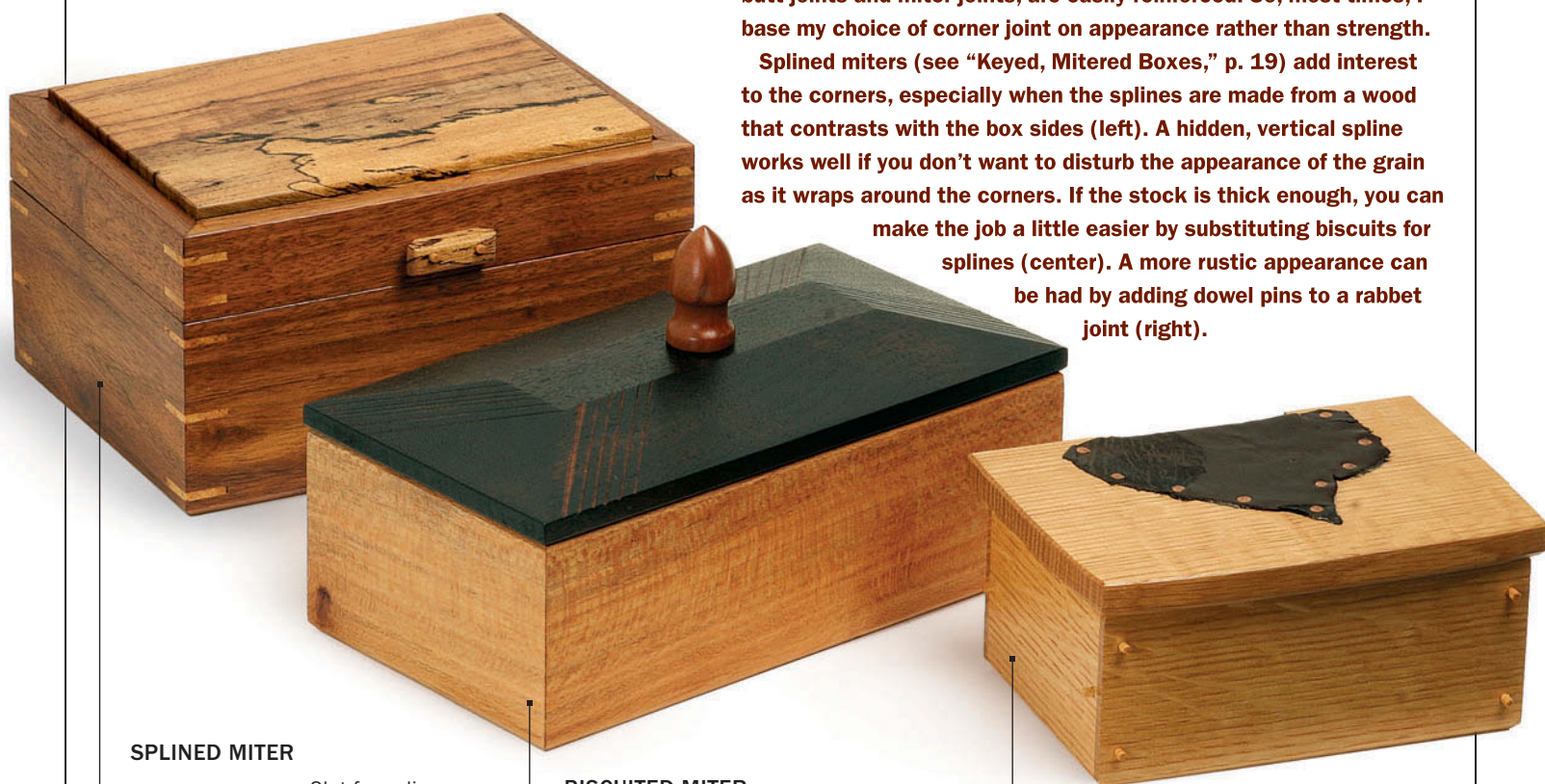


3. Then miter the ends and assemble the box as shown for continuous grain around all four sides.

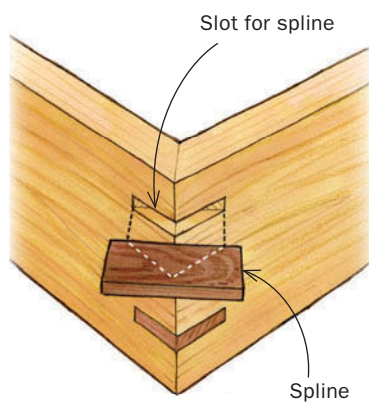
Choose corner joints early on

Most corner-joint options are more than strong enough to hold together a relatively light box. And joints with minimal strength, like butt joints and miter joints, are easily reinforced. So, most times, I base my choice of corner joint on appearance rather than strength.

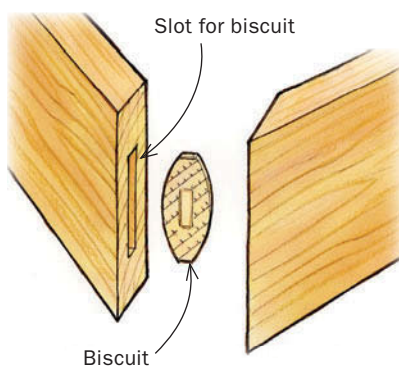
Splined miters (see “Keyed, Mitered Boxes,” p. 19) add interest to the corners, especially when the splines are made from a wood that contrasts with the box sides (left). A hidden, vertical spline works well if you don’t want to disturb the appearance of the grain as it wraps around the corners. If the stock is thick enough, you can make the job a little easier by substituting biscuits for splines (center). A more rustic appearance can be had by adding dowel pins to a rabbet joint (right).



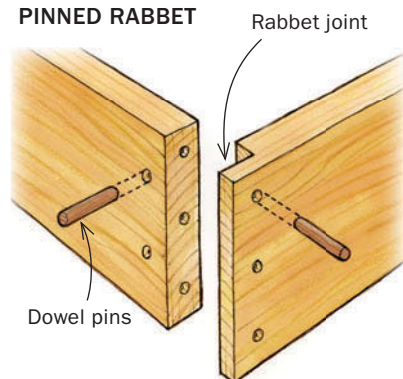
SPLINED MITER



BISCUITED MITER



PINNED RABBET



Traditional favorites

The classic dovetail joint (far left) never goes out of style. Feel free to vary the dovetail angle and spacing to get the look you want. Finger joints (near left) are also eye-catching, and easy to make on the tablesaw using a shopmade crosscut jig.



Rounded disk. A single countersunk screw driven through the bottom of the disk secures it to the corner of the box.

Don't overlook the feet

Add feet to a box and you immediately create a different look. Feet can be as unassuming as small, rounded disks (above left). You also can make feet simply by cutting away some of the bottom edge of each side (below left), or mounting the box to a mitered base frame with the bottom edge cut away (above right).

Sometimes, to give a box a more balanced look, I make an oversize bottom (below right) that gives the look of a continuous molding around the perimeter. Generally, I simply round over the edges of this base, and attach it with screws to the bottom edge of the sides. Oversize holes for the screw shanks allow the base to expand and contract in width due to seasonal changes in humidity. Countersink the screw holes so they sit just below the surface.



Cutaway base frame. Cutting away the bottom edge of a base frame also produces feet.



Cutaway sides. By cutting away the bottom edge of the sides, the box effectively ends up with four feet.



Oversize flat bottom. An oversize flat base creates the look of a molding around the bottom of the box.



Dividers and trays add versatility

Some boxes become more useful when you add dividers or trays. A box I make for holding stationery (left) has a sliding tray with three routed recesses for stamps and paper clips, plus a groove to hold a favorite writing pen. My jewelry box (below left) has a fully divided bottom with additional dividers in a sliding tray. A keepsake box (below right) has a mix of six small and three large compartments.

It pays to plan. If you're building a box for a specific use, plan any dividers and trays early in the process. Their size, number, and location will have a lot to do with the ultimate size and shape of the box.



Lid choices abound

Design possibilities soar when you start thinking about the lid. Choices include two-part lids (top left), sliding lids (center left) and rabbeted lift-off lids (bottom left).

Lids can be made from a single piece of solid wood or some variation of a frame and panel. I commonly use an overlapping raised panel that locks into the sides of the lid (below right).

Space inside the grooves allows room for wood movement caused by seasonal changes in humidity. To allow that movement, it's important not to glue the panel in place.



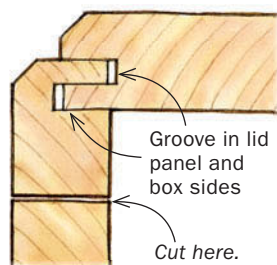
Two-part lid. Stowe used shop-made wooden hinges here. The hinge pins are brass.

Sliding. You open and close the top on this pencil box by sliding it.

Rabbeted lift-off. Gravity holds this lid in place. A rabbet around the underside of the lid keeps it centered.



RAISED PANEL



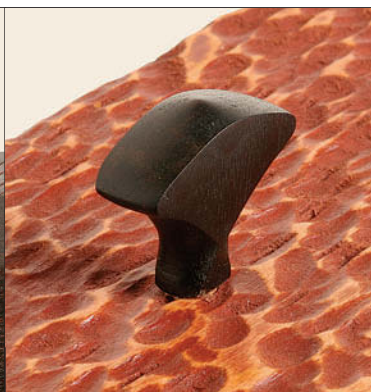
Sawn off. The top, bottom, and sides are assembled, then the lid is cut off about 1 in. below the top edge.

A pull can push the envelope

A well-designed pull looks good while making it easier to open a box. Shown here are some of my favorites. There are as many possibilities as there are types of boxes, so don't restrict yourself to only these designs. Add a little imagination and soon you'll be inventing your own.



Turned. Small lathe turnings make wonderful pulls. A single brass screw holds each one in place.



T-shaped. This profile quietly invites the thumb and forefingers, and is good for heavier lids.



Fan-shaped. Rounded and softened edges give this pull a delicate look that works nicely with lightweight lids.

Hinges, from hidden to handmade

Sliding and rabbeted lift-off lids can become awkward to use when boxes get around 12 in. square or bigger. At that size, I generally find that hinged lids work better.

Depending on the box design, there are several hinge types that I commonly use. Each type adds a distinctive look.



Wood. Shopmade hinges add to the handmade appeal. The flat version (above) is screwed from the bottom. Wood pins secure an L-shaped hinge (right).

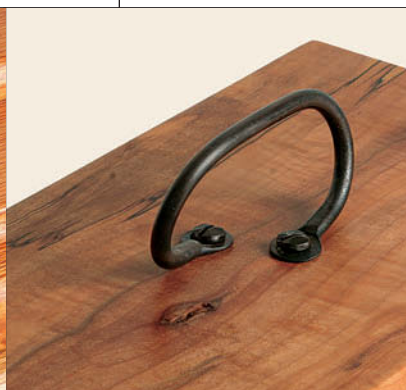


Leather. Three pieces of leather—two end pieces and a center piece—are secured with brass tacks to create a unique hinge.

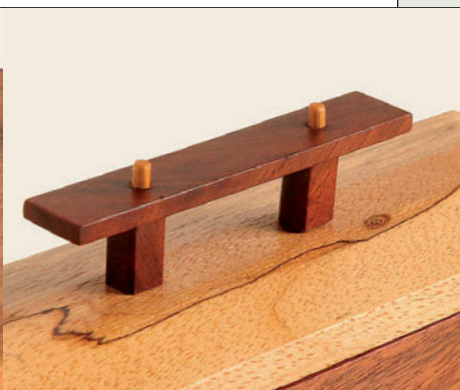


Specialty hinges

A butt hinge (left) with a built-in stop at 95° lets the lid tip back enough to keep it from falling closed (brusso.com). Barbed hinges (below) slip into thin kerfs. They need no screws and are almost invisible (woodcraft.com).



Bent-wire. A single bent wire gives a unique look. This one is from Horton Brasses (horton-brasses.com).



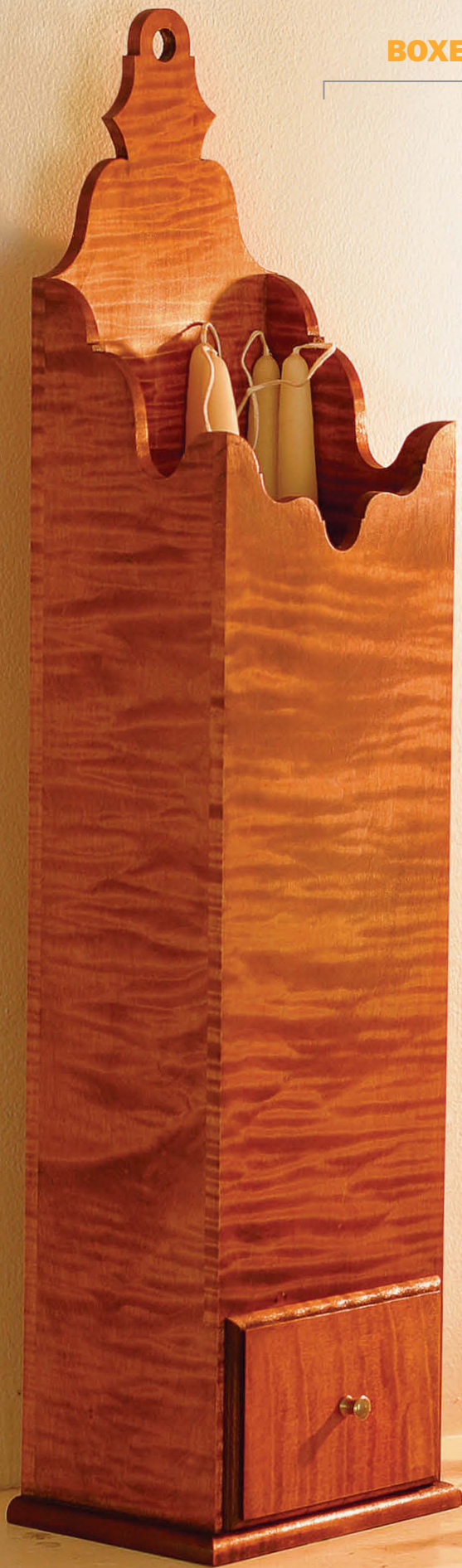
Flat. Flat stock doweled to a pair of posts adds an Asian flavor. Scale the size up or down depending on the box dimensions.



Front-mounted. Mounted to the front of a hinged lid, the pull serves as a lifting point.

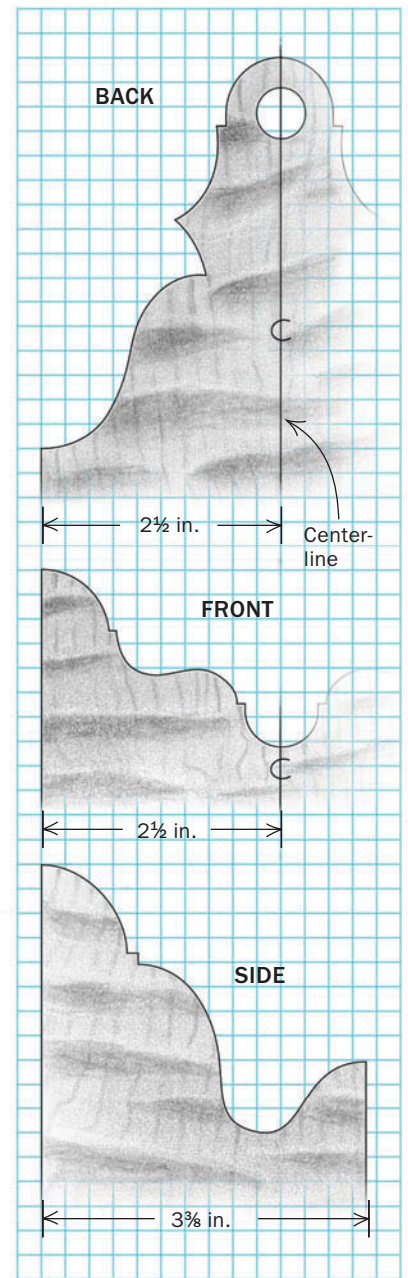
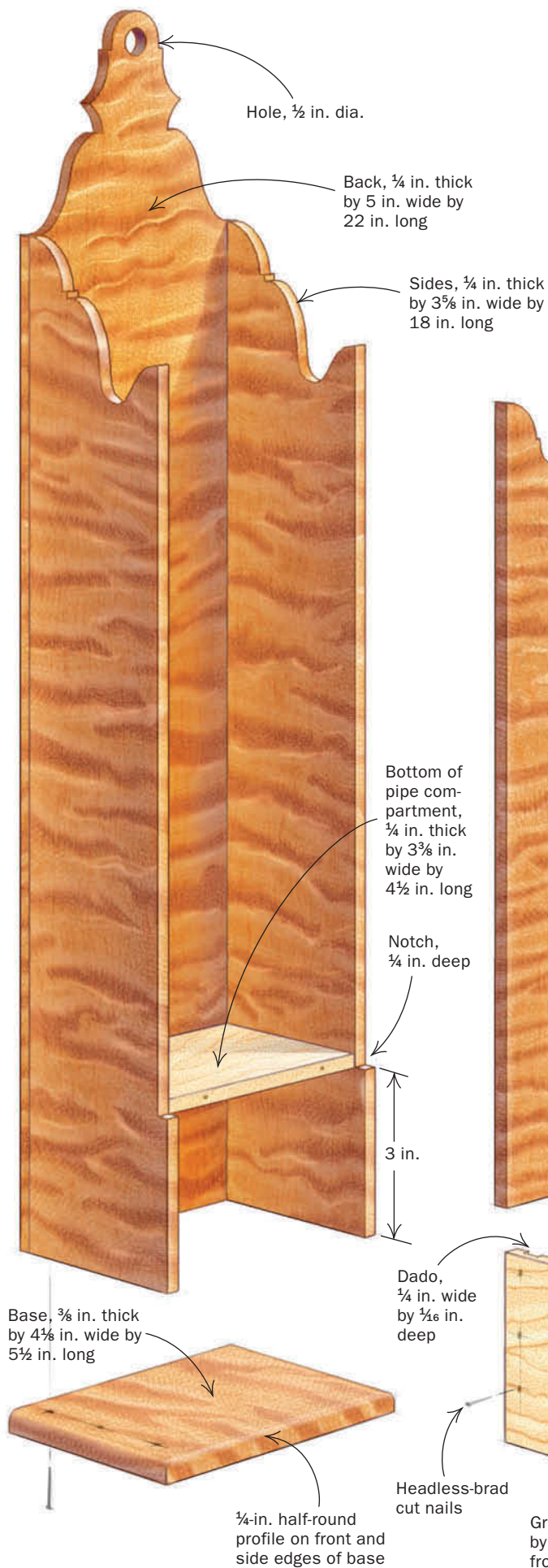


Live-edge. The natural curve of a live edge works perfectly as a lift for some boxes.

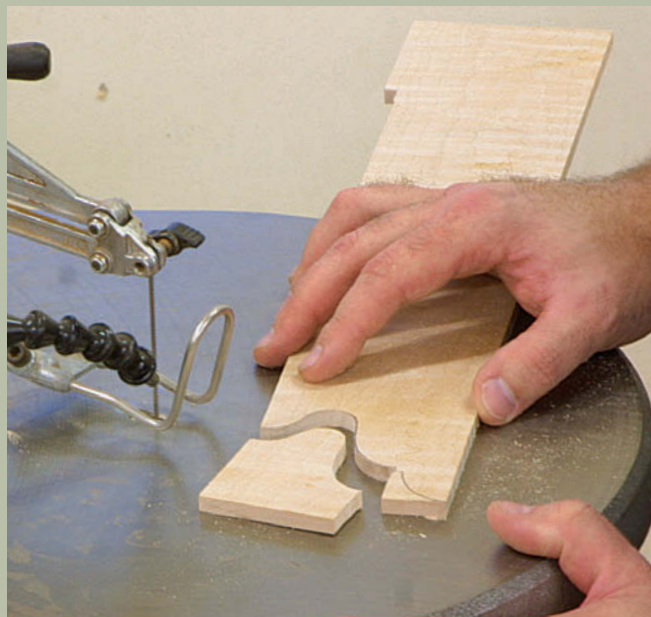


PIPE-BOX CONSTRUCTION

The primary wood for this pipe box is curly maple, and the secondary wood is poplar. Use templates to lay out the scalloped shapes on the front, back, and sides of the box. The patterns here are drawn on a $\frac{1}{4}$ -in. grid.



CUT THE SCROLLWORK AND ASSEMBLE THE CASE



With a scrollsaw and files, prepare the curves. Make relief cuts to the inside corners of the pattern, then cut each sweeping curve to the relief cut (left). Clean up the sawmarks with half-round bastard and smooth files (above).



face-grain joints where the sides meet the front and back are strong enough with glue alone. Trim the sides flush to the front and back using a card scraper. Then glue the base to the bottom of the case and drill pilot holes on the underside of the base for $\frac{7}{8}$ -in. headless brad cut nails.

Next, install the bottom of the pipe compartment. Dab a little glue above the drawer opening and then slide the bottom into place. To keep the compartment bottom square and perpendicular to the case sides while the glue sets, place $\frac{1}{4}$ -in.-thick plywood spacers along the inside walls of the drawer opening that are as high and deep as the opening. Once the compartment bottom is flat and in the right spot, drill two pilot holes in the front and back and then drive in the cut nails.

Build the drawer

The drawer is assembled with simple but long-lasting glue-and-nail construction. The front has a $\frac{1}{8}$ -in. lip on the top and sides (but not on the bottom) that covers the reveal around the opening.

Carefully measure the opening and add $\frac{1}{4}$ in. to the length of the drawer front and $\frac{1}{8}$ in. to its width, and cut the piece to size.

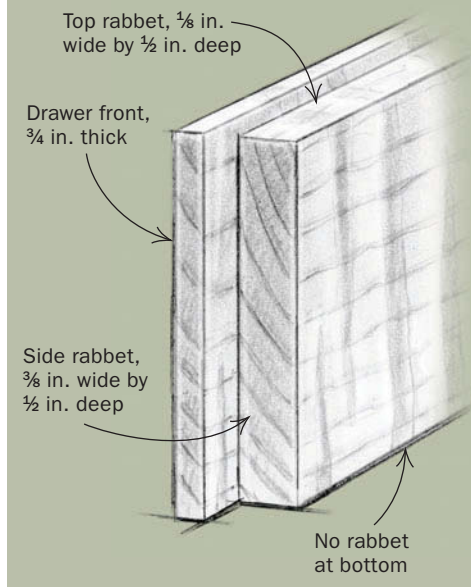
Use a router to cut the rabbets along the sides and top of the drawer front. Allow for clearance by cutting the top rabbet a little wider than the lip thickness, and the side rabbets a little wider than the overall thickness of the drawer side and lip: $\frac{1}{32}$ -in. clearance above and $\frac{1}{64}$ -in. clearance on each side of the drawer will leave enough



Gentle glue-up. Light clamping pressure is all that's needed for the front and back side joints (left). When installing the compartment bottom, use spacers to hold it square while the glue dries, then reinforce with nails set below the surface.

BUILD THE DRAWER WITH RABBETS AND CUT NAILS

The lip on the drawer front covers the top and side edges of the opening. The side rabbets are deep enough to accommodate the thickness of the drawer sides, and the thumbnail profile on the drawer front complements the one on the base.



Route the rabbets and profile. Use a straight bit to rabbet the sides and top of the drawer front (left). Next, use a 3/16-in.-radius roundover bit to rout the thumbnail profile on the drawer face (above). Start with the left edge and work in a clockwise direction to remove any cross-cut tearout. A zero-clearance fence helps reduce tearout.

space for a drawer this small. Next, with a 3/16-in.-radius roundover bit, cut the profile, with a 1/16-in. step, on all four sides of the drawer face.

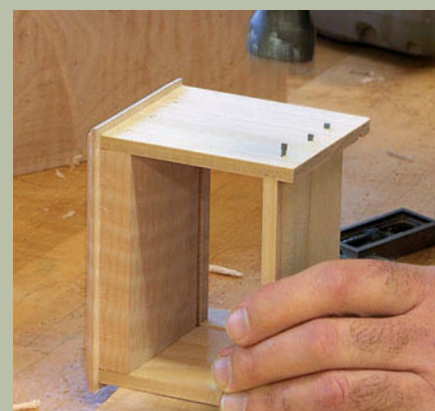
Once the drawer front has been fitted to the opening, cut parts for the sides and the back. The width of the side and back parts matches the long edge of the side rabbet, and the length of the back matches the length of the top rabbet plus twice the depth of each dado. To prevent the drawer from striking the back of the pipe box, cut the back end of the drawer sides 1/16 in. shorter than the depth of the opening.

Cut 3/16-in.-wide by 1/16-in.-deep grooves in the sides and the front for the drawer bottom. Then raise the blade slightly and rip the drawer back. The width of the drawer back matches the distance

between the top of the side and the top of the drawer-bottom groove. Finally, cut 1/4-in.-wide by 1/16-in.-deep dados into the sides for the back of the drawer.

After the drawer has been assembled, bevel the front and side edges of the drawer bottom, slide it in, and drive a cut nail from the bottom into the drawer back. Glue the front edge and the first 1/2 in. of the sides of the bottom to force the wood movement to the back of the drawer. Finally, cover visible nail heads with wood putty that will accept stain. Finish the box with an aniline dye, followed by several coats of amber shellac, and install a brass drawer pull to complete the project. □

Lonnie Bird teaches woodworking at his school in Dandridge, Tenn. (lonniebird.com).



Pilot holes prevent splitting. Drill pilot holes after gluing and before nailing the sides to the front. Glue the back to the sides, drill pilot holes (top), and nail (bottom).



A traditional option

If you want a challenge, you can build the drawer for the pipe box using dovetails and add a Massachusetts shell carving.



Online Extra

Learn to carve a shell at FineWoodworking.com/quickprojects.

Custom Cutting Boards

Great gifts from leftover wood

BY TIM ALBERS

A cutting board is a good destination for short or narrow offcuts of attractive wood. Nicely designed cutting boards also add a touch of custom woodworking to your kitchen. And if you use templates to make your boards, as I do, you can churn out a stack of gifts.

While any slab of wood can be used as a cutting board, there is more to this topic than first meets the eye. You want a safe surface for food preparation, and one that will stand up to sharp blades and lots of moisture. There are also issues of form and function: The goal is a board that is both beautiful and suited to its specific purpose, whether for slicing meat, bread and cheese, or fruits and vegetables, or just for serving.

Avoid soft or oily species

The first step is selecting the wood. Cutting boards are pretty simple as woodworking projects go, so more emphasis is placed

on the wood's appearance as one of the primary design factors. Durability is another concern. Hard maple is the traditional choice for making a cutting board, but nearly any hardwood will stand up well in the home kitchen.

Most woods are safe for kitchen use, though there are a few to avoid. Stay away from the rosewoods, such as cocobolo, and don't use olivewood, yew, or sassafras. Basically, avoid any wood that is known to cause allergic reactions or that has a high oil content, making gluing more difficult. It may seem obvious, but avoid softer woods like poplar, pine, and fir that will not hold up well to chopping and slicing. Deep cuts and cracks are potential homes for bacteria.

If you want to err as far as possible on the side of caution, stick with hard maple. It's a little tougher to work with, but it creates a smooth, durable cutting board, and it's available with a wide range of figure, such as quilted, curly, and bird's eye.

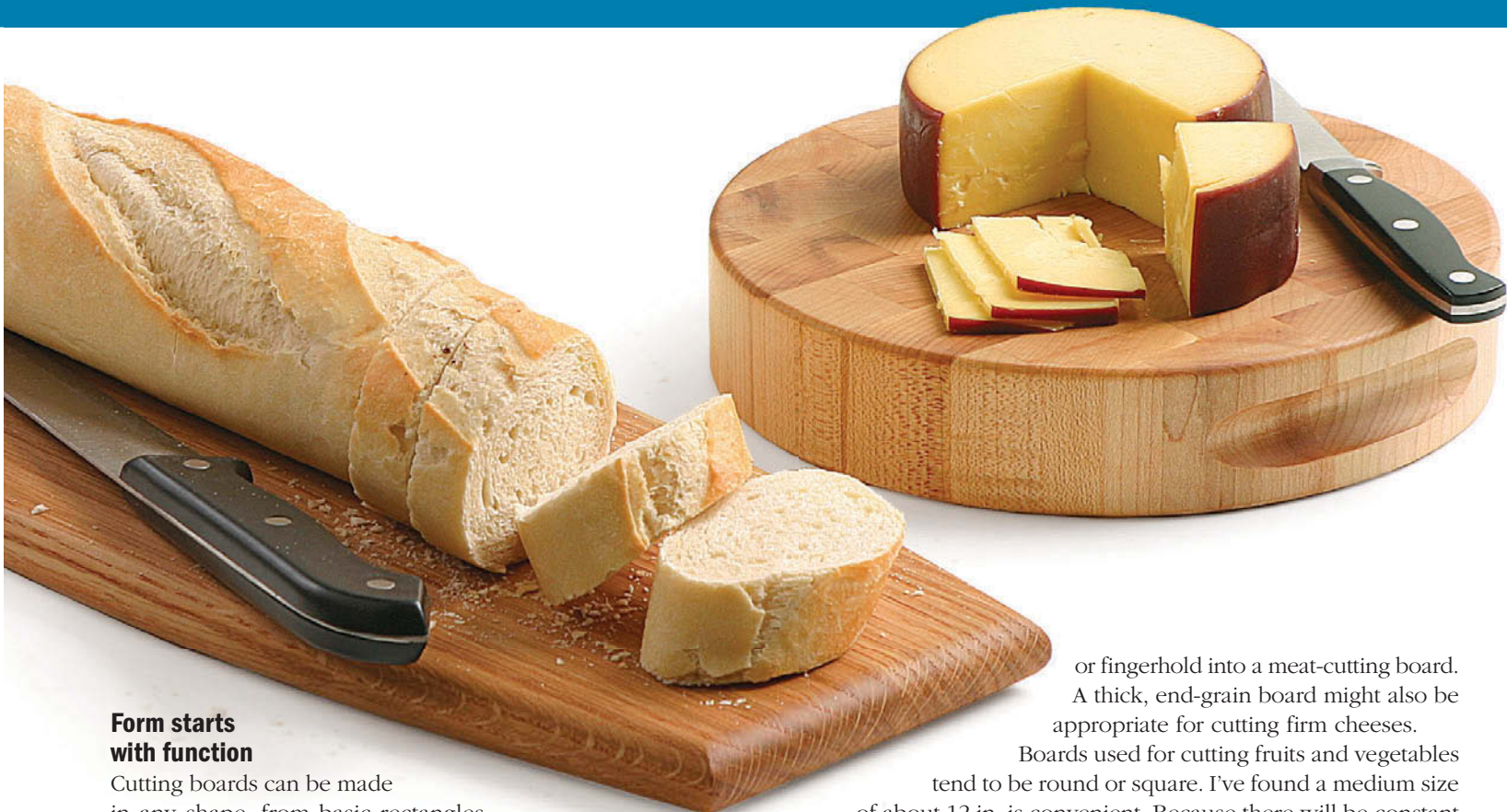
Use a router template to make multiples



Start with a template. This lets you fine-tune the shape before cutting into your good wood. Trace the shape onto the stock.



If you need one, rout the juice groove next. Use the first template to make an outside template, which will guide a top-bearing, roundnose router bit (top) or a router outfitted with a template guide.



Form starts with function

Cutting boards can be made in any shape, from basic rectangles and rounds to whimsical shapes or characters. There are no hard-and-fast rules. Traditionally, however, cutting boards are designed around their intended uses.

Boards designed for cutting meats can be round or rectangular, but should be designed to take a pounding. End-grain boards work well: Their durability and thickness are suited to the abuses of heavy chopping and cutting, while the extra mass keeps the board from sliding around the counter. End grain also has less of a dulling effect on knife blades than edge or face grain. Because of the extra weight, it's a good idea to incorporate some form of handle

or fingerhold into a meat-cutting board.

A thick, end-grain board might also be appropriate for cutting firm cheeses.

Boards used for cutting fruits and vegetables tend to be round or square. I've found a medium size of about 12 in. is convenient. Because there will be constant contact with liquids, edge-grain boards work well. Quartersawn lumber will allow for a thin but stable board with plenty of durability. Quartersawn stock often is narrow, which opens the door to using striped patterns of alternating woods.

A juice groove should be part of any board intended for cutting meats or fruits and vegetables. A juice groove is simply a recess cut or routed into the board's surface to collect liquids and prevent them from running onto the counter or floor.

For breads and cheeses I often make rectangular boards that resemble a loaf of bread or block of cheese, with a lighter profile



Saw and rout the perimeter. Saw close to the line before routing with a bearing-guided, flush-cutting bit.



Shape the edges. A bearing-guided bit makes a partial roundover on this board. Flip the board to complete the profile.

Many shapes and sizes

Cutting boards are best shaped to fit their cargo—long boards for bread, rounds and squares for cheese or meat, wide boards for fruits and vegetables. End grain and edge grain will stand up to a lot of abuse, while face grain is an attractive option for serving boards and bread boards, which don't encounter as much moisture or heavy cutting.



and an elegant handle. Bread and cheese boards don't take as much abuse as meat boards, and therefore don't have to be quite as tied down by their purpose. Figured woods and highly sculptured profiles and handles are common. Without constant water contact, face grain will hold up just fine.

If you have room to store them, it's nice to have some boards dedicated to serving. These can be made from figured wood or can incorporate elegant design features that you wouldn't necessarily use in a basic cutting board. These boards are great for serving breads, cheeses, or even appetizers. In creating some of these designs, I was particularly inspired by the cutting boards of Edward Wohl, a Wisconsin woodworker (edwardwohl.com).

Lighter boards can have hanging holes incorporated into their designs, either in the handle or in the body. Holes make storage easier and safer, and they can turn a stylish board into a wall decoration.

Glues: food-safe and waterproof

Through trial and error I have found the best results with high-grade polyvinyl acetate (PVA) glues, such as Titebond II and III, which contain a catalyst and are considered cross-linking glues. The catalyst creates a stronger bond than standard PVA glues. And Titebond II and III glues (when dry) are approved by the FDA for indirect food contact.

However, with any PVA, if you routinely submerge your cutting boards in water, you risk the glue joints failing eventually. Generally, a wooden cutting board should not be submerged in water or put in the dishwasher. It should be cleaned with warm water

and soap, toweled dry, and left to air-dry further, preferably not lying on a flat surface.

Sand finely for a blotch-free oil finish

Since many of the boards are made with figured woods, I like to do most of my heavy sanding or scraping while the board still is a wide slab, before it is shaped. If you try to do a lot of sanding afterward, it will be harder to hold onto the workpiece and you'll likely create a low spot somewhere or round over crisp edges.

After the board is sanded to P150-grit paper, cut and shape the profile. Then sand the board to P400-grit for a blotch-free oil finish. For a really smooth finish on end grain, go to P600 grit.

Two food-safe finishes

Like construction, finishing is straightforward. Flood the board with oil and let dry, wiping off the excess after 20 minutes. Mineral oil is the traditional choice. Look for mineral oil that meets the standard set by the United States Pharmacopeia (USP) organization, labeled "USP grade" or "meets USP standards." Mineral oil comes in different viscosities, typically light, medium, and heavy. A lighter grade will provide slightly better penetration as an initial coat. A word of caution: Mineral oil can weep from the board for days, so let the board sit on paper or an old towel to catch the excess.

An alternative finish is walnut oil, which is applied in the same manner as mineral oil. The advantage of walnut oil is that it actually dries after a day or two, whereas mineral oil never completely dries. Both finishes are easily renewable. □

Tim Albers is a part-time woodworker in Ventura, Calif., and loves to eat.

Get a grip

RAISE THE HANDLE

Raised handles require an extra layer of stock when gluing up, and some hand-shaping.

Glue an additional layer of stock at handle area.



PAN HANDLE



ROUT A FINGERHOLD

Fingerholds make nice handles in a thick board. This maple board features edge grain for stability and durability, and a juice groove to collect liquids.

ADD FEET

A raised cutting board allows better airflow, and a dry board is inhospitable to bacteria.



Greene-and-Greene Frame



Cloud-lift pattern and square pegs
are classic details

BY KELLY J. DUNTON

A picture frame is an ideal project for a woodworker, regardless of skill level. It requires very little material, so it's inexpensive to build. Plus, it can be built quickly, offering a nice change of pace from complicated furniture projects that can take weeks or even months to complete.

With its rounded edges, stepped sides, square pegs, and distinctive cloud-lift patterns, this Greene-and-Greene-inspired frame resembles a piece of heirloom furniture. But I added a twist to the design by carving around the edges of the cloud lifts, and by using cherry instead of mahogany, which the Greenes favored.

Sturdy mortise-and-tenon joints hold the frame together, while the framed materials sit inside a rabbet. The profiles are cut with a jigsaw or bandsaw and cleaned up with

a router and a simple half-template. And the carving, done with a marking knife and chisel, is a good introduction to some basic carving techniques.

Joinery first

The frame fits a standard mat that is 18 in. tall by 24 in. wide. The dimensions can be adjusted for different frame sizes, but check that the framed materials will fit the rabbet. If possible, build the frame from a single board—it will be easier to match the grain patterns and tones of the wood.

Cut the joinery before the curves—it's easier to work on square pieces. I used a hollow-chisel mortiser to cut the mortises on the rails first. Then I cut the tenons on the stiles at the tablesaw using a dado blade, and used a shoulder plane to fine-tune the fit of the tenons. The rabbet runs

Sturdy joinery

FAST MORTISE-AND-TENONS

Beefy tenons make this frame stronger than the mitered joints of a typical frame.



Mortises first. A hollow-chisel mortiser makes quick work of the mortises, but you can also use a drill press and square the corners with a chisel.



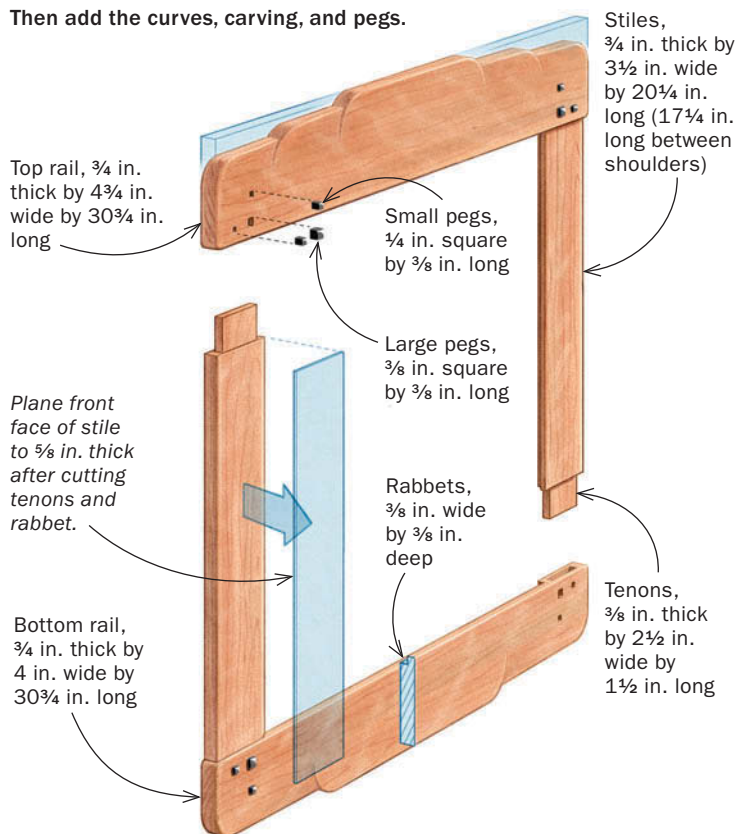
Dado the tenons. A miter gauge and a stop block ensure equal shoulder-to-shoulder length.



Rabbet the stiles. At the router table, cut through-rabbets on the inside edges of the stiles.

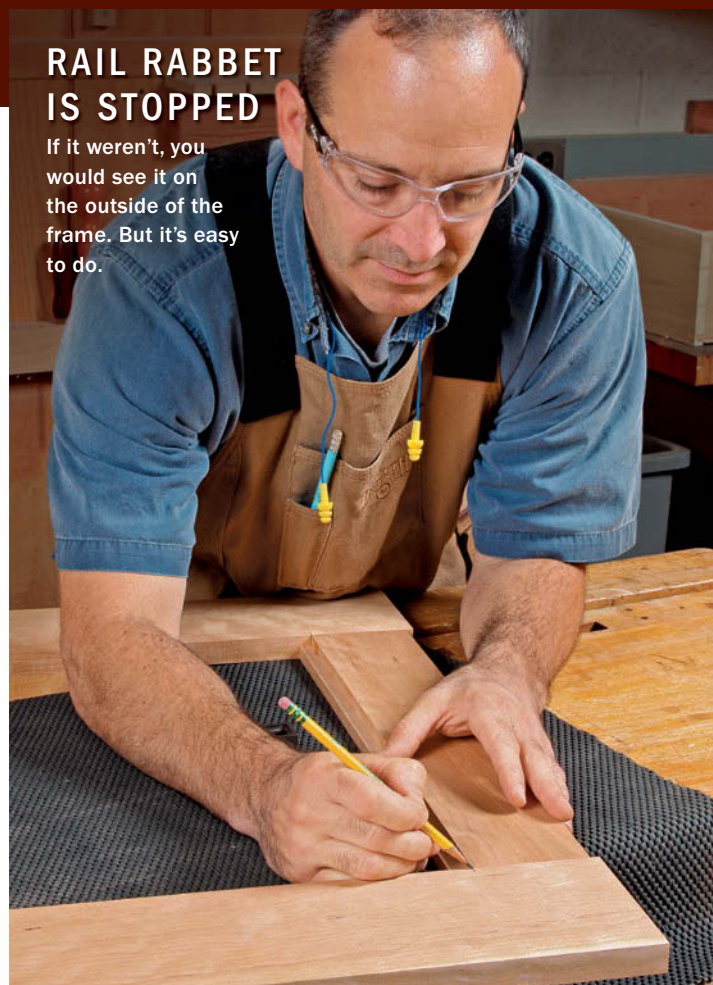
SIMPLE ANATOMY

Leave the pieces square while cutting the joints. Then add the curves, carving, and pegs.



RAIL RABBET IS STOPPED

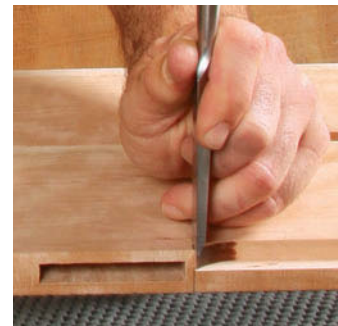
If it weren't, you would see it on the outside of the frame. But it's easy to do.



Mark the ends. Dry-fit the frame and use a pencil to transfer the stopped rabbet marks from the stiles to the rails. Carry the marks to the opposite face with a square.



Line it up. Mark the edges of the rabbeting bit on the router-table fence and align the marks with those on the workpiece. Pivot in to start the cut and pivot out to stop the rabbet.



Square the edges. Mark the ends of the rabbet with a knife and then square them with a chisel. Nibble away, working toward your scribe lines.

Use a template to rout the profiles

MAKE A PAIR OF HALF-TEMPLATES

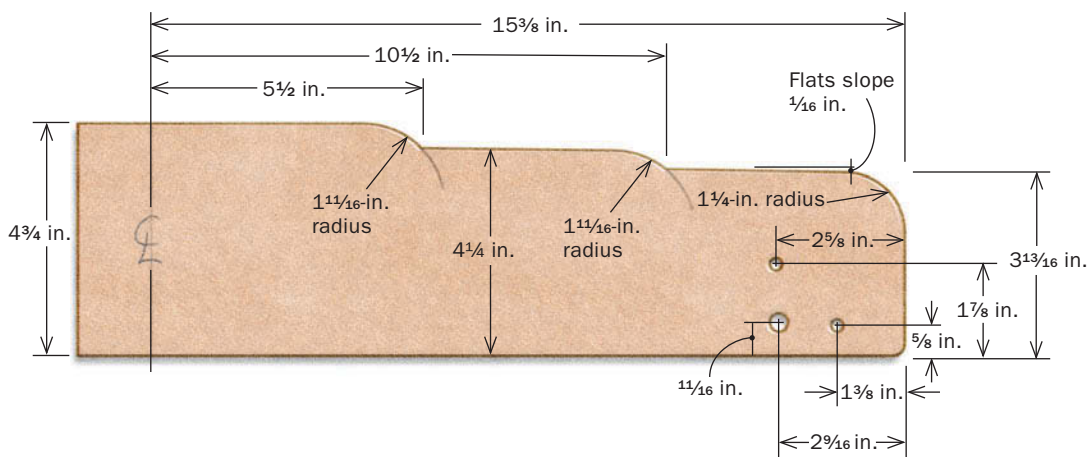
The half-templates, made from ½-in. MDF, make it easy to cut symmetrical curves and align the pegs.

Uncanny curves. After marking the guidelines on the template, use the bottom of a can to draw the curves.

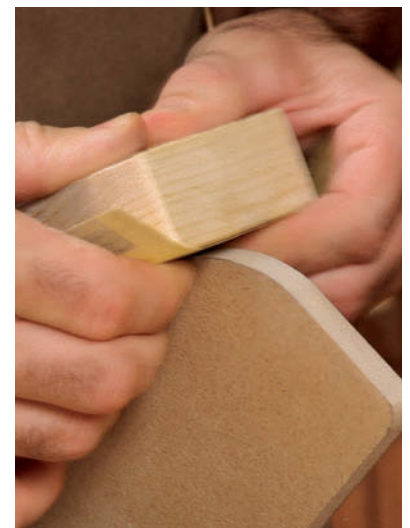
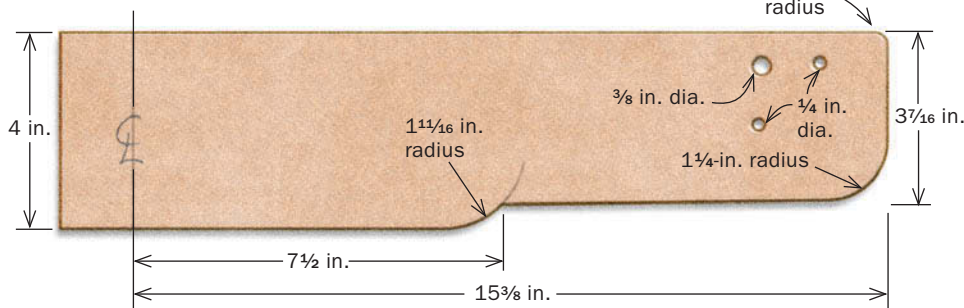


Bandsaw the profiles. Stay close to the line.

TOP TEMPLATE



BOTTOM TEMPLATE



Final prep. Use a sanding block to clean up the edges and shape the templates as perfectly as possible. Defects in the template will transfer to the workpieces during routing.

the entire length of the stiles, but stops short of the ends on the rails. It's easiest to cut the rabbets at a router table with a 3/8-in. rabbeting bit.

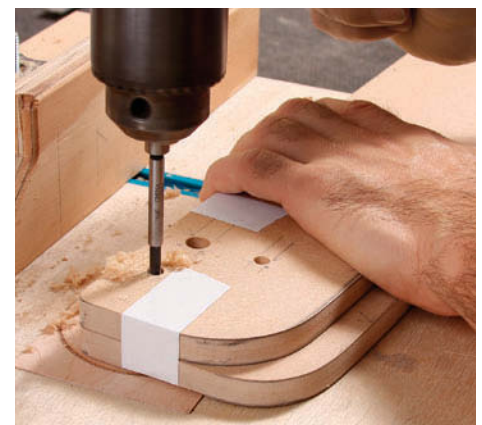
Rabbet the stiles first. Then dry-fit the frame to mark the stopped ends. Disassemble the frame, rabbet the rails, and use a chisel to square the rabbeted corners.

After rabbeting, plane 1/8 in. of material from the top faces of the stiles. The planing gives the frame a layered look—a key Greene and Greene design element.

Half-templates ease curves

The cloud-lift patterns on the rails are another design element of the Greenes. Cut them using half-templates for each rail. The templates ensure both sides of the profile will be symmetrical, and they also locate the holes for the peg mortises.

Make the templates from a piece of 1/2-in.-thick MDF that is the same width as the rail, and a few inches more than half the length. The extra length will help guide the router bit into the cut.



Drill holes once. Mark the peg holes on one template and tape it to the other to drill a matched set of holes.

PERFECT PROFILES

Place the template on each side, aligning it with the centerline.

Lay out the curves. Mark the profile on both sides of the rails, and bandsaw the curves. Stay about $\frac{1}{8}$ in. to the waste side.



Then stick it on. Use double-sided tape to attach the template to the rail.

You can use the scale drawing to lay out the curves on the template, but I just used cans with similar radii. The largest can will also help later when carving. Draw and cut the template with a jigsaw or bandsaw, and clean up the edges with a file or sandpaper. Then drill the holes in the corners.

Align the centerlines of the template and rail, and trace the template onto both halves. Cut away the waste and use double-sided tape to affix the template to the workpiece. Flush-trim the rails to the template with a bearing-guided bit on the router table (see photos, right).

While the templates are on the top faces, use drill bits—Forstner, if possible—as transfer punches to mark the centers of the peg mortises. Cut the holes at the drill press, using a piece of scrap in the frame mortises to prevent blowout.

After drilling, use sandpaper or a handplane to surface the workpieces, and round over the edges of the rails and stiles with a handheld router.

Carving complements stepped look

The shallow carving around the cloud lifts extends the line of the curve into the rails, and adds a three-dimensional look to the surface. Start the carving by placing the largest can on one of the inside curves on the frame. Scribe around the can with a marking knife to sever the wood fibers.

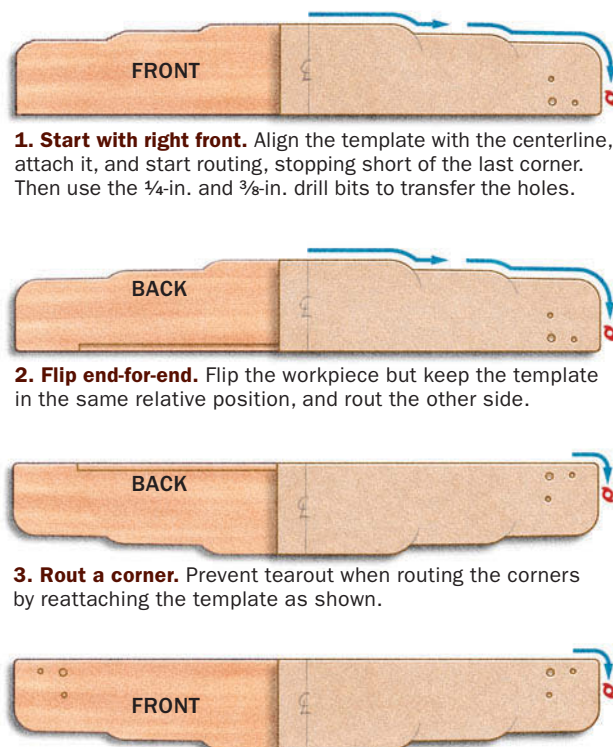
Use a 1-in.-wide chisel to pare along the frame's face into the scribed line. Cut deepest at the edge of the frame, and taper toward the middle. You may need to deepen the scribe line with the marking knife. Clean up the carving with sandpaper and round over the edge to match the routed



Rout downhill. A flush-trimming bit follows the template, but you must rout down the curves to prevent blowing out the grain.



Transfer punch. With the template in place on the front of the rails, use drill bits to mark the peg locations.



1. Start with right front. Align the template with the centerline, attach it, and start routing, stopping short of the last corner. Then use the $\frac{1}{4}$ -in. and $\frac{3}{8}$ -in. drill bits to transfer the holes.

2. Flip end-for-end. Flip the workpiece but keep the template in the same relative position, and rout the other side.

3. Rout a corner. Prevent tearout when routing the corners by reattaching the template as shown.

4. Rout the other. Flip the workpiece end-for-end and reattach the template. Rout the corner and then transfer punch the remaining holes for the pegs.



Round all the edges. Round over all edges with a router and a $\frac{1}{8}$ -in. roundover bit. But avoid the shoulders of the stiles.

Relief carving

The same can used to make the templates extends the curves onto the frame, and guides the carving.



Scribe the edge. Line up the can on the profile and continue the curved line. The knife line gives the paring cuts (right) a place to stop cleanly.



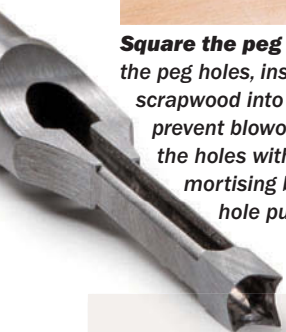
Ease into the line. Use a 1-in. chisel to pare along the face, into the knife line. Recut the line as needed.



Crisp curves. Square up the inside corners left round by the router bit. Then pare along the edge to extend the roundover.



Square the peg holes. Drill out the peg holes, inserting a piece of scrapwood into the mortise to prevent blowout. Then square the holes with a hollow-chisel mortising bit or a square hole punch (see below).



SOURCES OF SUPPLY

Hollow-chisel mortising bits
1/4 in. and 3/8 in., \$14.50 each

Square hole punches
1/4 in. (\$25.50), 3/8 in. (\$27.50)

leevalley.com



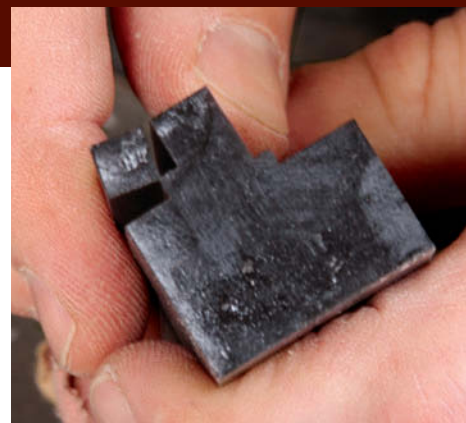
Glue and clamp. After carving and drilling the peg mortises, brush glue in the mortises only (to avoid squeeze-out) and clamp the frame along the stiles.

Greene-and-Greene pegs made easy

Cut the pegs from an ebony pen blank and shape them before gluing them in place.



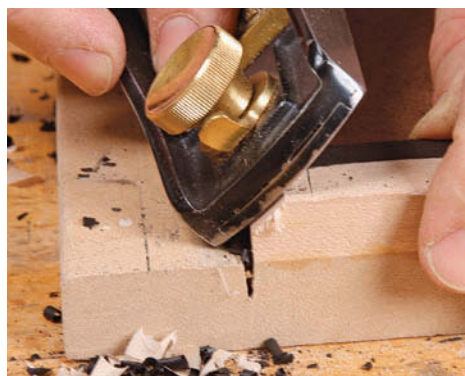
Cut the kerfs. A thin-kerf blade will make straight cuts with minimal waste—a bonus with expensive, exotic woods like ebony. Dunton uses a scrap piece to hold the block against the fence.



Not too deep. Leave just enough material so the ebony strips stay safely attached to the blank on the tablesaw, but snap away cleanly by hand afterward.

Online Extra

To see Dunton make these pegs, watch the video at FineWoodworking.com/quickprojects.



Chamfer first. Use a block plane and bench hook to chamfer the ends of the stock.



Soften second. Pillow the pegs by rounding the chamfered ends on a piece of 320-grit sandpaper on top of a folded napkin.



Insert carefully. To avoid squeeze-out, put glue in the mortise only. Then tap the peg down to just the right height.

edge. After carving, glue up the frame and let it dry for a few hours.

Add pegs to corners

The solid-wood pegs in the frame's corners add a decorative detail to the frame, but they don't actually peg the tenon in place. It's OK; the mortise-and-tenon joints are plenty strong enough for a picture frame.

Greene-and-Greene pegs are gently pillowed, which can be tricky to shape. I find it best to start with a square strip cut from a pen blank. Chamfer the ends with a block plane, then round the chamfers by rubbing the ends into a piece of

sandpaper. Cut off the pillowed ends with a handsaw to get the pegs.

Apply a dab of glue to each peg and set it in place with hand pressure. The pegs should sit evenly, so when gluing be careful to avoid sinking them too deeply. I find it's easiest to set all three in place and then tap each one down a little at a time until they are about equal height from the surface—about $\frac{1}{16}$ in. higher than the face.

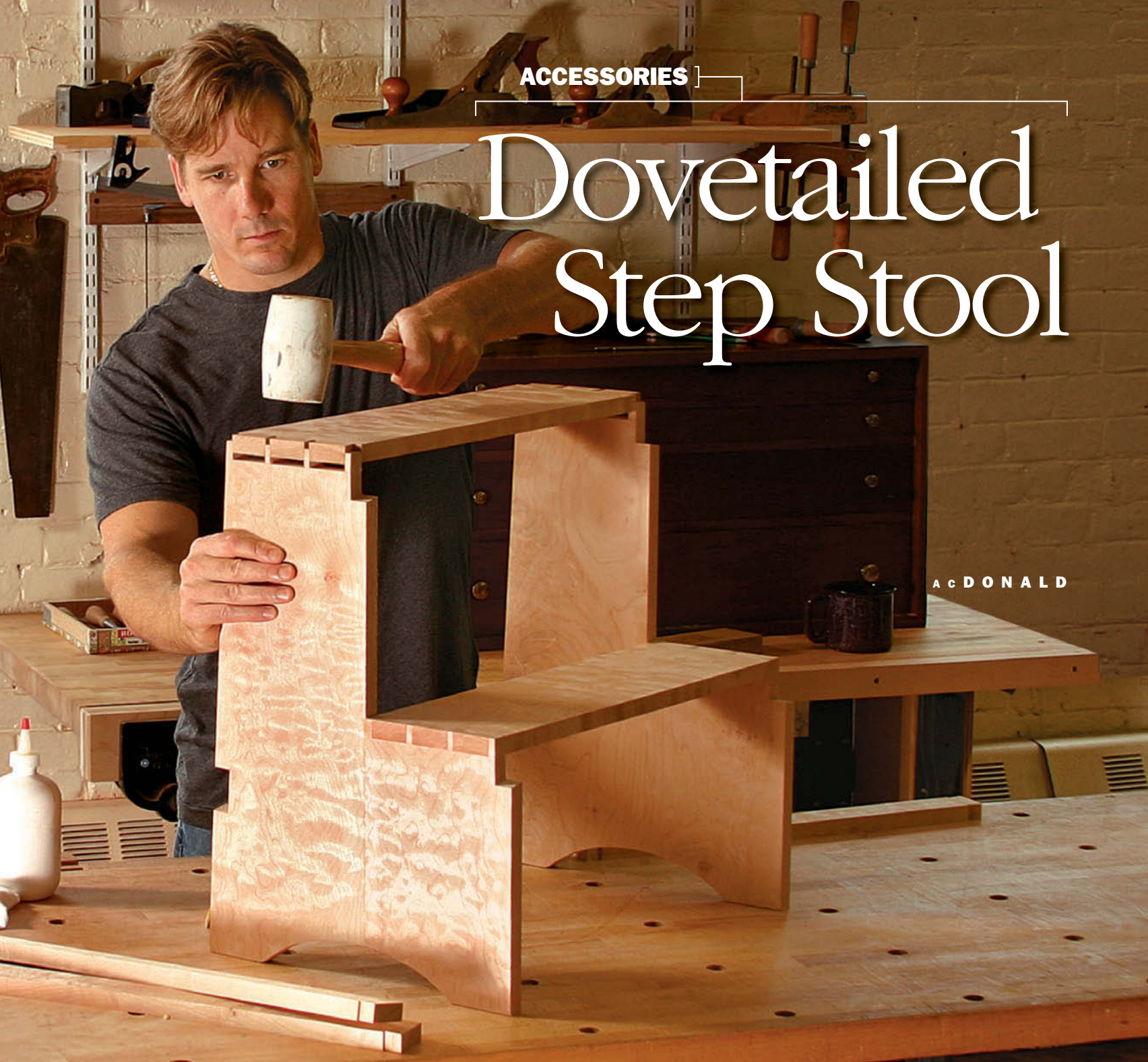
Finish the frame with a washcoat of shellac, and two to three coats of Minwax Antique Oil finish. □

Kelly J. Dunton is an associate art director at Fine Woodworking.



Dovetailed Step Stool

A C DONALD



The design of a Shaker two-step stool isn't complicated. There are two steps, two sides, and three stretchers, all joined by dovetails. The crisp, unadorned lines are elegant. My version—influenced by the work of Ira Richer, a former classmate at North Bennet Street School—preserves the simplicity and elegance, with some embellishment. I added a slight but graceful curve to the stretchers

in front of the steps, and tapered the back of the stool outward from top to bottom to make it more stable.

If you're an experienced hand-tool user, this stool is a great opportunity to put your skills on display. There are no hidden parts, so all of your work is visible. It lets you show just how far you've come.

Beginners, though, shouldn't be scared off. I'll show you how a pair of dividers

and a small guide block can bring beautiful hand-cut dovetails within your reach. And because the stool is a small project, you can take your time and practice on scrap before cutting into good stock.

There's more to this stool than an exercise in hand-tool use, though. Its stability makes it perfect for children who need to reach a sink or bookshelf, or for you when you're reaching a high shelf. It also makes

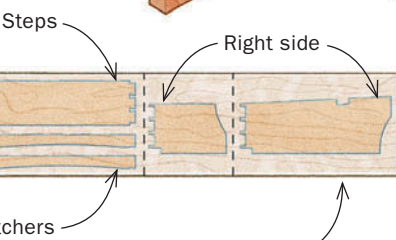
LAY OUT THE STOCK



This stool really shines if it appears to be made from a single wide board. Careful layout gives a grain and color match good enough to make the glue joints on the sides almost disappear. It also gives the appearance that the grain wraps continuously from one side, across the steps, and to the other side.

Top and bottom stretcher, $\frac{3}{4}$ in. thick by $1\frac{3}{4}$ in. wide ($1\frac{3}{8}$ in. at center) by $20\frac{1}{4}$ in. long

Top and bottom step, $\frac{3}{4}$ in. thick by 6 in. wide by $20\frac{1}{4}$ in. long

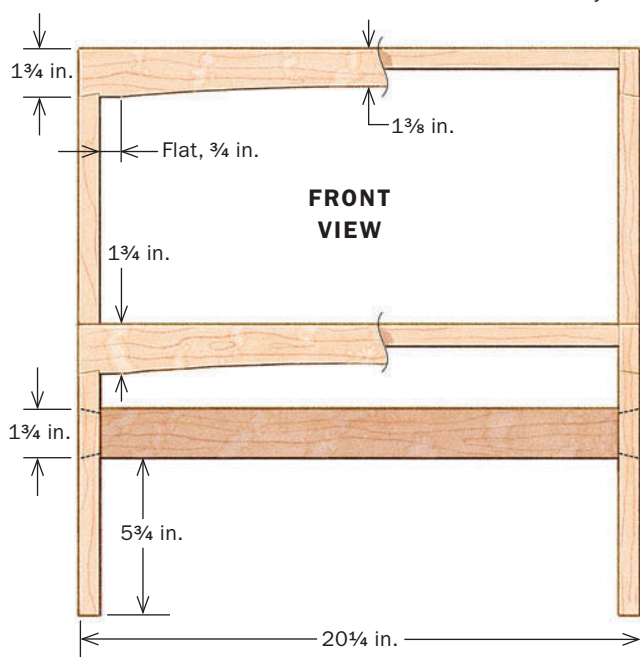


*All parts are rough-cut 1 in. longer than finished length.

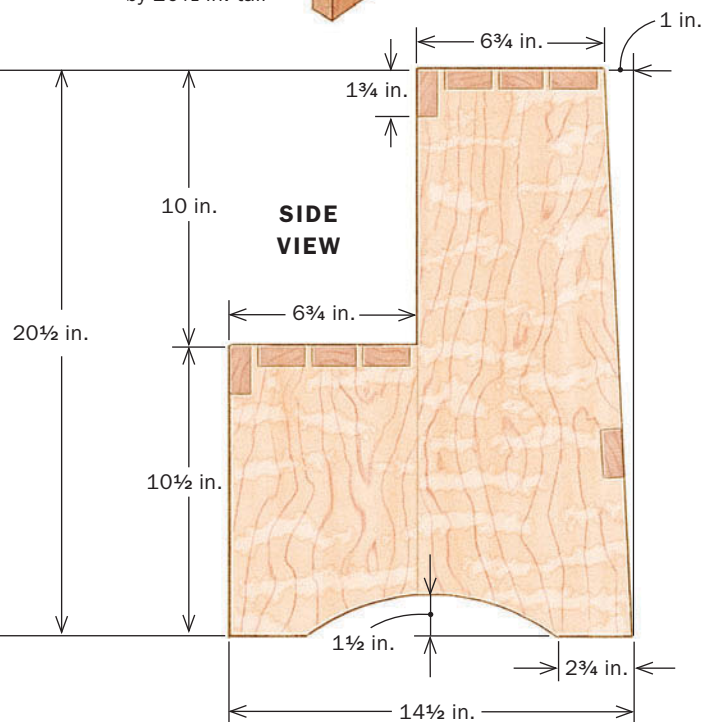
All parts can be cut from a single board 10 in. wide by 10 ft. long.

Side, $\frac{3}{4}$ in. thick by $14\frac{1}{2}$ in. wide by $20\frac{1}{2}$ in. tall

Back stretcher, $\frac{3}{4}$ in. thick by $1\frac{3}{4}$ in. wide by $20\frac{1}{4}$ in. long



FRONT VIEW



SIDE VIEW

Gap-free dovetails by hand

1 ACCURATE LAYOUT

Taper the back edge before laying out the dovetails. Otherwise, you might cut dovetails where the taper should be and ruin the work you put into laying out the stock.

Scribe a shoulder line. Set a marking gauge to the thickness of the step board and scribe a shoulder line on the inside and outside faces of the sides, but not the edges. Then scribe all the way around your step boards.

2 PINS FIRST

On the sides of this project, it makes sense to start with the pins. The wide spaces between them make it easy to transfer them to the tail board.

Backsaw defines the pins. Cut to the outside of the layout lines, leaving about $\frac{1}{16}$ in. to be pared away.

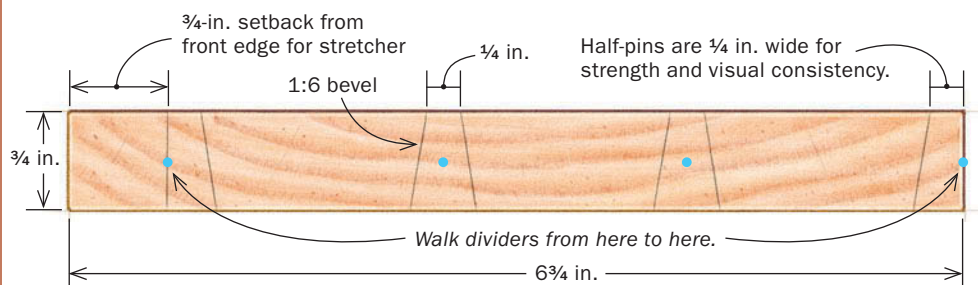
Find the pin centerlines. After marking the notch for the front stretcher, and the half-pins, open a pair of dividers about 1 $\frac{1}{2}$ in., and walk them from the notch to the end of the board. Adjust them until you finish right at the edge. Now you can mark the centerlines of the full pins.



Mark the pins on the ends and faces. Use the centerlines as a reference, orienting the pins so the narrow end is on the outside faces of the sides. A dovetail marker gives consistent angles.



Coping saw removes waste. The first pass is a scooping diagonal cut. A second cut across and close to the shoulder line leaves little material to be pared away.



a great spare seat or plant stand. This two-stepper is functional in the modern home, but its Shaker heritage is clear.

Smart layout sets stool apart

To achieve uniform color and grain, try to make this stool from a single piece of lumber, 10 in. wide by 10 ft. long. If you don't have the tools needed to mill rough $\frac{3}{4}$ in. thick, use boards premilled to $\frac{3}{4}$ in. thick. Start by trimming each end of the

board to get rid of any checks in the end grain. Next, lay out all of the parts on the board (see drawing, p. 49). This is an important step. Each side is made from two boards because cutting and fitting dovetails is easier when you're not dealing with a large, awkwardly shaped panel, but they'll look like a single wide board if your layout is done carefully.

Lay out the two boards for the left side, then the two steps and their stretchers,

then the two boards for the right side. Fit in the rear stretcher alongside one of the front stretchers.

Cut out the parts and joint and plane them to their finished dimensions.

Dovetails: Pins first on the sides

Pins first, or tails first? It depends. With the steps and sides, it's easier to cut the pins first, because the wide space between them makes it a snap to mark the tail boards. Later, when dovetailing the stretchers, it's better to cut the tails first and transfer them to the sides.

Taper before you lay out—The taper on the back makes the stool more stable because it keeps your weight closer to the center when you stand on the top step. Cut the taper before you do anything else. It begins at the top, 1 in. from the back edge.



Chop the shoulders to the line. With a newly sharpened chisel, remove the last bit of waste above the shoulder line. A board under the workpiece prevents chipout.

USE A GUIDE FOR THE SIDES



Beveled guide is the key. Bevel both ends of the guide block to pare both sides of the pins. A rabbet brings the guide over the entire pin so your chisel bears against it throughout the cut.



One push is all it takes. With a sharp chisel and a steady hand, you can pare away all the waste with one quick cut. Keep the chisel flat against the guide.

3 TAILS NEXT



One clamp frees up two hands. Use a clamp to hold the pin board in place. Its inside face should line up with the shoulder line scribed on the tail board. Misalignment here will lead to a sloppy joint.



One strike, you're done. One stroke with a sharp pencil gives an accurate mark. Use two pencils for fewer trips to the sharpener.



Cutting the tails. Make the side cuts with a backsaw, and use a coping saw as shown to remove the waste quickly.

I cut it with a handsaw and then cleaned it up with a handplane.

You also should prep the inside surfaces of the boards for finishing. If you do it after cutting the joints, their accuracy will be thrown off a bit. And it's not easy to prep them after the stool is glued together.

Dividers conquer pin layout—Start by scribing shoulder lines on the sides. Set a marking gauge to the thickness of the step board and mark only the inside and outside faces of the boards. Scribe your step boards now, too.

Next, mark the notch location and lay out the pins using a pair of dividers. Mark out the two half-pins on the ends, then use the dividers to step off the centerlines of the two full pins. You could use a ruler and basic math to find the centerlines, but it

takes far longer. With dividers, you simply make small adjustments to the space between the points until you begin and end your walk on the outer half-pin lines.

Guide simplifies paring—Because you'll pare to the layout lines, you can remove the waste quickly. Use a backsaw to cut outside of the pin lines. Then use a coping saw to remove most of the waste, leaving a little material to be pared.

Use a sharp chisel to pare down to the shoulder line. Check your progress with a square; the shoulder you're creating here should be flat or slightly hollowed. That way, the joint will close up along the shoulder line. Cleaning the cheeks of the pins is a snap if you use a simple guide. The bevel on its ends guides the chisel at just the right angle and keeps it square to the shoulder. If your pins aren't square,

Glue the sides and fit the stretchers



Tips to simplify glue-up. Glue up the sides before gluing the steps in place. To compensate for the taper on the back edge, use the offcut as a caul. A folded piece of sandpaper between the caul and edge keeps the caul in place. A third clamp supports the longer side at just the right height.

your layout won't be accurate and your dovetails will have gaps.

Tails come next—Place a step near the edge of the benchtop, top face down. Stand a side board on end and align its inside face with the shoulder line on the step board. Clamp the side board to the bench.

Use a sharp pencil to strike one line along each side of the pins. After the pins have been transferred, clamp the step board in a vise and use a square to mark from the transfer lines down to the shoulder line. To mark accurately, put your pencil on the line, move the square up to it, and then make your mark.

When cutting tails, I angle the saw slightly away from the layout line and into the waste. That way an errant cut won't damage the tail. To get a tight fit, press the joint together, pull it apart, and look for shiny spots. These are the areas where you should pare. Repeat until the joint fits.

Glue up the sides—Once the joints fit well, glue the side boards together, making sure the pins are oriented in the same direction. I use my thumb to keep the bottom edges in line and my fingers to ensure that the boards are level with one another. Trust your sense of touch.

Stretchers get tails first

When the sides are dry, dry-fit the steps and sides and lay out the stretchers. Mark the tails with the same dovetail marker or bevel gauge you used on the steps and sides. Cut the tails with a backsaw and clean them up with a chisel.



A notch for the stretcher. Lay the stretchers across the sides and mark the tail with a sharp pencil. Strike only one line. More than that and you'll have fat lines and sloppy joints.



Remove the waste and pare to fit. To save time, keep the stool assembled. A steady hand prevents damage (left), but a handplane will remove wayward cuts. After cutting away the bulk of the waste, trim the tail socket until it's a clean fit for the tail (right).



Lay the stretchers on the stool and transfer the dovetails to the sides. Remove the stretchers and cut the sockets the same way you dovetailed the sides: Define the edges with a backsaw; then use a coping saw to remove the waste and a chisel to clean things up.

Before the final assembly, cut the curves on the bottom of the sides and front stretchers with a coping saw. Clamp each piece vertically in the vise as you cut the curve. Use a spokeshave and flat file to clean up the cuts. On the stretchers, work from either end toward the center. On the sides, work from the center out.

Staged glue-up is hassle-free

Gluing the stool together all at once can be tricky because of the number of clamps involved, so do it in stages. Glue the bottom step to the sides first, then glue the top step. Finish up with the stretchers. Keep the clamps on just long enough for the glue to set, about 30 minutes. It takes only a few hours to get the stool glued up.

Scrape off any squeeze-out while the glue is still tacky. Don't wipe it off with a wet rag; that leaves behind a residue that's hard to get off.

After the glue is dry, prep the outside surfaces for finishing. Start with a smoothing plane and card scraper, and finish with P150-grit sandpaper. The stool will be tough to clamp in place because of its shape, and the stretchers prevent you from hanging it on a planing jig cantilevered off your bench. I find it best to clamp one side down while I clean the other, and to do the same with the steps. If you keep

Online Extra

For the complete finishing recipe, go to FineWoodworking.com/quickprojects.

your blade sharp and take light cuts, you shouldn't have any trouble.

I used a coat of oil followed by several coats of homemade wiping varnish to make the grain sparkle and give good protection against stains and shoes. When it's dry, you'll have a piece of furniture to be proud of, not only because it's beautiful and functional, but also because you made it by hand. □

Tommy MacDonald builds furniture in Canton, Mass., and hosts Rough Cut: Woodworking with Tommy Mac on WGBH public television.

www.finewoodworking.com

Assemble in stages



One step at a time. Clamping is easier if you do each step in turn. Dry-fit the rear stretcher to keep things square as the glue dries.



One stretcher at a time. Use two clamps to hold the stretcher against the step and two more to pull it down into its socket.



Sharp plane eases awkward work. Prepping the outside surfaces isn't simple, but clamping the stool down tight to the bench and using a very sharp plane to take light shavings makes the job manageable.



ACCESSORIES

Chippendale Mirror

Get period-furniture
flavor in a
small project

BY STEVE LATTA

During the late 18th century, elaborately framed mirrors, known as looking glasses, served as testimonials to the wealth of their owners. A looking glass similar to the one shown here would have cost the owner 10 to 12 shillings, a hefty price considering that the average wage for a skilled tradesman of the time was about 6 shillings a day.

This is the first serious piece I give my students to make. Because I'm blending a traditional piece into a modern curriculum, I don't go nuts over historical precedence and technique, and I take full advantage of modern machinery. For a small project, this mirror introduces a wide range of skills from basic design and layout to veneering and scrollwork. Each year, my class ends up with a great collection of stunning mirrors that they present as thank-you gifts to mom and dad for the thousands doled out for tuition.

Begin by constructing a two-layer frame

Despite its elaborate appearance, this project has only two main parts. The frame, which I make first, consists of a visible mitered molding in mahogany that sits on top of a poplar subframe; surrounding it are scrollsawn parts made from a shopmade core with figured veneer (in this case makore) as the face veneer and plain veneer on the back.

The common way to build a frame is to use $\frac{3}{4}$ -in.-thick primary wood and miter the corners. Even when the joints are splined or

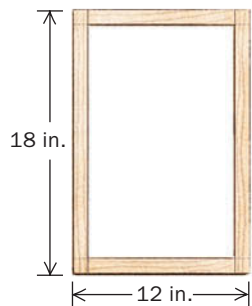
nailed, this is a poor approach. I make a poplar subframe with half-lap corners using stock that is $\frac{5}{8}$ in. thick by 1 in. wide. This approach creates a much stronger frame, uses less primary wood, and is historically correct. Don't worry about the contrasting woods—when stained, the poplar will blend right in.

Before you start milling, purchase the mirror so that you can measure its exact dimensions and size the frame accordingly. You could use ordinary $\frac{1}{8}$ -in.-thick flat mirror, but this frame justifies the extra cost of $\frac{1}{4}$ -in.-thick mirror with a 1-in. beveled edge.

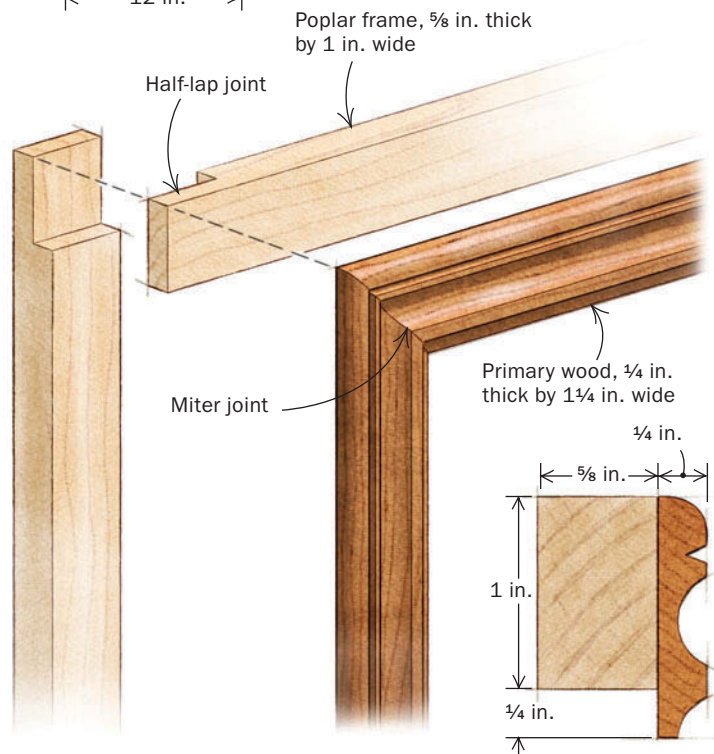
Mill the poplar subframe members an extra $\frac{1}{16}$ in. long to allow the joints to overhang slightly, and cut the half laps on the tablesaw using a miter gauge with an auxiliary fence to prevent blowout, and a tenoning jig for the cheek cuts. Dry-fit the subframe, glue opposite corners to make sure they are square, and then glue the rest. Trim the overhang with a chisel, making sure that you don't round the edges. Remember that the veneered ornamental pieces will be glued to this surface and any irregularities will make for a poor joint. If the frame turns out square, mitering the molding pieces is a snap. If the frame is at all out of square, you'll have to fudge the joints in order to get a nice, tight fit.

After I've profiled the front, visible moldings (see drawings, opposite page), I cut their miters. With an L-shaped auxiliary fence attached to the chopsaw, make 45° cuts to the left and right, but be careful to keep the cut as shallow as possible and avoid

Build a strong frame



For durability, a poplar subframe with half-lap joints supports a mitered molding of mahogany. Because the mahogany is $\frac{1}{4}$ in. wider than the poplar, it provides a lip to hold the mirror. To hold a standard 10-in. by 16-in. mirror, the outside dimensions of the frame are 12 in. by 18 in.



cutting through the fence. These initial cuts become reference marks for the exact location of future cuts, so rather than shifting the blade angle $\frac{1}{2}^\circ$ or so, I use scrap pieces of veneer to shim the molding in, out, up, or down to tweak the miter if needed. After completing a cut, slide the molding away before you raise the blade; most damage to trim cuts occurs as the blade is lifted up from the stock.

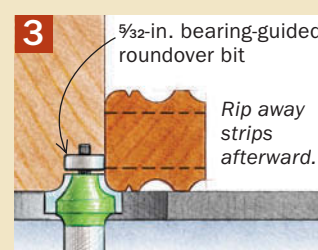
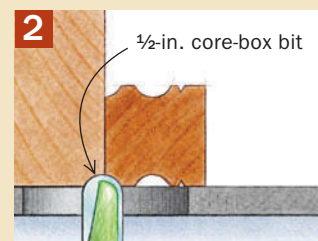
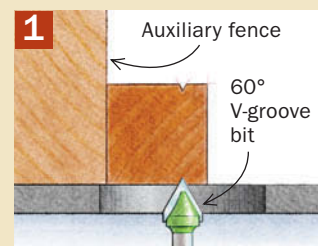
There is a logical system to follow for making all of the cuts smoothly with superior results. First, fit the top piece of molding with a 45° cut on both ends. Clamp it in place using two or three spring clamps. Custom cut the adjoining miters on both side pieces, making sure that they are tight across the joint and run evenly along the full length of the poplar subframe. Take the right-side piece, mark its length, and cut a 45° miter at the bottom. Clamp it in place using spring clamps. Custom cut the bottom miter to fit this piece, but cut the opposite end about $\frac{1}{8}$ in. long for final trimming.

Measure the length of the left-side piece and cut the bottom miter before clamping it in place. Don't try to lay the bottom molding over the side moldings and guesstimate the final miter joint. Remove the right-side molding and fit the left-hand miter of



Construct the subframe. When gluing the poplar subframe, make sure it is perfectly square. If not, applying the mitered molding becomes much more difficult.

THREE BITS COMBINE TO MAKE THE MOLDING



There are many historical designs for the molding, so feel free to experiment with your existing router bits. If you want to use the same bits as Latta, you should be able to find them fairly easily. Freud and Amana both make all three, which are widely available online or through dealers.



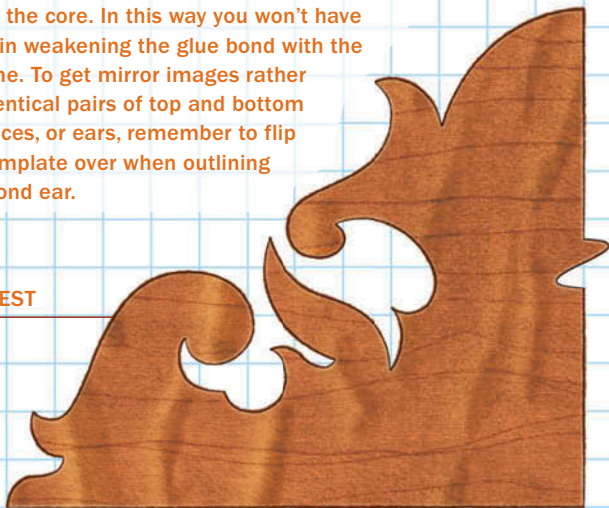
Dry-fit the molding. The secret to perfect miters is to dry-clamp each piece so that the subsequent section can be located accurately.

Attachments adorn the frame

LAYING OUT THE ATTACHMENT TEMPLATES

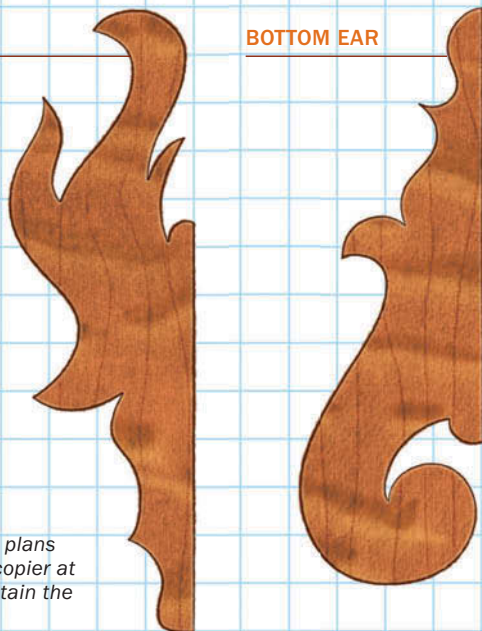
When using the four templates to lay out the attachments, keep the flat sides parallel to the grain of the core. In this way you won't have end grain weakening the glue bond with the subframe. To get mirror images rather than identical pairs of top and bottom side pieces, or ears, remember to flip each template over when outlining the second ear.

TOP CREST



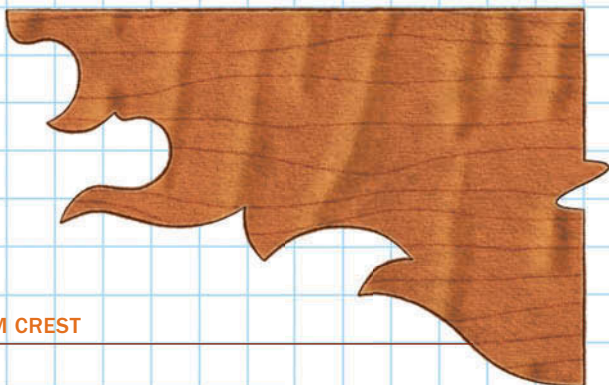
TOP EAR

BOTTOM EAR



Enlarge the plans on a photocopier at 200% to obtain the full size.

BOTTOM CREST



the bottom piece, leaving the piece a hair long. Clamp the right-side piece back on and slide in the bottom molding. Because the proper angle of cut already has been established, it should need only a slight cut to bring it to final length.

Dry-fit all of the pieces onto the frame using lots of spring clamps. To prevent sliding, glue the top and bottom sections first, angling the spring clamps so that they push the miter joints tight. Once these pieces have tacked, glue the sides, again using the clamps for directional pressure. Before the glue has set, check the inside edge for squeeze-out that might interfere with the mirror.

Make the core, and then apply the veneer

With the double frame complete, work on the veneered attachments: the top and bottom crests and four side pieces, or ears.

The core will be visible, so make it from solid wood. Do not use plywood or medium-density fiberboard (MDF). Like the subframe,

1. GLUE THE VENEER TO A CORE

Use a short-nap paint roller to apply a thin but even coat of yellow glue to both the veneer and the poplar core (right). When clamping the veneer as shown below, apply pressure to the center cauls first. This helps prevent air from getting trapped under the veneer.



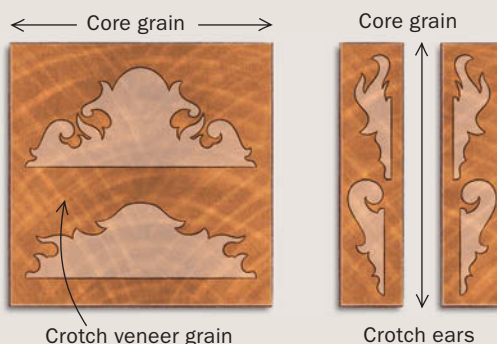
Orienting the patterns

With most veneer, orient the grain parallel to that of the core. With crotch veneer, to make the veneer appear to radiate out from the mirror (right), the veneer's grain is laid perpendicular to the core's grain and the templates are laid out differently. To prevent the core from cupping, you also should use crotch veneer for the back side.

TYPICAL VENEER



CROTCH VENEER



a poplar core will blend in with the veneer when stained. Because the core is 12½ in. sq. but only ¼ in. thick, I make it from a series of 2½-in.-wide strips to reduce the risk of cupping. To avoid wasting stock, I resaw strips of 1-in.-thick poplar on the bandsaw or tablesaw. If your planer can handle 12½ in., glue up the entire core, paying attention to grain orientation to reduce the likelihood of cupping and tearout during final thicknessing.

Although the backs of the attachments will not be visible, I veneer both sides of the core to reduce the potential for warping. The grain of both veneers should run parallel to the poplar core

so that the dominant figure radiates from the center of the mirror. Make sure the figured face veneer is the same thickness as the plain veneer on the back. Take time to study the veneers and select the smoother side as the outside face. If the veneers must be seamed, locate the joint at the separation between the top and bottom crests. Seam the two parts with 2-in. clear packing tape; it allows you to see the actual joint and, with white or yellow glue, peels off if removed within an hour.

The easiest veneering method is to use a vacuum bag, but you can make a veneer press for a project this size. It consists

2. CUT THE ATTACHMENTS WITH A SCROLLSAW



Lay out the attachments. Spray-mount the patterns to ¼-in.-thick Masonite or plywood and cut out the templates with a scrollsaw. Use these templates to lay out the designs on the veneered panel. Scissors and cardboard work well, too.

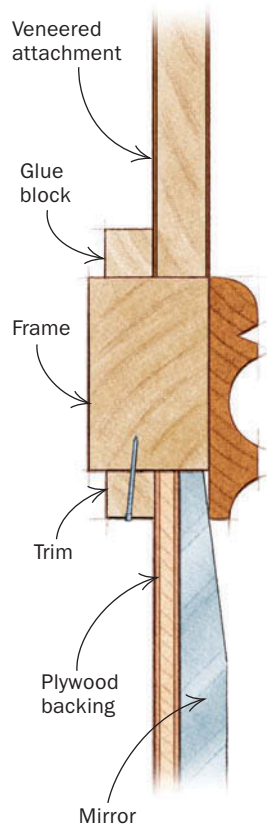


Saw the attachments. When coming to a sharp internal corner, don't try to revolve the piece around the blade. Instead, back out and saw in on the adjacent line.

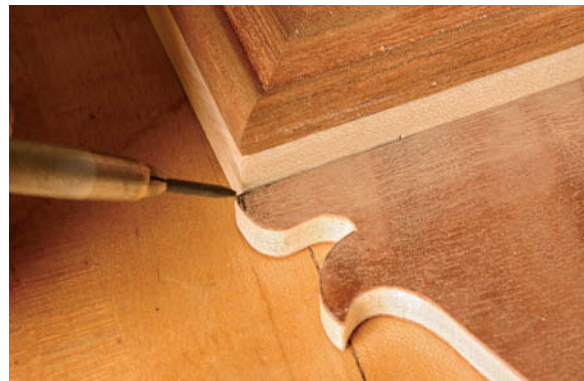


File the edges. Use a fine file to remove sawmarks, but angle it slightly to avoid breaking the back edge.

Rubber bands clamp the pieces to the frame



A good contact surface. Joint and square the straight edges of the attachments with a block plane so that they will have good glue contact with the frame.



Fit to length. After the top and bottom crests have been cut out, hold them against the frame and mark any overhang for removal.



Glue on the first attachments. Apply a thin film of glue to the straight side of the top crest, place it on the poplar subframe, and begin clamping with rubber bands. Use two rubber bands knotted together to stretch around the frame, securing the ends over projections on the crests. Because the attachments do not touch each other, if you work carefully it is possible to apply all six at one time.

of top and bottom plates that are about 13½ in. sq., made from two or three layers of ¾-in.-thick MDF glued or screwed together. The thickness adds stiffness and gives a better transfer of clamp pressure. Cover the inside surfaces with plastic laminate or strips of clear tape to prevent squeeze-out from binding the veneers to the press. I also make three sets of cauls out of 8/4 pine that are about 3 in. wide by 18 in. long, crowned in the center by about ⅛ in.

Use a narrow short-nap paint roller to apply a film of glue on both the core and veneers. Always roll veneer with the grain or the veneer will curl on the roller and break. Apply a strip of clear tape

that ties the front and back veneers together along the side to reduce slippage during the pressing. Place the stack between the MDF slabs, apply the cauls top and bottom, and clamp the center pair of cauls first. Slowly tighten only until the bow in the cauls is flattened out. Do this in a controlled manner, directing the squeeze-out to the outside

edge. Overtightening or clamping too quickly can create glue pockets under the veneer that will be a problem down the road. After about half an hour, open the press and carefully remove any tape used to seam a joint. Clamp the press back up and let the assembly dry overnight.

Remove the veneered core from the press. Scrape away squeeze-out (any shiny spots of adhesive on the core will scrape right out)

and sand the core to P220-grit. Wipe the grain with a moist cloth and double-check for glue; it will be tough to remove after the parts have been sawn. Even when fully cured, keep the uncut blank covered and under weight to reduce the chance of cupping.

Cut the ornamental attachments with a scrollsaw

Orient the patterns as shown in the drawing on p. 57, leaving about ½ in. between the top and bottom crests. Make sure that the straight edges of all four ears are parallel with the grain of the core. This prevents cupping and gives a good surface to be glued to the frame.

My students typically come in with poor hand-eye coordination, and there's nothing like a scrollsaw for bringing it up to par. Before scrolling your pieces, practice, practice, practice. The more you practice, the less cleanup you'll need. Although a bowsaw with a narrow blade or a fretsaw would work, an electric

To purchase digital plans and a complete cutlist for this mirror and other projects, go to FineWoodworking.com/PlanStore.



scrollsaw with a #4 double-tooth blade is best. Don't worry about getting a straight cut along the edges that mount to the mirror frame as you'll clean these up with a block plane. With the parts cut out and any rough areas filed, break all of the edges with sandpaper. Mark and trim the top and bottom crest pieces to length.

To join the pieces to the frame, put a thin bead of glue on the edge of each attachment (not on the frame) and apply it by pressing the face edge down and then rolling it back until it is perpendicular to the poplar frame. This moves the squeeze-out to the back edge where it can be removed

Sources of Supply

VENEER AND SHELLAC
rockler.com

SCROLLSAW BLADES
wildwooddesigns.com

**MOHAWK'S
ULTRA PENETRATING
BURNT UMBER DYE**
mohawk-finishing.com



Add glue blocks. Apply small sections of wood to the back of the frame to reinforce the veneered attachments.



Install the mirror. After finishing the frame, place four dabs of clear silicone caulking on the inside of the frame and then lower in the mirror. Use tacks or a pin nailer to attach mitered trim to hold the mirror and plywood backing in place.

easily with a chisel. Clamp the pieces to the frame with rubber bands. Check the mirror from the side and make sure the pieces aren't leaning, tweaking the front and rear pressure of the rubber bands if necessary. When dry, reinforce the joints with glue blocks applied using a simple rub joint.

After final sanding and cleanup, finish the frame by wiping or spraying on a non-grain-raising burnt umber dye to harmonize the woods, and then brushing on garnet shellac to give the piece an antique appearance. Install the mirror using a few small dabs of silicone along the inside lip of the frame. The mirror is backed by a piece of 1/8-in.-thick birch plywood fastened in place with 1/4-in.-sq. poplar strips mitered and tacked in place. Be sure to cut the bottom strip in two so that you can lever away the strips in case the glass needs replacing down the road. □

Steve Latta is an instructor at Thaddeus Stevens College in Lancaster, Pa.

Two Unique Lamps

BY CHRISTIAN
BECKSVOORT

I love the warmth of light passing through wood, and lamps made with thin veneers are the perfect way to get that effect. I've designed many hanging, floor, wall, and table lamps using a variety of veneers. Standard commercial veneers and wide edge-banding are just the right thickness, and lighter-colored woods tend to make the best lamps: birch, maple, pine, holly, white cedar, sycamore, and basswood, to name a few. This is one of my favorite designs, handsome yet easy

TABLE OR HANGING



Make two different lamps using one technique. See p. 65 to build Becksvoort's hanging version.

to build, and versatile enough to work as either a table lamp or hanging lamp.

The table lamp has a crosslapped base, four vertical posts, and a smaller crosslapped top to tie the posts together. The shade is hard maple veneer rings alternating from outside to inside. I had store-bought edge-banding in my shop, so I used the existing width and didn't have to cut veneer strips. But you can always use full sheets of veneer and cut them to width

Rings of veneer create style
and ambience

A DIFFERENT KIND OF TABLE LAMP

Top crosspieces, $\frac{3}{8}$ in. wide by $\frac{1}{2}$ in. tall by 11 in. long

Notch, $\frac{3}{8}$ in. wide by $\frac{1}{4}$ in. deep

Posts, $\frac{1}{2}$ in. thick by $\frac{1}{2}$ in. wide by $20\frac{3}{16}$ in. long

Outer and inner maple veneer rings, $2\frac{1}{4}$ in. wide

1-in. spacing between rings leaves $\frac{5}{8}$ -in. overlap between inner and outer rings.

Lowest inner ring is $4\frac{7}{8}$ in. from the base.

Lowest outer ring is $3\frac{1}{16}$ in. from the base.

Slot, $\frac{1}{8}$ in. wide by $\frac{1}{2}$ in. deep

Brass socket

Brass tubing with threaded ends, $\frac{3}{8}$ in. dia. by 7 in. long

Tenon, $\frac{3}{8}$ in. square by $1\frac{5}{16}$ in. long, trimmed flush after glue-up.

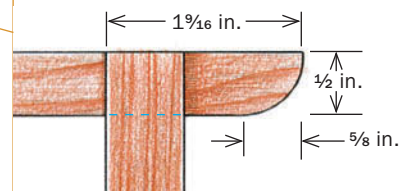
Sawkerf for wedge, $1\frac{1}{16}$ in. deep

Notch, $1\frac{3}{16}$ in. wide by $\frac{3}{8}$ in. deep

Bottom crosspieces, $1\frac{3}{16}$ in. wide by $1\frac{5}{16}$ in. tall by 13 in. long

Inline switch

TOP CROSSPIECE TENON DETAIL



PERFECT CROSSLAPS

Create the crosslaps at the top and bottom of the lamp using a standard tablesaw blade.

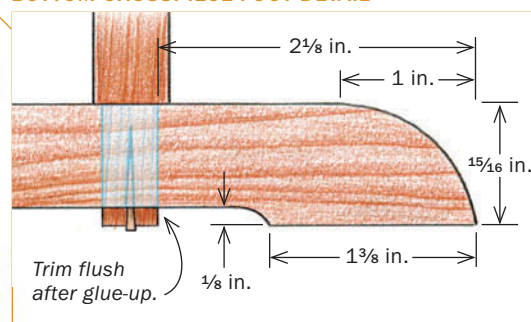


Center the joints. Using the rip fence as a stop, make repeat cuts to waste away the joint. Start at the center point and work your way out, flipping the piece back and forth to keep the joint centered in the stock.



Sneak up on the fit. Keep test-fitting the second piece to the first as you make the centered cuts. The pieces should fit snugly.

BOTTOM CROSSPIECE FOOT DETAIL



SOURCES OF SUPPLY

VENEERS/BANDING

woodcraft.com;
homecraftveneer.com;
forestplywood.com

LAMP PARTS

Available at most hardware stores and at
mylampparts.com;
grandbrass.com

ZINSSER BULLS EYE SPRAY SHELLAC

Aerosol can, available at any hardware store

DRILL AND MORTISE THE BASE

The base gets four mortises to hold the posts, and a center hole for the brass lamp post.



A shallow relief creates the feet. Using a stop block against the router-table fence, Becksvoort pivots into the cut and pivots out at the halfway mark. Then he flips the piece and pivots in again from the other side. This ensures that all the feet are exactly the same size.



Work from the center out. Locate the center of the crosslap, and then use a compass to mark an equal distance on all four feet. The distance is not as important as that they all be identical.



Start on the drill press and finish up by hand. While the base pieces are together, drill for the center hole that will hold the brass post (left). Then take apart the base and drill the four holes that will be the through-mortises (center). Use a chisel to turn the drill-press holes into square mortises (right).

without complicating things too much. That would give you grain continuity along the height of the lamp and open up your wood choices.

Easy joints for the base and posts

I started with the base, crosslapping the parts at the center. When I had a perfect fit, I drew the curved ends of the pieces, cut them on the bandsaw, and sanded them smooth. Also, I routed a relief on the bottoms that created four feet.

At the drill press, I drilled a hole near each end of the crosspieces and a fifth hole in the center. Next, I chiseled around the holes to make four through-mortises, leaving the center hole round to accommodate the brass tubing that holds the wire. Finally, I glued and clamped the lap joint.

The four posts are easy to make. I tackled the tenons on the bottom ends first. Then on the top end, I made a centered slot to form the inside of the bridle joint.

Top pieces get crosslaps and tenons

The top is similar to the bottom, two pieces crosslapped in the center, but you don't have to cut through-mortises for the posts. Instead, cut a tenon on the ends of each piece, which forms the center of the



FINISH UP THE FRAME

Four posts are mortised into the base and then the top pieces are added to provide the framework for the rings. The bottom of each post gets a traditional tenon to go into the base. The top of each post gets a bridled-joint slot to hold its top piece.



Tenon and slot the posts. You can form the tenons with a standard tablesaw blade. Use a miter gauge, with the rip fence as a stop. Work your way around the stock, making multiple cuts (above). Create the slot on the top of the posts with a tenoning jig (right).



Glue the posts into the base. For added strength, Becksvoort hand-saws a kerf in the tenons and wedges them during the glue-up (above). So the top doesn't get in the way while gluing in the rings, he only dry-fits it at this point, holding it place with rubber bands (right).

bridle joint. Again, I made the crosslap on the tablesaw, then cut a centered tenon on each of the four ends. The bottom edges of the tenons are rounded. After sanding, I glued the crosslap but just dry-fitted the top onto the posts, until the rings were in place. This completed the lamp frame and left me with the fun part, the shade.

Nine rings for the shade

To make the shade, I prefer plain wood banding, but banding with thin paper backing works, and makes the wood less likely to split. The pre-glued stuff does not work, because the glue may melt. I made the rings first and then attached



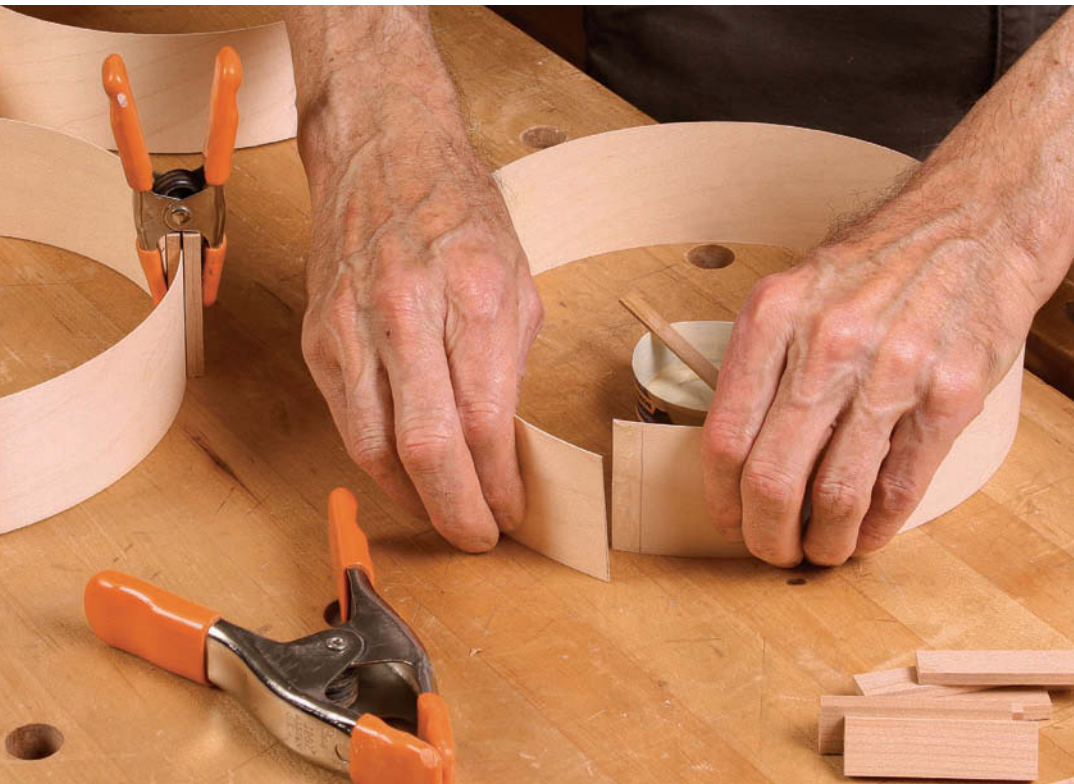
ADD THE RINGS

The nine veneer rings give this lamp its unique look and warm glow. Use an easy mathematical equation to figure out the size of the rings. First create the rings, and then glue them to the frame.

Embrace the math. For perfect-fitting rings, Becksvoort uses a simple formula. Measure the distance from the outside of the posts for the outer rings and the inside of the posts for the inner rings. To find the circumference (the length of the veneer strips), multiply that distance by pi (π), 3.1416. Add $\frac{3}{8}$ in. for the gluing overlap.



Rings are easy to make. Cut the rings to length with each end square (right). Mark the $\frac{3}{8}$ -in. overlap at the ends of each strip, apply a thin layer of glue, and tape the lap to form a circle. Working on a flat surface, add a small caul on the inside and outside of the lap and apply a spring clamp for pressure (below).



them to the frame. A simple formula determines the length of the veneer strips that I glued into the rings (see photo, left). You might be tempted to just test-fit one ring for the outside and one for the inside and make the rest to match. I am leery of this method, because test-fitting a circle on the inside is more difficult than the outside. If you don't get it right, you could mess up all the interior rings. Also, you could end up with squarish circles instead of the consistency you get with minor calculating.

Once I cut the veneer strips to length, I marked the overlap on the ends of each strip, applied a thin layer of glue, and clamped the overlap to form a circle.

I laid out the location of the rings on the posts. The rings overlap to hide the bulb. This also creates a dramatic effect because the lighting is different where the rings overlap. I glued on the bottom outside ring first and worked my way up, alternating between the outer and inner rings. Because the spring clamps I use for pressure get in the way of gluing and clamping the next ring, I also use tape to keep things in place. That way I can pull the clamps after a few minutes and keep working. The top crosspieces go on last.

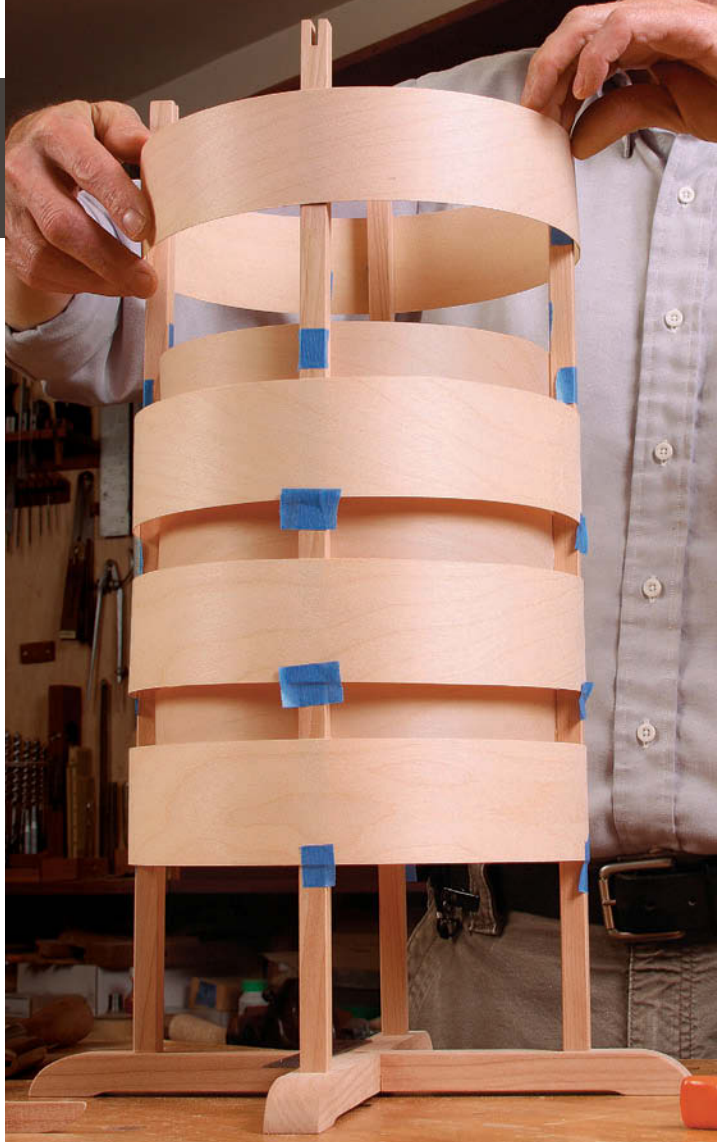
Adding electricity

To electrify the lamp, I purchased a brass socket, brass tubing with threaded ends, two threaded brass lock washers to fit, about 10 ft. of electrical cord, an inline switch, and a plug. Simply wire the cord to the socket, tie an underwriter's knot, pass it through the tubing, screw the tube through the $\frac{3}{8}$ -in. hole in the feet, and attach the plug and inline switch. I use compact fluorescent bulbs because they create less heat than standard bulbs.

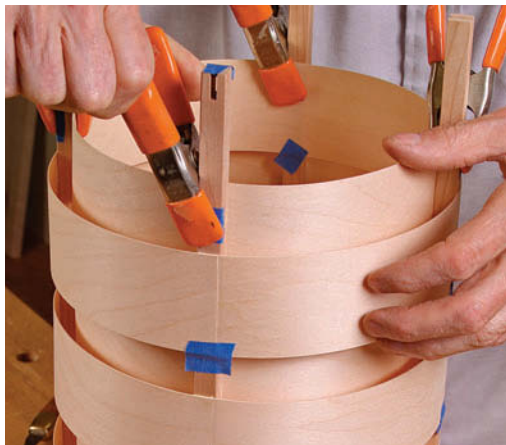
For a finish, I decided on spray shellac. Any wipe-on or brush-on finish is out of the question, because of the overlapping rings. I concentrated on spraying the outside of the rings, but to do a good job covering the overlapping areas you will have to get some spray on the inside of the shade, which is not a big deal. □

Christian Becksvoort is a woodworker in Maine.

Photo (top right): Christian Becksvoort



Dry-fit first. Mark the locations with tape (above), make sure the rings fit well, and make sure all the joints end up on the same post (right), which will become the back of the lamp. When you are ready to apply glue, work from the bottom ring up, putting glue on the posts only, not the veneer.



Add the top. When all the rings are dry, glue the top into its bridle joints. Spring clamps are perfect for this glue-up.

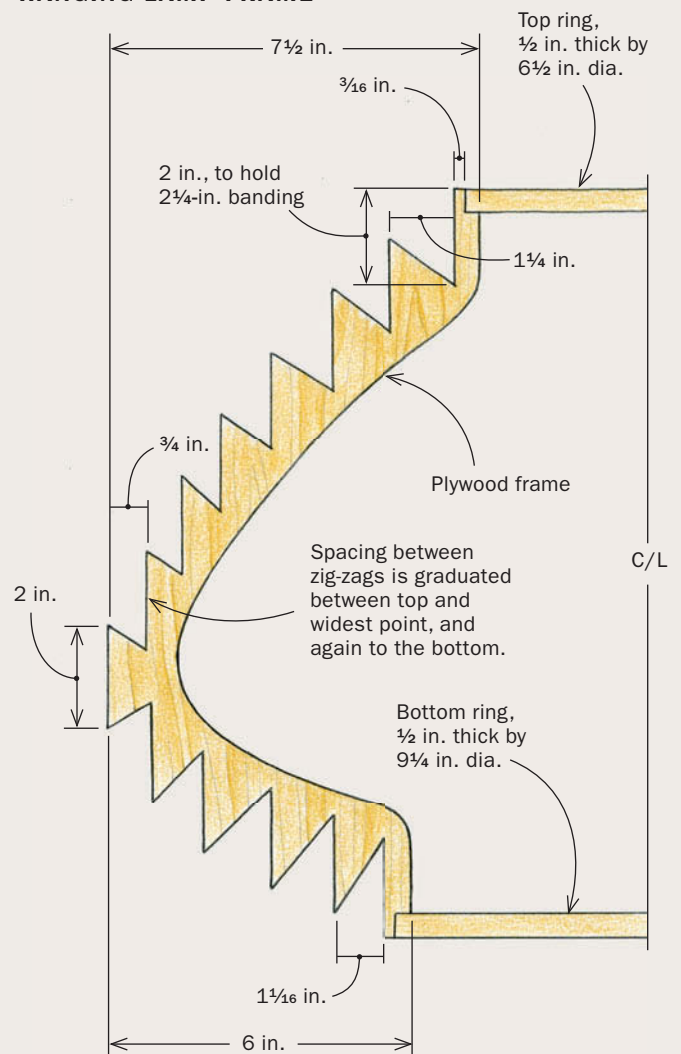


A twist on the straight lamp

This version of the veneer ring lamp uses store-bought edge-bandings the same way as the straight version. The difference from the straight lamp is the internal frame. Rather than four straight posts connected to a top and bottom, four curved, notched plywood frames get screwed to a top and bottom ring turned from a bricklaid block of cherry. When the rings are attached, they follow the stepped shape of the frames. The brass hanger is from Lampshop.com, with its ring snipped off and its arms inserted into the cherry ring. —C.B.



HANGING LAMP FRAME



Standing Frame



Turn it around to change the picture

BY CHRISTIAN BECKSVOORT

SIMPLE ANATOMY

The sleek design and basic mortise-and-tenon joinery in this standing frame make it a quick project and a great gift.

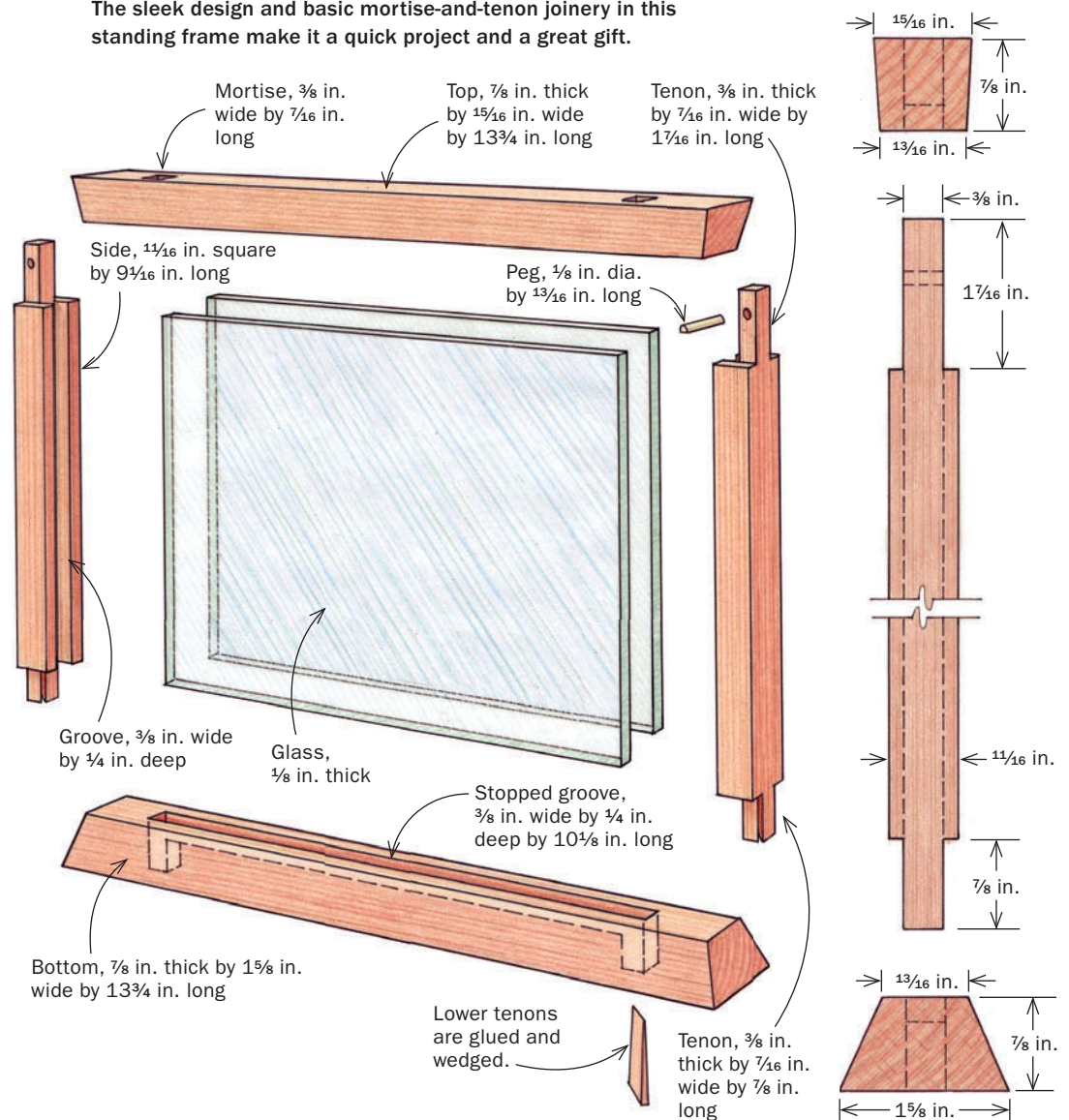
I have a black-and-white woodcut print and a piece of needlepoint that are dear to me. Since wall space is limited in my house, I decided to make a free-standing frame to display them. Both pieces of art fit in the same frame, one on each side facing out, and the frame can be placed on a tabletop, shelf, desk, dresser, anywhere you have free, flat space—at home or in the office. The frame also makes a great gift.

Because both sides are visible, I knew this frame would be a bit trickier to design than a typical, wall-hung picture frame. I also needed a way to take apart the frame, should the artwork ever need to be replaced.

The frame required a relatively wide base to stand on. Playing around with several designs, I settled on a wide base, a narrower top, and through-tenons on the uprights to allow for disassembly. Although the frame dimensions will vary depending on what it is to hold, the building process can be adapted to any size.

Cut the joints

Once you've measured both pieces of art, added a proportional border/mat, and come up with an overall



SHOW OFF TWO PIECES OF ART IN ONE FRAME



Installing artwork is a breeze. Just sandwich the art between two glass pieces and slide the package into grooves in the bottom and sides (left). The mortised and grooved top fits onto the sides (center), and dowels lock it all in place (right).

GROOVES, BEVELS, AND MORTISES ARE SIMPLE TO MAKE



Start on the drill press. Drill through the top and bottom, centering the mortise holes in the stock.



Through-grooves on the sides. With a straight bit on the router table, run through-grooves on the two side pieces.



Stopped grooves in the top and bottom. With two stop blocks clamped to the fence so that the bit lines up in the mortise holes at each end, pivot down into the first hole with the router running, run the groove, and lift the workpiece out of the second hole.

dimension, you can rough out the frame parts for the base, the top, and the two sides. Use a drill press to rough out the mortises in the top and the base.

Cut the through-grooves in the two sides, and then move on to the stopped grooves in the top and bottom pieces. The grooves line up with the mortise holes and run between them.

Square up all four mortise holes in the bottom and top. Both the top and bottom now have a groove centered on the wide faces, ending at the square mortises.

Cutting tenons on the sides of the frame is the last structural operation. With only one height setting, I cut the tenons on the

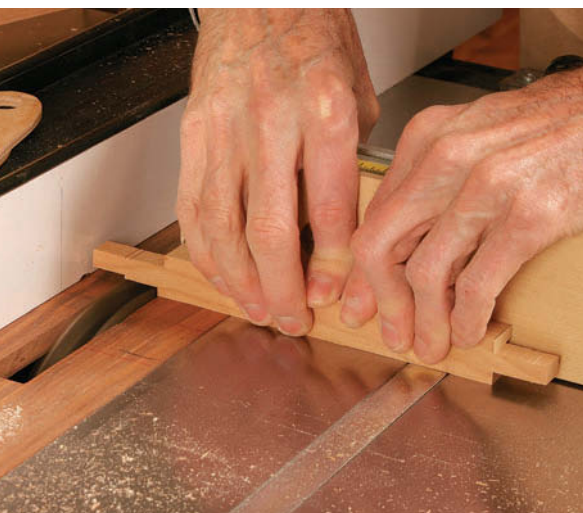
tablesaw using a wide dado blade. Small bevels on the tops of the tenons make the frame easier to assemble.

Assemble the frame

When I was working out the original design and the artwork and glass panes were in place, everything fit well but looked clunky. So, to give it a lighter appearance, I ripped a bevel down the sides of the top and bottom and crosscut an angle on each end.

Once you've completed the joinery and beveling, sand all the parts to P220-grit and glue the sides to the bottom, wedging the tenons diagonally on the underside. Plane and sand the bottom

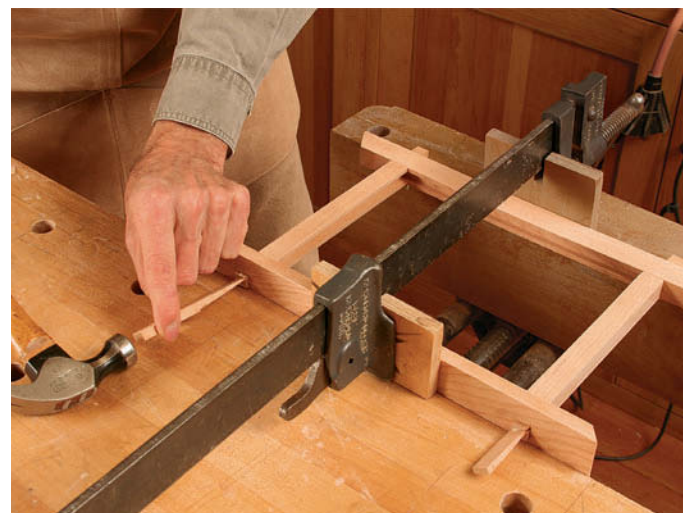
TENONS, WEDGES, AND PEGS KEEP THE FRAME TOGETHER



Quick and easy tenons. Using a dado set, miter gauge, and the rip fence as a stop, form the tenons on the side pieces.



Lower tenons are wedged. Saw a diagonal kerf in the bottom tenons. When the wedges are tapped in, the tenons will spread in all directions.



Tap in wedges. Glue the sides into the bottom, set the top in place for clamping, glue the wedges, and tap them into place. Saw the tenons and wedges flush, and then smooth the bottom with a block plane.



Chisel the mortises square. Now square up the mortise holes all the way through the top and bottom pieces.



Bevels lighten the look. Becksvoort rips a bevel down the length of the top and bottom, refining the look.



Angle the ends, too. With the tablesaw blade still tilted from the bevel, use a miter sled and cut angles on the ends of the top and bottom.

flush. With the frame fully assembled, but without the artwork or glass, take a knife and mark the spot where each tenon protrudes through the top. Then remove the top and drill holes through the tenons, using shims so the tenons lie flat and are supported on the drill-press table. I make sure the hole overlaps the knife marks by about $\frac{1}{32}$ in. By offsetting the holes like this, the dowels with a flat sanded on one side are then forced into the space, pulling everything tight.

Using a dowel plate, make two dowels out of any very hard, tight-grained wood such as apple, rock maple, dogwood, or hornbeam. Begin with square stock and use a knife to cut a

series of bevels around the end. Rounding the ends helps start the stock in the dowel plate. Then simply hammer the stock through the dowel plate. Fit the dowels (see photos, below) and cut them to length. The dowels are removable with hand pressure, although if you insert them in January and then want to open the frame in August, it helps to have a small block to push the dowels out.

Finally, I applied two coats of Tried & True Danish Oil, polishing the first coat with 0000 steel wool after it dried. □

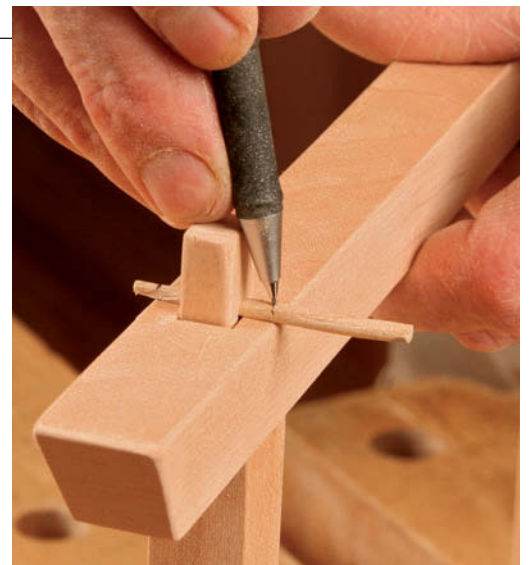
Christian Becksvoort is a woodworker in Maine.



Dowels secure the top. Dry-fit the frame to mark for the dowels. Mark the point where the tenon protrudes. Drill a hole at that point, overlapping the knife mark by about $\frac{1}{32}$ in.

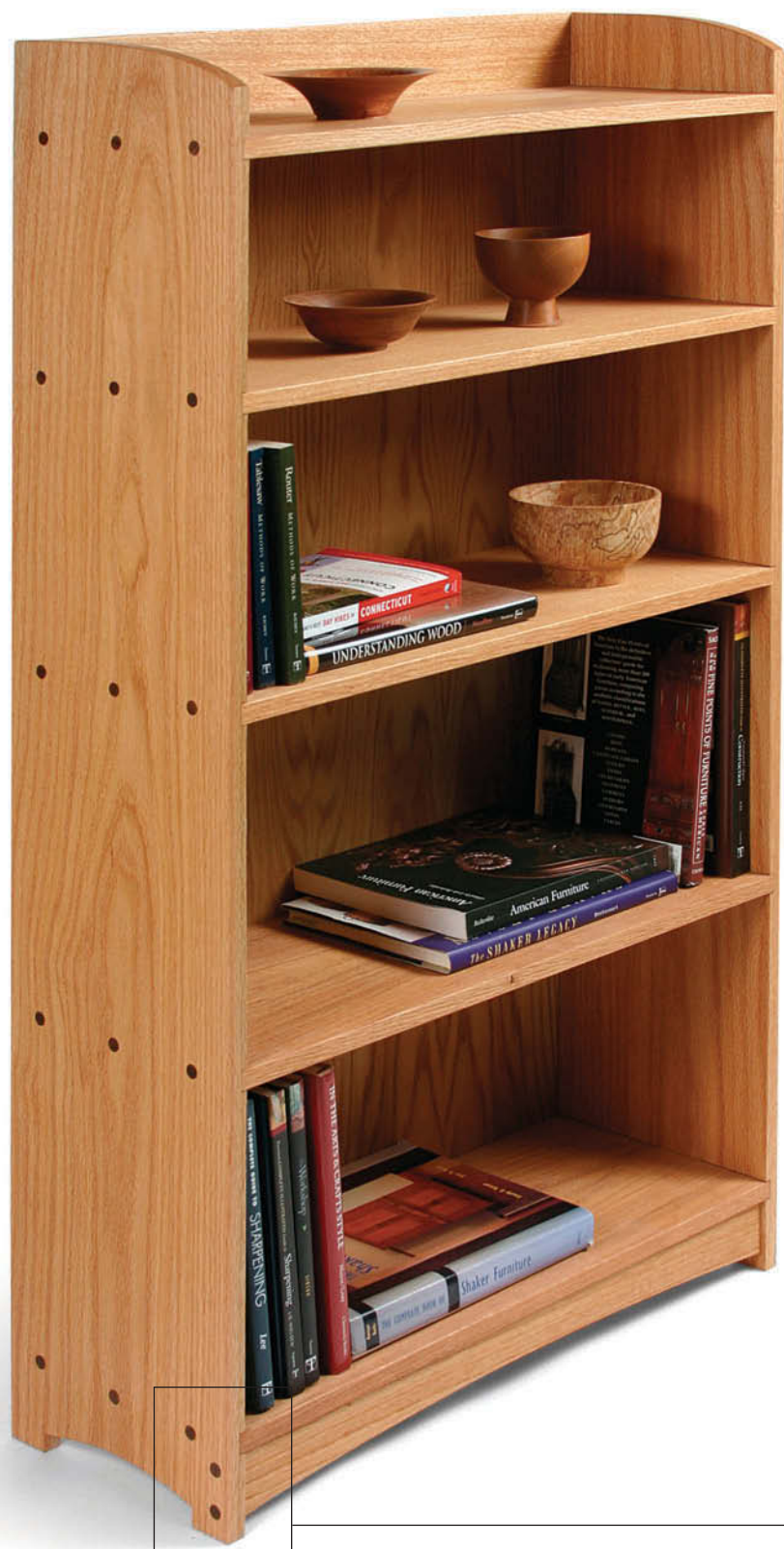


Flatten the dowels to create a perfect fit. Sand a flat into each dowel and then insert it, flat side against the top of the frame, until hand tight.



The final cut. Mark the dowels and cut them to length, flush with the sides of the frame.

Arts & Crafts Bookcase



Portable power tools and presurfaced oak make it simple and speedy

BY ASA CHRISTIANA

You can thank Mike Pekovich, *Fine Woodworking's* art director, for designing this simple but handsome bookcase. He took a straightforward form—an oak bookcase with dado and rabbet joints—gave it nice proportions, and added a few elegant curves.

Pekovich and I agreed that screws would reinforce the joints well, and that gave us a design option on the sides. Choose oak plugs and align the grain carefully, and the plugs almost disappear. Make walnut or maple plugs instead, and the contrasting wood adds a nice design feature to the broad sides, highlighting the construction.

Before diving in, take a moment to appreciate a few of the subtler details. Curves add life to rectangular furniture, and this design uses three types of them, each irregular and organic, as opposed to radius curves that can seem mechanical.

The top of each side has a gentle curve, drawn from a section of a French curve, that tightens as it moves forward. At the bottom are two natural curves formed with a flexible wood batten. On the stretcher, the curve extends end to end; the bottom of each side features a short, graceful arch that begins and ends with a straight step to suggest legs. Pekovich also made the sides and back



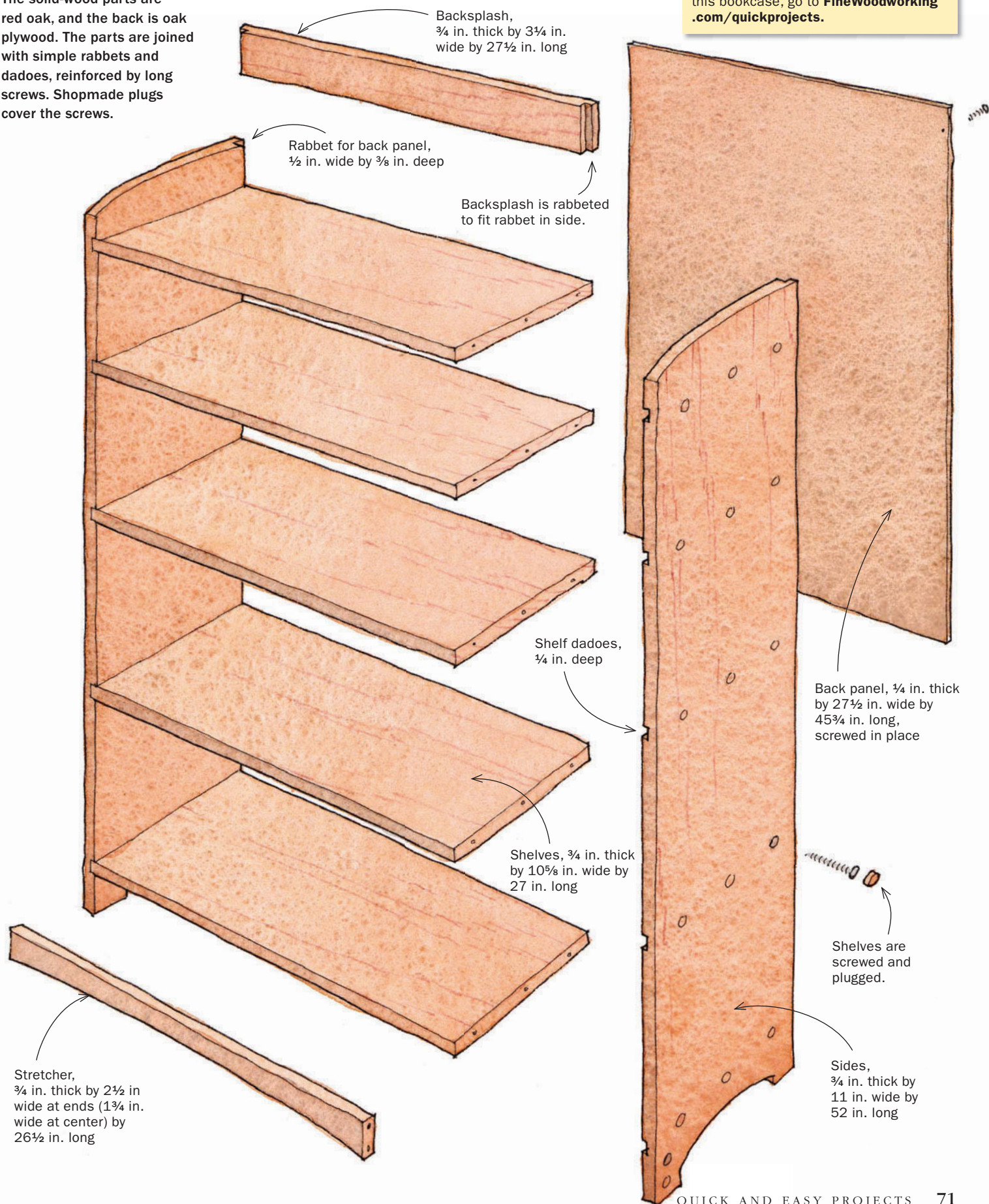
To see or not to see. Make the plugs from a contrasting wood like walnut (far left) to emphasize the construction. Or use the same wood as the rest of the piece to make the plugs disappear.

10 EASY PIECES

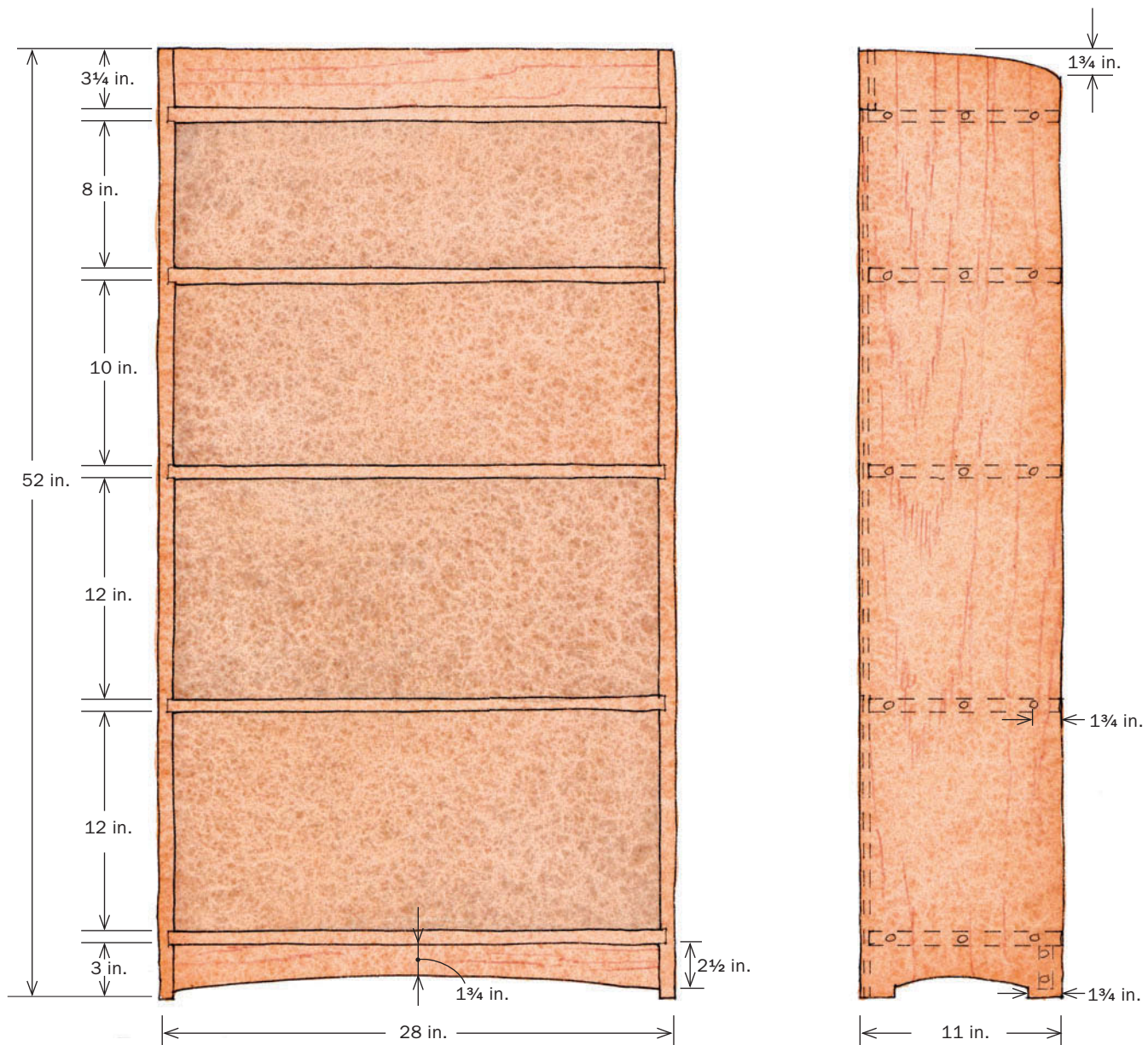
The solid-wood parts are red oak, and the back is oak plywood. The parts are joined with simple rabbets and dadoes, reinforced by long screws. Shopmade plugs cover the screws.

Online Extra

For a free video series on how to build this bookcase, go to FineWoodworking.com/quickprojects.



BOOKCASE DIMENSIONS



extend up past the top of the case, creating a natural display area.

Last, note how the space between the shelves is graduated, growing smaller as it moves upward. This is common in bookcases because it is both pleasing to the eye and functional, creating a sense of movement and inviting different-size items onto different shelves.

Important lessons are built in

The bookcase is designed around a number of fundamental lessons for would-be furniture makers. The entire project can be completed with just a circular saw, jig-

saw, drill, and a router. And if, as we did, you use the presurfaced lumber available at most home centers and lumberyards, you won't need pricey milling machines. Although it is cheaper to buy rough (oversize) lumber and mill it yourself, before investing in a jointer and a planer, you want to be sure you have the space for them, can handle the noise and dust, and will be using them more than a few times a year.

You can watch a complete series of free videos on how to build this bookcase at FineWoodworking.com/quickprojects, but all of the information you'll need is also pictured in detail in the next two pages.

Size the parts and cut the joinery

The construction is pretty straightforward. Start by picking flat and straight boards, and then cut all of the parts to size using a miter saw, circular saw, bandsaw, or better yet, a midsize tablesaw.

The shelves attach to the sides with simple dadoes, and the back panel and back-splash fit into rabbets. There are a lot of ways to cut these square notches in wood, but the easiest and most surefire method is to use a simple T-square jig to guide a handheld router through the dado cuts. To cut the rabbets in the back, I use the router's accessory edge guide to keep the

Cutting the joinery

With dimensioned lumber, there's nothing complicated about building this bookcase. Knock the parts down to final size, cut the curves, and then rout the joinery. The directions below are also available as a step-by-step video at FineWoodworking.com/quickprojects.



Eyeing straight boards. If you're buying pre-surfaced boards, sight down the edges and faces to be sure they're straight. Twisting or warping are hard to fix without a jointer and planer.



Tablesaw supports. Use a stand to balance long pieces when crosscutting to length. A well-positioned workbench can help support the pieces while ripping boards to length.



Dadoes made easy. Make a simple T-square jig for cutting dadoes with a handheld router. The jig has a fence that sits against the edge of a workpiece, and another that guides the router.



Rabbets, too. Use the router's edge-guide accessory to cut rabbets in the bookcase sides. Screwing an extra-long wood fence to the edge guide gives better control when entering the cut.



Jigsaw basics. The bookcase has a number of curves that can be cut with a jigsaw (shown) or a bandsaw. The less-expensive jigsaw is a great tool for beginners.



Smooth curves. You can use a variety of tools to fair the curves. For outside curves, a small, handheld belt sander is the quicker option, but a sanding block will also work.



Inside curves can be tricky. But a curved sanding block makes it easy. Make a block out of waste pieces from the jigsaw cuts. Keep the sandpaper in place with staples.

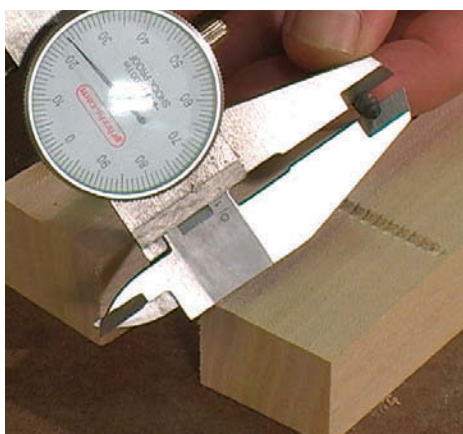


What's a counterbore? This larger hole creates a place for the screw head to sit below the surface. A plug on top will hide the screw. Use a Forstner bit for a big hole like this.



Small drill follows big one. The Forstner bit leaves a little dimple in the center of the hole, which guides the smaller bit. The shaft of the screw passes freely through this clearance hole.

Assembling the case



Dial in the pilot hole. Use a caliper to determine the size of your screw by measuring the root (between the threads) for the pilot hole. If you don't have a caliper, do it by eye.



Dry-fit and drill pilot holes. To locate the pilot holes, fit the shelves into their dadoes and clamp the assembly. Keep the bit in the center of the clearance hole when drilling.



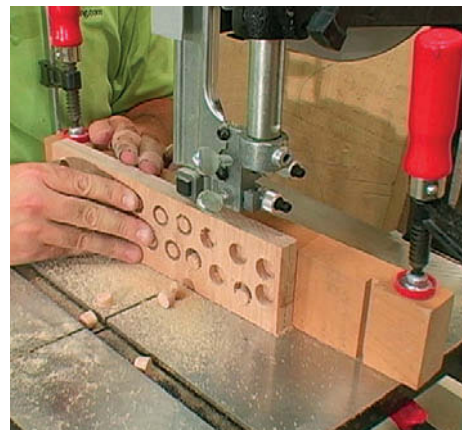
Brush on the glue. After dry-fitting the case and drilling the pilot holes, take apart the case and brush yellow glue on the joints, being sure to put glue on both mating surfaces.



Clamp it up. Long parallel-jaw clamps are a good investment. They help keep assemblies square. Be sure the shelves stay flush with the front edges of the sides.



Plug-cutter basics. If you have a drill press, you can use a plug-cutter to make your own plugs in any wood. Don't drill too deep or the plug will break off and jam in the cutter.



Bandsaw them free. This is an old boatbuilder's trick. If you have a bandsaw, just run the workpiece on edge to free the plugs. Then chase them around the shop floor.



Tap them home. You can test your counterbores in scrapwood to be sure they will be deep enough to hold the screw and plug. To insert a plug, just dip the tip in glue and tap it home.

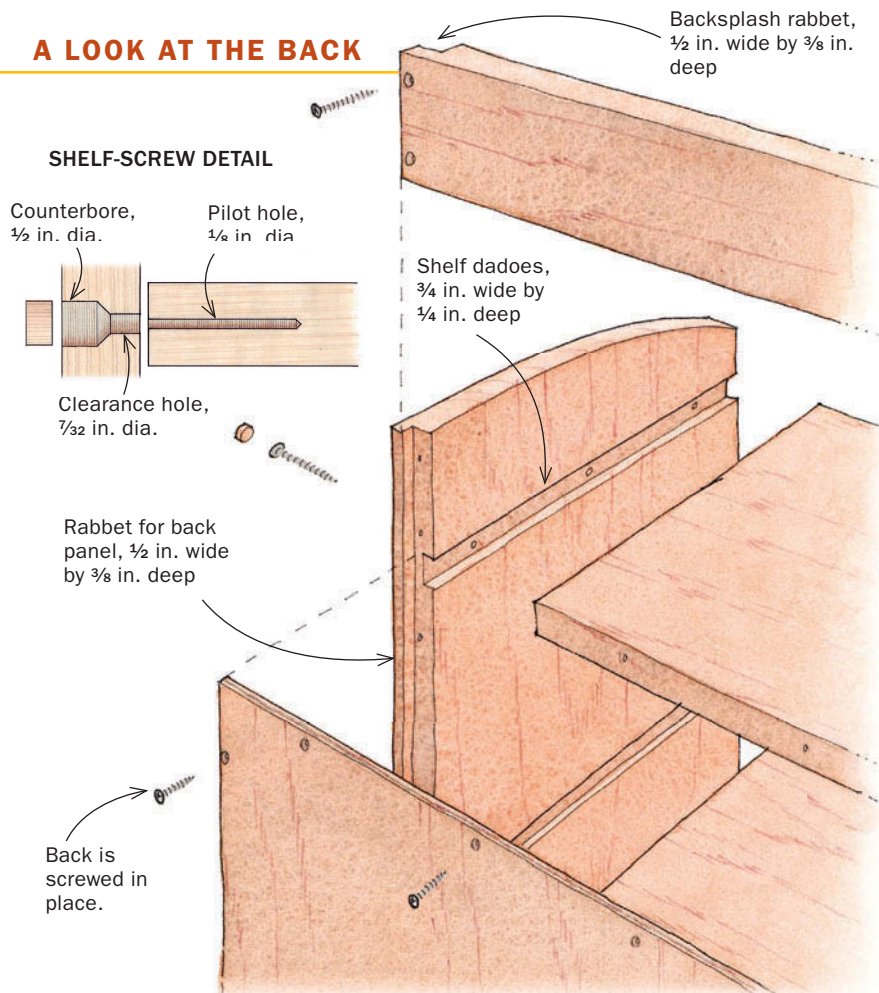


A few final pieces. The backslash is cut to length and rabbeted, and then glued and screwed in place. Cut the lower stretcher to fit between the sides and screw it in place.



Easy oil finish. It's easier to finish the sides before attaching the rear panel. I sanded the pieces to P400 grit, and then applied three coats of tung oil, followed by a coat of paste wax.

A LOOK AT THE BACK



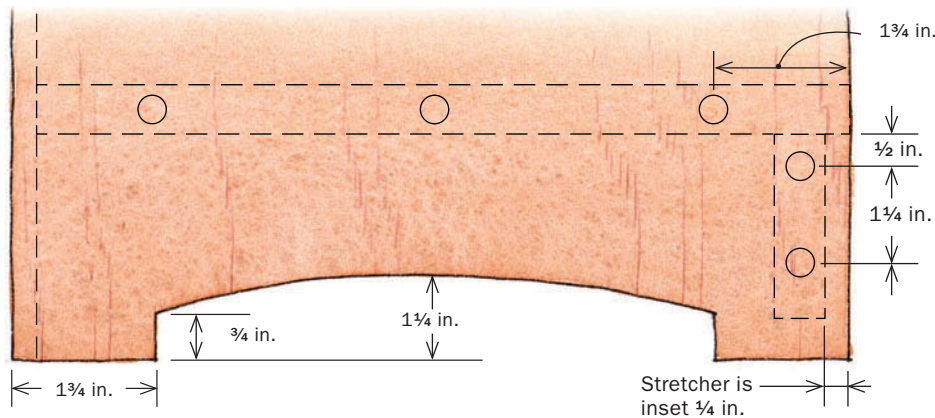
LUMBER AND HARDWARE LIST

PART	QTY	SIZE	MATERIAL
SIDES	2	3/4 x 11 x 52	Oak
SHELVES	5	3/4 x 10 5/8 x 27	Oak
BACKSPLASH	1	3/4 x 3 3/4 x 27 1/2	Oak
STRETCHER	1	3/4 x 3 x 26 1/2	Oak
BACK PANEL	1	1/4 x 27 1/2 x 45 3/4	Oak veneer plywood
SCREWS FOR SHELVES, BACKSPLASH, STRETCHER	30	#12 x 2-in. flathead screws	Steel
SCREWS FOR BACK	24	#6 x 3/4-in. flathead screws	Steel
GLUE	1	8 fl. oz. bottle	Yellow glue

help to hold everything together while the glue dries, so I used fewer clamps. Add the plugs—which you can buy or make yourself with a bandsaw—at the end to fill those ugly screw holes.

I finished the piece using oil and wax, but Jeff Jewitt's techniques for finishing in a day (see pp. 120-122) would also work well.

FOOT DETAIL



cuts on track. Mark and then cut the curves in the sides and stretcher using either a bandsaw or jigsaw. You can smooth the pieces with a power sander or just use a hand sander—that would be you, armed with sandpaper and a sanding block.

Once the parts are sized and the profiles cut, you can lay out and drill the holes that attach through the sides and into the

ends of shelves. The best way to avoid split wood and stripped screws is to drill right-size clearance and pilot holes in the sides and shelves (see detail above).

I sanded most of the parts before gluing the piece. That way, I didn't have to sand into any corners or tight spaces after assembly. And when I did glue it all, the screws that strengthen the dado joints

Make the bookcase your own

Don't be afraid to make changes to this or any other project you see in magazines. There are other presurfaced woods at the lumberyard or home center—maple, pine, and even poplar, which works great if you plan to paint the piece. And if you have a jointer and planer, you can buy rough lumber at a hardwood dealer and choose from a wider selection of woods.

Feel free to change the size of the case, too. I'd still recommend graduating the shelves, though; it just looks better.

You can leave out the screws and plugs, too. If you screw the plywood back into its rabbets and to every shelf, it will add plenty of strength to the case.

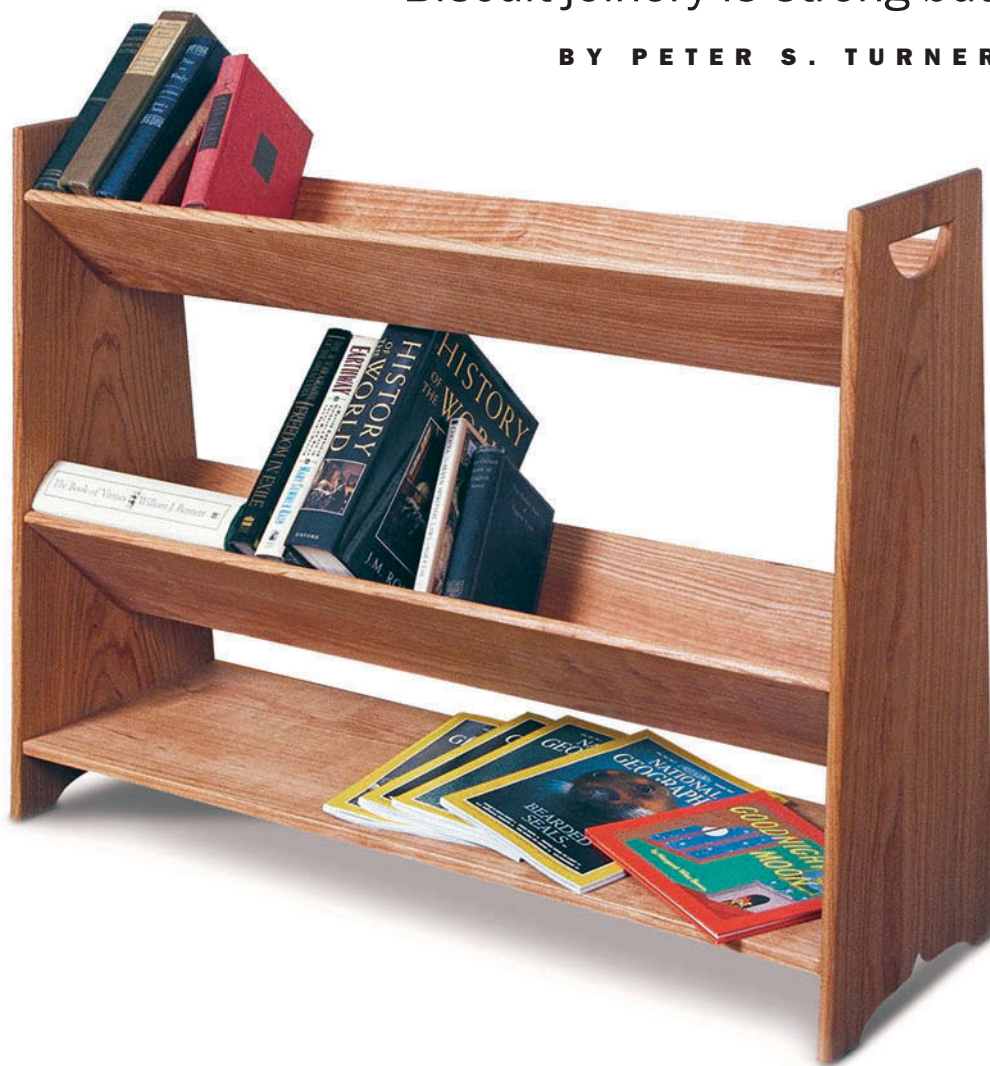
If you are unfamiliar with any of the techniques, watch the online videos carefully. And when you're finished with the bookcase, be sure to let everyone know you built it. Bragging is half the fun. □

Asa Christiana is editor of Fine Woodworking.

V-Shelf Book Rack

Biscuit joinery is strong but simple

BY PETER S. TURNER



to give the piece a light, delicate look. If possible, when buying the lumber, pick boards at least 7 in. wide. That way, you can make each V-shelf piece from a single plank and the sides and bottom shelf from two edge-glued planks. Don't worry if you can't find enough wide, figured boards, however. Edge-glued smaller pieces will still create a very sturdy bookshelf.

Start with the taper

After dimensioning the parts and cutting them to length, I use a shopmade tablesaw jig to cut tapers on the sides (see drawing, opposite page). Make the jig from a piece of plywood with a few guides screwed to it at an angle. Set the jig by placing it against the tablesaw fence and nudging the fence toward the blade until the left side of the jig just touches the blade. Then lock the fence, place one of the sides in the jig, and screw a piece of scrap onto the right-side guide to act as a hold-down. Cut the taper by pushing the jig along the tablesaw fence (see top photo, opposite page).

To cut the opposing taper, flip the workpiece on its other face, place the cutoff against the right edge of the workpiece, and place a shim the same thickness as your tablesaw blade between the cutoff and the jig guide (see bottom photo, opposite page). Make sure all the pieces are snug, attach a hold-down, and cut the taper.

Join the shelves and shape the pieces

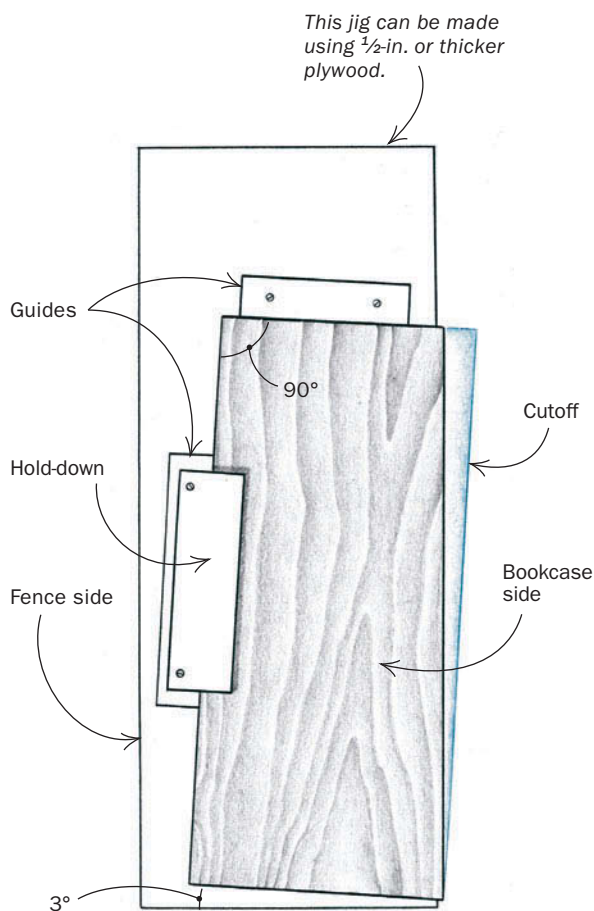
To create the V-shelves, I glue and biscuit the two pieces together into an "L" shape. For each V-shelf, cut a set of slots in the edge of one board, and a mating set into the face of the other board. I use four biscuits per shelf, evenly spaced.

Furniture with few design flourishes benefits from wood that has a lot of figure. When I build a simple bookcase like this one, which is modeled after a bookshelf that belonged to my great-grandmother, I carefully select cherry with bold grain patterns for the pieces. Often, I find that picking boards for a project like this can be one of the most rewarding and critical parts to making furniture, since the wood will make the design really sing.

This bookcase in particular makes a great project for beginners because it's small, goes together quickly, and the tapered sides, handles, and whale-tail cutouts are simple-to-make details that add a lot of visual interest. Plus, biscuit joinery makes it easy to assemble. For those who are just getting started in woodworking, there's a lot you can learn from this bookcase that can also be adapted into future projects.

Dimensioning the parts is pretty straightforward, too. I kept everything 1/2 in. thick

SIMPLE JIG FOR CUTTING TAPERS



To glue up the V-shelves, position one clamp over each biscuit joint, and protect the wood with scrap. When I tighten the clamps, I use a square to check that the pieces stay 90° to each other. When the glue dries, rip each wing to its final width.

The long edges of both V-shelves and all edges of the sides, excluding the feet and cutouts, are rounded over, leaving a crisp edge where the roundover meets the edge of the board. To get that shape, I set my router-table fence slightly past the outside edge of the bearing on a 1/2-in.-radius roundover bit. I use hold-downs and featherboards to make sure the stock passes firmly over the bit. After routing, I carefully scrape and sand the roundover, so as not to soften the edges.

Next, draw the cutouts for the handles and the whale tails using a compass and a French curve. Cut out the pieces using



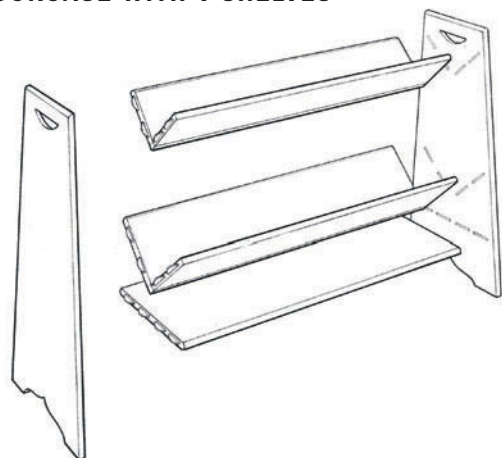
Rip one side.

A hold-down screwed to the right guide of the jig keeps the workpiece snug when sawing.

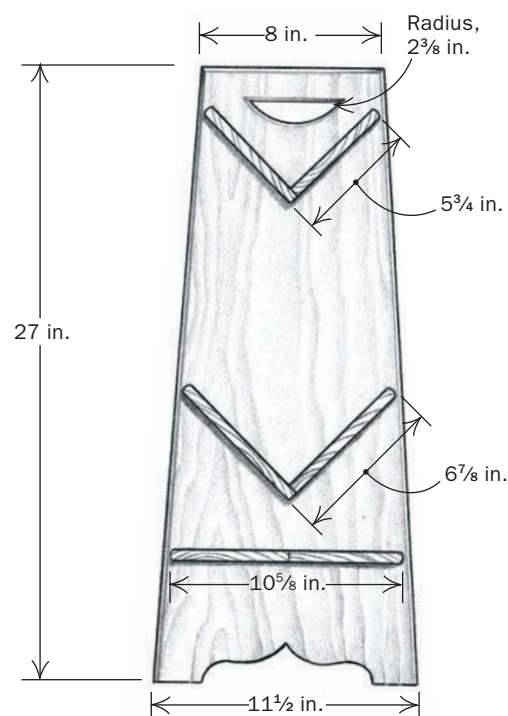
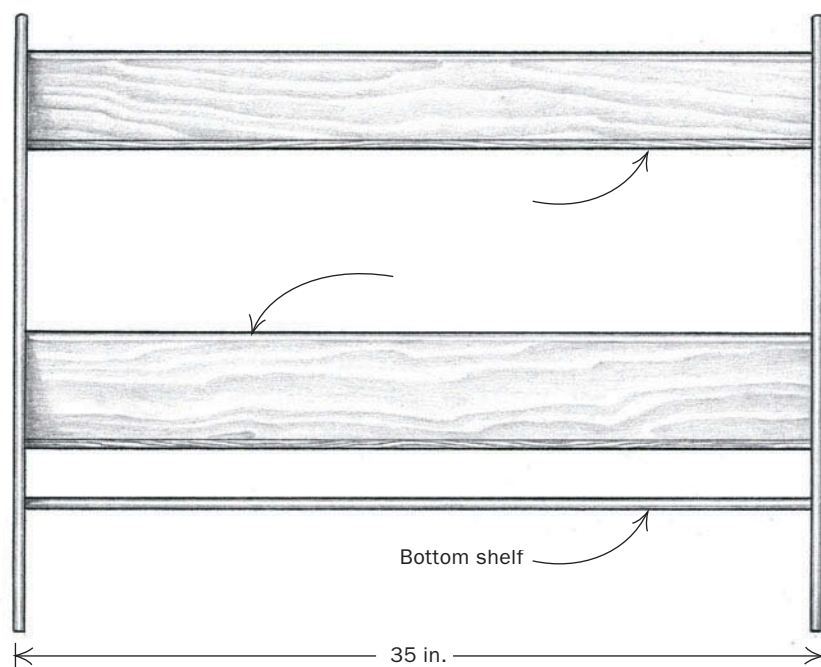
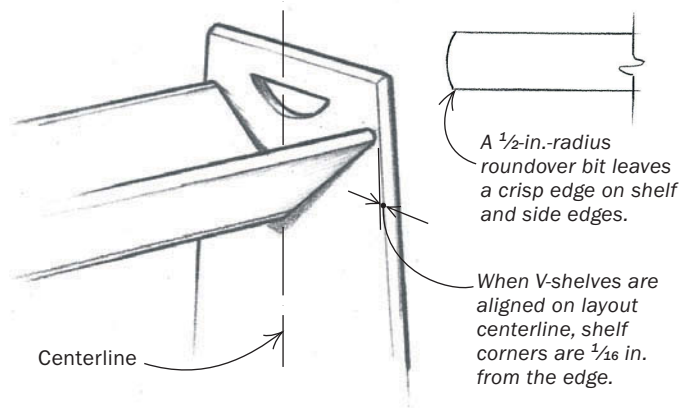
Cutting the opposite taper.

Place a shim the thickness of the sawblade against the right guide, then the cutoff and, last, the workpiece, which is turned over on its other side.

BOOKCASE WITH V-SHELVES



All parts of this bookcase are made from $\frac{1}{2}$ -in.-thick material. The shelves are joined to the sides with No. 10 biscuits. The lengths of all three shelves should be the same and the ends of the V-shelves dead even.



These joints hold the case together. The V-shelves are joined at 90° to each other. Biscuit slots cut in the ends of the shelves join them to the case sides.



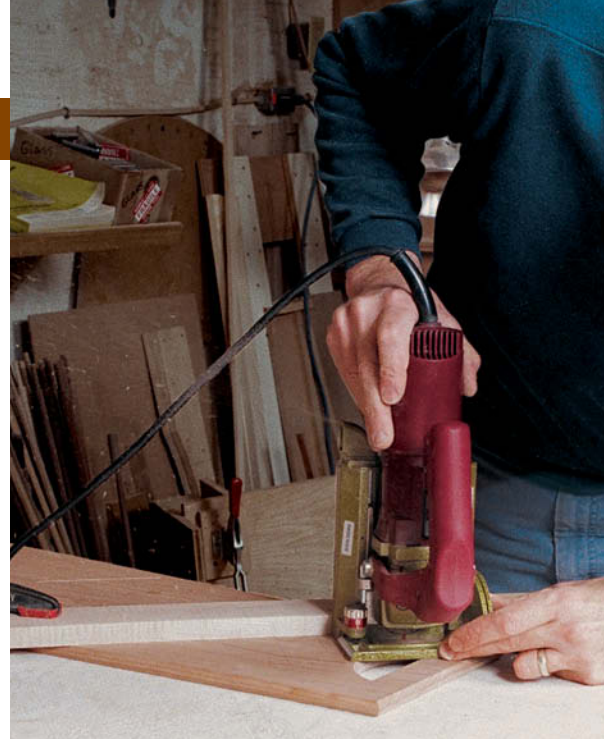
a jigsaw, staying just to the waste side of the line, then use a handheld router with a $\frac{1}{4}$ -in. roundover bit to ease the edges. I use a file and chisel for final shaping of the corners of the handles and the sharp junctures where the curves of the whale tails meet.

Match side slots to the shelves

To lay out and cut matching biscuit slots on the shelves and sides, you'll need to line up the pieces using tick marks and a shopmade guide to position the joiner. To do that, you'll first need to mark and cut slots into the ends of the shelves, and then use the shelves to mark the locations of the mating slots on the sides.

You can line up the pieces by drawing a vertical centerline on the inside face of each

USE V-SHELVES AS LAYOUT GUIDES



Mark the sides. Trace the bottom of the shelf and then transfer the biscuit slot marks to the sides (left). Mark the offset from the traced lines to position the straight-edged board (center), and then clamp it in place. Guide the biscuit joiner by butting the base of the tool against the board to cut the slots (right).

side. Locate a V-shelf by placing it on end against a side, keeping the apex of the V on the centerline. Slide it along the centerline until both edges are inset $\frac{1}{16}$ in. from the case side. Transfer the layout marks for the center of each slot and then trace along the bottom edge of the shelf.

To cut the slots in the sides, you'll need to register the biscuit joiner against the surface without using the tool's fence. I do this by clamping on a straight piece of wood parallel to the lines I traced on the sides. But because it's registering against the base of the joiner instead of the fence, the guide must be offset a little. Measure the distance from the bottom face to the bottom of a V-shelf slot. Then measure the distance from the bottom of the blade to the base of the biscuit joiner. Subtract the first number from the second to find the offset. Use it to line up the straightedge, clamp it in place, and cut the slots.

Assemble, clean up, and finish

Before final assembly, I dry-fit the case to make sure that everything lines up. I use cauls and backer boards to avoid marring the pieces and to make sure I get even clamping pressure. The backer boards are two pieces of scrap plywood slightly larger than each side. To these, I attach a pair of cauls with double-faced tape.

I also use a shopmade squaring jig that's nothing more than a right-angled triangle made of scrap. I clamp this jig to the bot-



Assemble the bookcase on end. Cauls, a squaring jig, and backer boards ensure that the case is clamped tightly and won't be marred.

tom shelf and one side to keep the case properly aligned during glue-up. When I assemble the case, I stand it on its side. After clamping it, I check whether all the shelves fit flat against the sides (see bottom photo). I mark any that don't, unclamp the case, and plane them to fit before glue-up.

Prior to finishing, I sand all the pieces up to 180-grit, then wipe everything down with a damp rag to raise the grain. When the pieces are dry, I continue sanding up

to 320-grit. When I sand the edges, I'm careful not to lose their definition.

One of my other favorite aspects of furniture making? Applying the first coat of an oil finish. It's wonderful to see the grain and figure pop out once the oil is rubbed into the wood. After three coats, it's done. □

Peter S. Turner designs and builds furniture in Portland, Maine.

Knockdown Bookshelves

Sturdy shelves go together in a day

BY STEVE LATTA

I get the most pure enjoyment from reproducing 18th-century furniture, but every now and then it's nice to break out of that mode and dive into a project that I can knock out in a day or two.

This set of bookshelves is just such a beast, and it will cover a lot of wall in the little amount of time required to build it. I've made three versions of this design since I built the first one. The first has lived in three separate homes, but now it fits in the dining room.

There are some nice features about this design. When you combine the simplicity of the joinery with the absence of hardware, you have a bookcase that can be taken apart and reassembled in minutes. The angle on the bottom of each vertical makes the case lean toward the wall, so the more weight that you put on it, the more secure it is. In most cases, there is no need to tie it to the wall; although, if you have kids, you may want to add a few fasteners as a precaution. A couple of corner braces attached under the

bottom shelf and along the top shelf should do the trick.

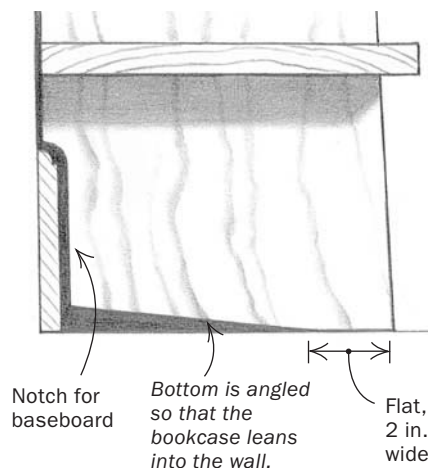
Choose your wood and size the joints

This is a great project for using up old scraps. For these units, I used some less than perfectly clear leftovers of walnut for the verticals and dimensioned No. 2

white pine 1x12s for the shelves. If you don't have boards wide enough to make the verticals (mine are 10 in. wide at the bottom), you can glue them up from smaller boards, but make sure the front piece is wide enough that you won't expose a gluejoint when you cut the taper on the front edge. For the pine shelves, I bought more width than I needed so that I could cut around knots and defects to end up with clear front edges on all of them.

The shelves and the verticals lock together with what I call a housed lap joint (see drawing, p. 82). The shelves are notched wherever they meet a vertical, and the verticals are notched and dadoed on both sides so that the shelves sit firmly on the shoulders of the dados. I cut the dados slightly wider ($\frac{1}{32}$ in. or so) than the shelf material is thick. That way, the pieces slide together fairly easily, even after a finish has been applied to them. Don't be obsessive about getting a microfine fit. The joy of this design is lost if you end up having to

BOTTOM DETAIL



put together the unit by beating it with a block of wood and a hammer.

In figuring sizes and spacing for the shelves, I kept it simple. The bottom shelf sits high enough off the floor (7 in.) to clear the tallest baseboard in an old house where we used to live. The spacing between shelves decreases in 1-in. increments from the bottom to the top.

Cut the dadoses before tapering the verticals

Shoot for a thickness on the verticals of around $1\frac{1}{8}$ in. to $1\frac{1}{4}$ in. (Make sure you leave some extra scrap pieces to use in setting up the joinery cuts.) You can cut the joinery using a router or a tablesaw with a carriage jig like the one I used (see photo, p. 82). If you use a tablesaw, you'll need a long auxiliary fence to keep the stock steady. You'll also need to support the weight of the stock that hangs out over the end of the saw table.

Before cutting the joints in the verticals, make a practice cut halfway through a scrap piece of shelf stock. Use this sample to set the depth of the dadoses in the verticals. To be sure all of the verticals are dadoed correctly, first cut them all to length and then use a story stick to mark the locations of the dadoses on the front edges of the verticals. A pencil line provides a reference to cut to, and a blue chalkline indicates on which side of the line to cut.

To set the depth of the dadoses, take a scrap from one of the verticals and set it



A HOUSED LAP JOINT CONNECTS THE PARTS

6 in.

Latta chose this joint for its ease of construction and its strength. Shoulders created by the dados in the verticals give full support at the intersection with each shelf. The interlocking shelves and verticals fit together without the need for hardware.

Dadoes,
 $\frac{3}{16}$ in. deep

Verticals, $1\frac{1}{2}$ in.
to $1\frac{1}{4}$ in. thick

Shelves,
 $\frac{3}{4}$ in.
thick

Size the
notches
so that the
shelves slide
in easily.

Depth of notch should
be just under half the
width of the vertical.

1 in.

Distance
between
verticals,
20 in.

Shelf decre
1-in. i
ments from
bottom to top.

Angle the
bottom
 5° .

Flat,
2 in.
wide

10 in.

84 in.

60 in.



Dado one side at a time. After setting the blade to the right height, make all of the dado cuts on one side of the verticals. Transfer the cut lines for the dadoes on the second side with a square and a sharp pencil.

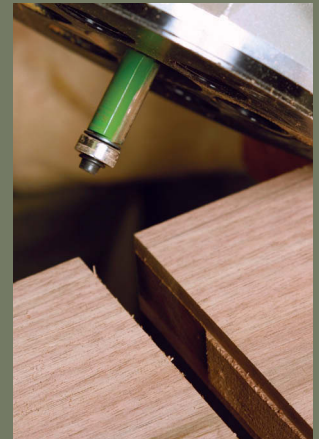
against a stop block on the carriage. Raise the dado blade, make a cut, flip over the scrap, and make another cut opposite the first. Adjust the height of the dado blade until the notched shelf sample slides easily onto the dadoed sample without excessive play. Now begin making the dadoes on only one side of each vertical. Then use a small square and a sharp pencil to mark the dado cuts across the front edges of all the verticals. Flip over the verticals and, lining up the pencil lines with the kerf in the carriage, cut the dadoes on the other sides of the verticals. Hold-down clamps keep the boards from sliding out of position.

After cutting the dadoes, lay out the taper on one of the verticals and mark each dado for where a chunk of waste needs to be taken out to receive the shelf. Use a jigsaw to cut away most of the waste. Stay about $\frac{1}{16}$ in. from the edges of the dado and clean up using a router with a bearing-guided, flush-trimming bit.

Cut the taper on one vertical using the bandsaw and then, with a jointer or a handplane, clean up that edge. Use the first vertical as a pattern to mark and cut the others. The radius on the top front corners of the verticals (and on the ends of the shelves) can be cut a number of ways. If I'm doing lots of shelves and sup-



Cut away the wood you don't need. *Housed lap joints require you to remove some wood from all of the pieces being joined. In the verticals, remove most of the waste with a jigsaw.*



Clean up the jigsaw cut. *Use a router equipped with a bearing-guided, flush-trimming bit.*

ports, I make a template out of medium-density fiberboard (MDF) and flush-cut the pieces using a router. Once the verticals have been cut to shape, soften the outside edges with a 1/8-in. roundover bit. Finally, notch the bottom back edge of each of the verticals to clear any baseboard on the wall where they will live. Now use a sliding compound-miter saw to make a 5° angled cut on the back edge of the bottom of each vertical, leaving a 2-in.-wide flat at the front.

Notch the shelves to fit

After ripping the shelves to width, mark out the notches from the back edge. Cut the notches for the shelves using the same dado setup you used for the verticals, and set up the carriage with a stop block. Use the hold-down clamps on blocks to grip the shelves firmly. Raise the dado blade as high as possible to get the flattest cut on the downward arc. Just be careful to keep your hands completely away from the cut while using the sled.

After cutting all of the shelves at one setting, reset the stop block and repeat the process until all of the notches have been cut. Make any necessary adjustments in the length of the notches so that the shelves line up with the back edge of the verticals. When you are done notching, radius the

ends of the shelves and round over the front top and bottom edges. If your layout and machining have been accurate, all of the pieces should slide together easily. At this point they're ready for a final sanding and finish.

You can assemble this bookcase by yourself, but it never hurts to have a second pair of hands to help out. Lean the verticals against the wall and slide the bottom shelf into place. One by one, work your

way up to the top. This process should take only a few minutes. Use small shims with double-sided carpet tape to level the case. If the unit is installed on a slippery wood or tile floor, you can mount a few small metal corner braces beneath the bottom shelf. □

Steve Latta teaches woodworking at the Thaddeus Stevens College of Technology in Lancaster, Pa.



Notch cuts require clamps. *While plowing out the notches for all of the shelves, Latta clamps the workpiece in place for each cut, being careful to keep his hands well clear of the exposed dado blade.*

Versatile End Table

Little dowel jig handles all the joinery

BY ASA CHRISTIANA

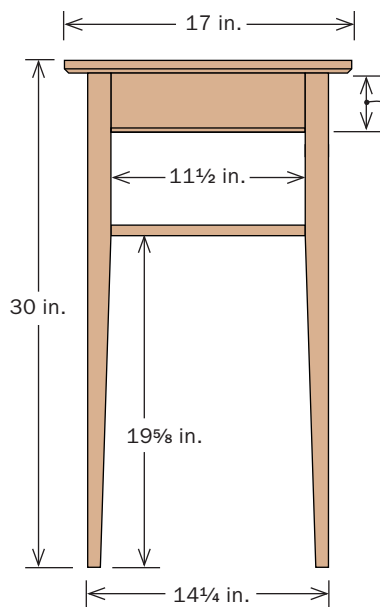
Decades of bad factory-made furniture may have given dowels a rickety reputation, but don't be fooled: The tiny pegs offer a simple, strong way to make fine furniture. They're an especially useful joinery tool for beginners because they require only a drill, a couple of bits, and an inexpensive jig to install. They're strong enough for all but the most demanding applications, and they help speed furniture-making because you need only to make simple butt joints before drilling dowel holes.

Dowels join just about everything on this small walnut table. I used them to attach the aprons and shelf to the legs, and to align the boards used for the panels. Properly executed, dowel joints make projects like this as simple to build as handmade furniture gets.

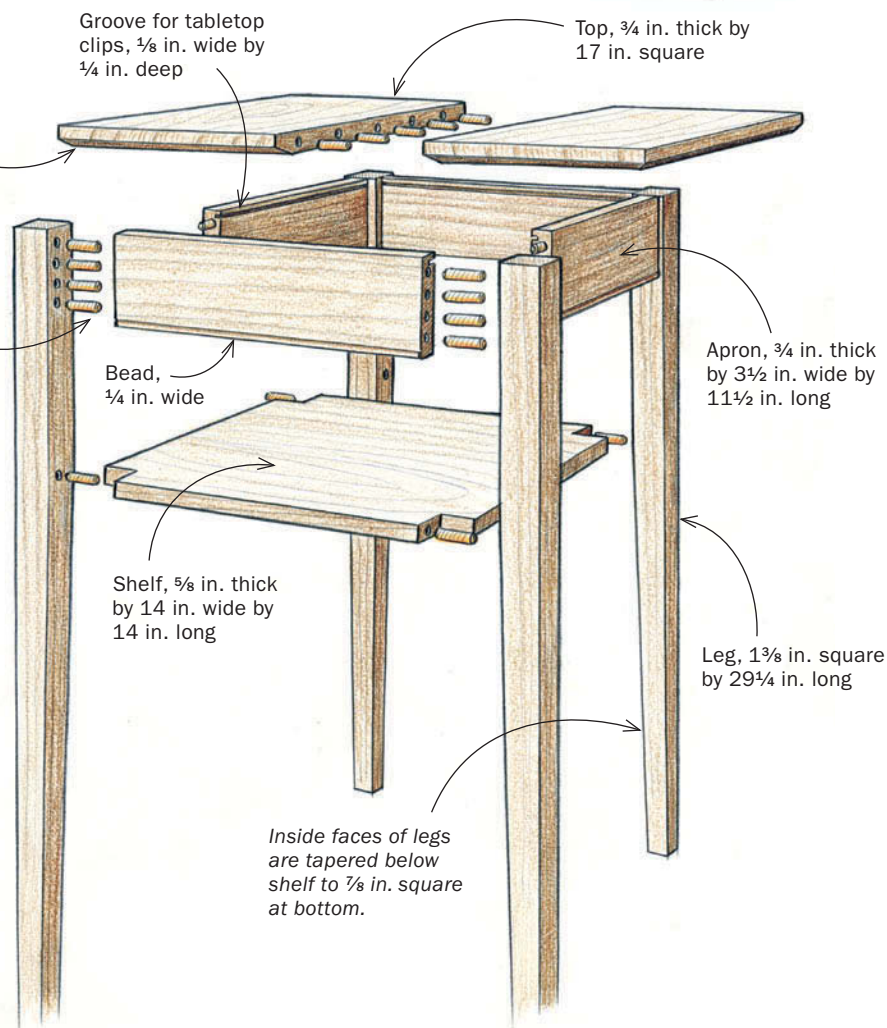
After dimensioning the pieces, I start by tapering the legs using a jig similar to Peter Turner's (see p. 77). Make the jig from $\frac{3}{4}$ -in.-thick medium-density fiberboard (MDF) with a hardwood runner screwed to the bottom so it will sit in a tablesaw's miter slot.

CLASSIC ELEMENTS, EASY JOINERY

Tapered legs are quintessential Shaker, but the beads and doweled shelf add a twist.



Easy taper. Use some blocking and a couple of Da-Sta-Co clamps to create a simple tapering jig that rides in your table-saw's miter slot.



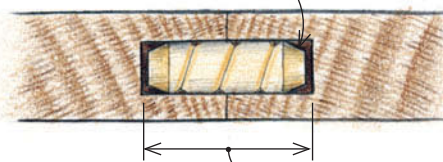
GLUE UP PERFECT PANELS

Set the depth.

Insert the drill bit into the doweling jig until the point protrudes to the desired depth. To create a simple depth stop, wrap a piece of painter's tape into a "flag" around the bit where it enters the top of the jig.



Dowels used for panel alignment need not be longer than about 1 in.



In this joint, the depth of each hole should be half of the dowel's length, plus $\frac{1}{16}$ in. or so at each end to accommodate excess glue.



Layout is simple. Make a series of pencil marks squarely across each joint to locate the mating holes.



Drill the holes. Registration marks on the doweling jig align with your pencil marks to locate the jig. When the depth-stop flag begins sweeping chips from the work surface, you've reached the correct depth.

TIP

The strength in a panel glue-up comes from the large long-grain mating surfaces. Be sure to apply glue on these surfaces as well as in the dowel holes, spreading it evenly inside and out.



Size the MDF so that the sawblade trims the edge. Mark the taper, line it up on the edge of the jig, and use a couple of Da-Sta-Co clamps to lock the legs in place.

Next, I drill dowel holes for the aprons and legs using four dowels for each joint. To create a slight shadow line, offset the holes in the legs by disassembling the jig and adding a thick shim (see p. 86).

Align glued-up panels perfectly

I also used dowels to keep the boards aligned when I glued up the panels for the tabletop and shelf. To mark out for the joinery,



Chamfer the bevels.

A handheld router and chamfering bit are an easy way to cut the bevels on the tabletop. Do the end-grain cuts first. If you get some blowout at the ends, the long-grain chamfers will remove it.

SECRETS OF SUCCESS

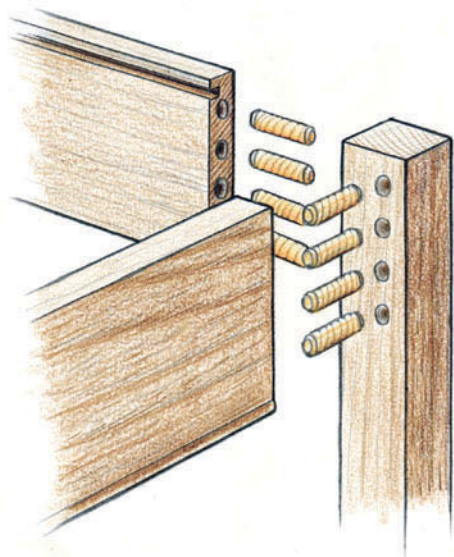
A good dowel joint depends on a snug fit between dowel and hole. Hardware-store dowels won't do, but good, cheap dowels are available from online woodworking suppliers.

To drill accurate holes, use a brad-point bit. Its center spur prevents the bit from wandering and enlarging the hole. To keep mating holes aligned and ensure that the holes are square to the surface, you'll need a doweling jig. The \$14 model from Rockler at left works with $\frac{3}{8}$ -in.-dia. dowels for this project, but $\frac{1}{4}$ - and $\frac{1}{2}$ -in. sizes are available, too. For places where the jig can't go, a set of dowel centers is a smart accessory. These metal plugs (left photo, center) fit a hole precisely and transfer its location to the mating piece (see p. 87).



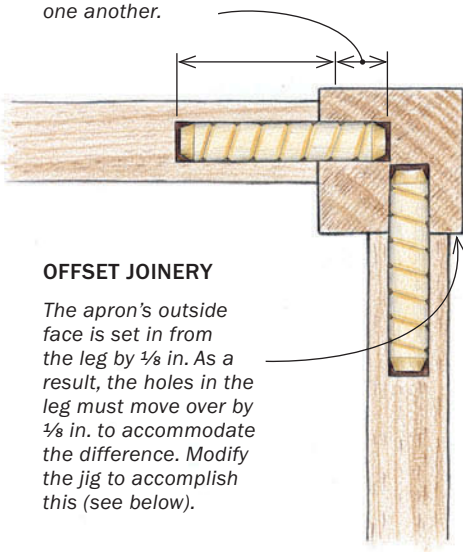
A lengthwise slit releases air and excess glue. A simple hand-saw jig holds the dowels upright when cutting.

BUILD STRONG JOINTS



HOLE DEPTHS DIFFER

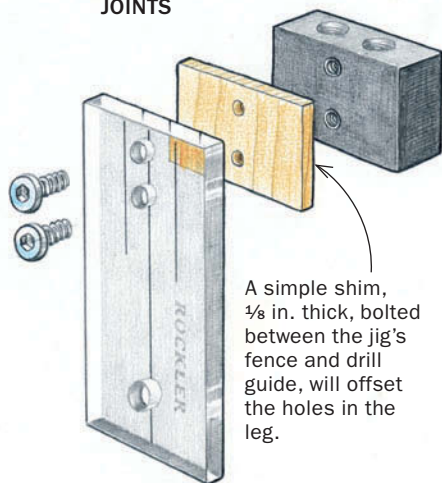
With a 2-in. dowel, the holes in the leg must be shallower to avoid interfering with one another.



OFFSET JOINERY

The apron's outside face is set in from the leg by $\frac{1}{8}$ in. As a result, the holes in the leg must move over by $\frac{1}{8}$ in. to accommodate the difference. Modify the jig to accomplish this (see below).

HOT-ROD THE JIG FOR OFFSET JOINTS

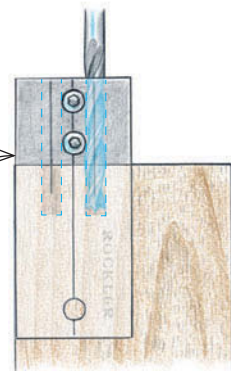


A simple shim, $\frac{1}{8}$ in. thick, bolted between the jig's fence and drill guide, will offset the holes in the leg.



TRICK FOR ACCURATE SPACING

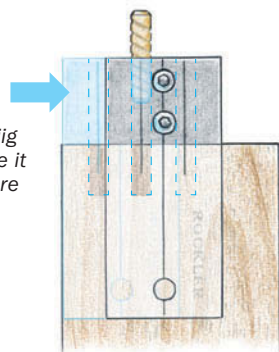
Start with the jig flush to the edge of the workpiece.



Drilling the first two holes. Secure the apron in a vise and clamp the jig so its edge is flush with the top of the apron.



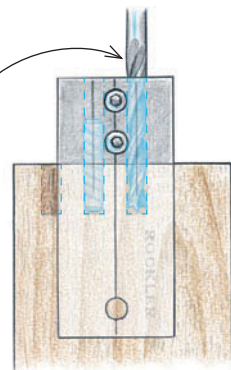
Move the jig and secure it with a spare dowel.



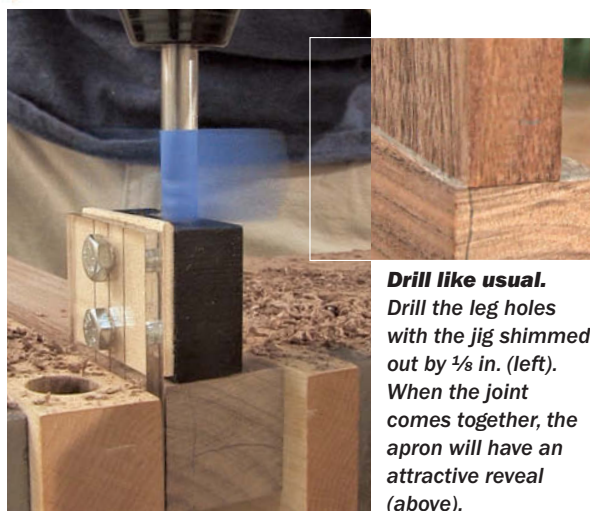
Move the jig over. To continue the line of holes beyond the jig's reach, use a dowel to hold the jig in the last hole you drilled.



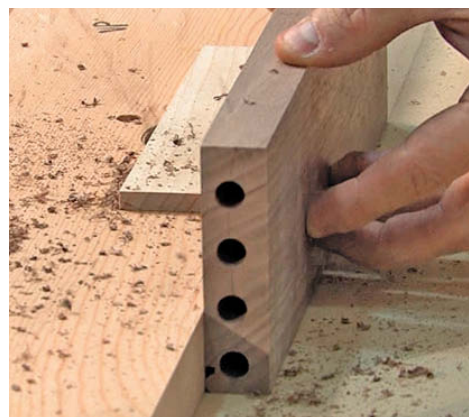
With the jig secured, drill the next hole in line.



Drill and repeat. With the jig secured, drill the next hole. Repeat as needed for a line of evenly spaced holes.



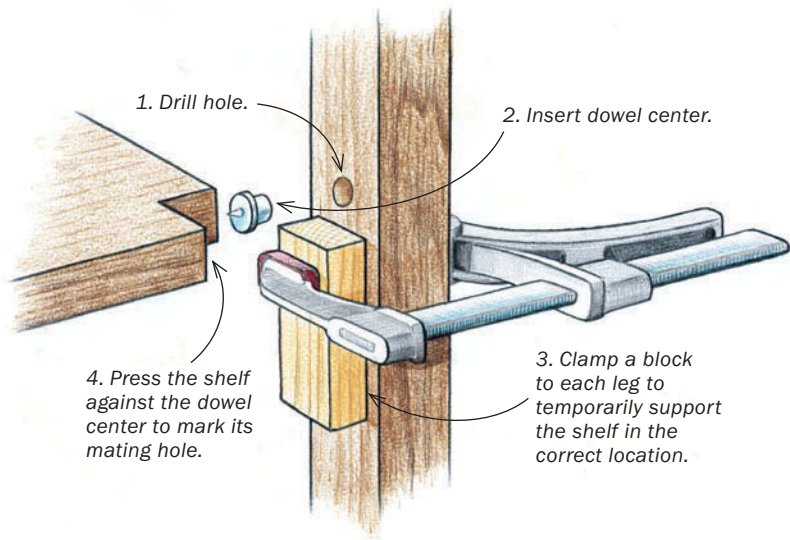
Drill like usual. Drill the leg holes with the jig shimmed out by $\frac{1}{8}$ in. (left). When the joint comes together, the apron will have an attractive reveal (above).



Check your depth. Avoid cutting into your dowel holes when routing the beads and cutting the grooves in the aprons at the tablesaw.



DOWEL CENTERS SOLVE TRICKY JOINTS



draw tick marks across the joints, about 6 in. to 8 in. apart. Use these marks to align the doweling jig. This joint's strength comes from the long, edge-grain glue surface, so the dowels don't need to be numerous or large.

Be sure to drill $\frac{1}{16}$ in. or so deeper than needed to hold excess glue when the joint goes together. Also, when gluing any dowel joints, don't put glue on the dowel itself; the hole will scrape it off and create a mess. Instead, put glue in each hole and spread it with a small brush or stick. When the panels are dry, cut them to size and then bevel the tabletop and use a bandsaw or jigsaw to cut the notches for the shelf.

Hide the shelf joinery

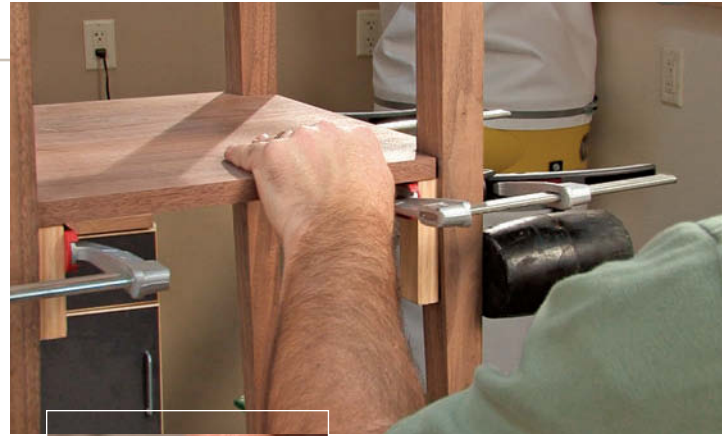
A simple dowel joint is far more elegant than stretchers or cleats when it comes to attaching the shelf. To mark and drill the holes, you'll need to dry-fit the legs to the aprons and then clamp a support block to each leg so that its top is level with the shelf bottom. Then you can drill the hole in the leg and slot a dowel center into the hole. A light mallet tap on the outside of each leg will press the dowel center's point into the shelf edge, marking the mating hole. Now drill the dowel hole in the shelf.

Final details

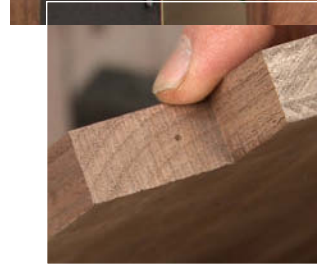
Before gluing the piece, cut the beads that run along the front of the aprons and the inside grooves that hold the S-clips. I cut the beads at the router table using a $\frac{1}{4}$ -in. beading bit. I align the bit so the bottom of the bead is even with the table's surface and then adjust the fence so it almost reaches the inside curve. I cut the grooves using a tablesaw, and offset the cut just a little so that the S-clips will pull the top down tightly.

Sand all the pieces up to P220 grit before gluing. I used band clamps to pull it all together during glue-up, but regular bar clamps or pipe clamps would also work. For a finish, I used five coats of wipe-on polyurethane, followed by a coat of paste wax. □

Asa Christiana is Fine Woodworking's editor.



Locate the shelf. A support block clamped to the leg holds the shelf in place. A light mallet tap drives the dowel center into the shelf edge (above). The dimple (left) locates the drill bit for a perfectly aligned hole.



Drill the shelf edge. Eyeball the drill and the edge of the shelf to make sure the hole is straight and square.



Easy clamping. A band clamp will give good pressure on the dowel joints, and is a little easier to fit in place than a pile of separate bar clamps (though that works, too).

Online Extra

For a step-by-step video series on this table project, go to FineWoodworking.com/quickprojects.



TABLES

Round-Top Table

Arts and Crafts
classic is fun
to make

BY KELLY J. DUNTON

The inspiration for this table dates back a century to designs by Gustav Stickley. He defined his furniture philosophy as being “where the beauty lies in simplicity of the wood and of the joints themselves.” To be faithful to the original designs, I built my table from white oak with pegged through-tenons joining the lower stretchers to the legs.

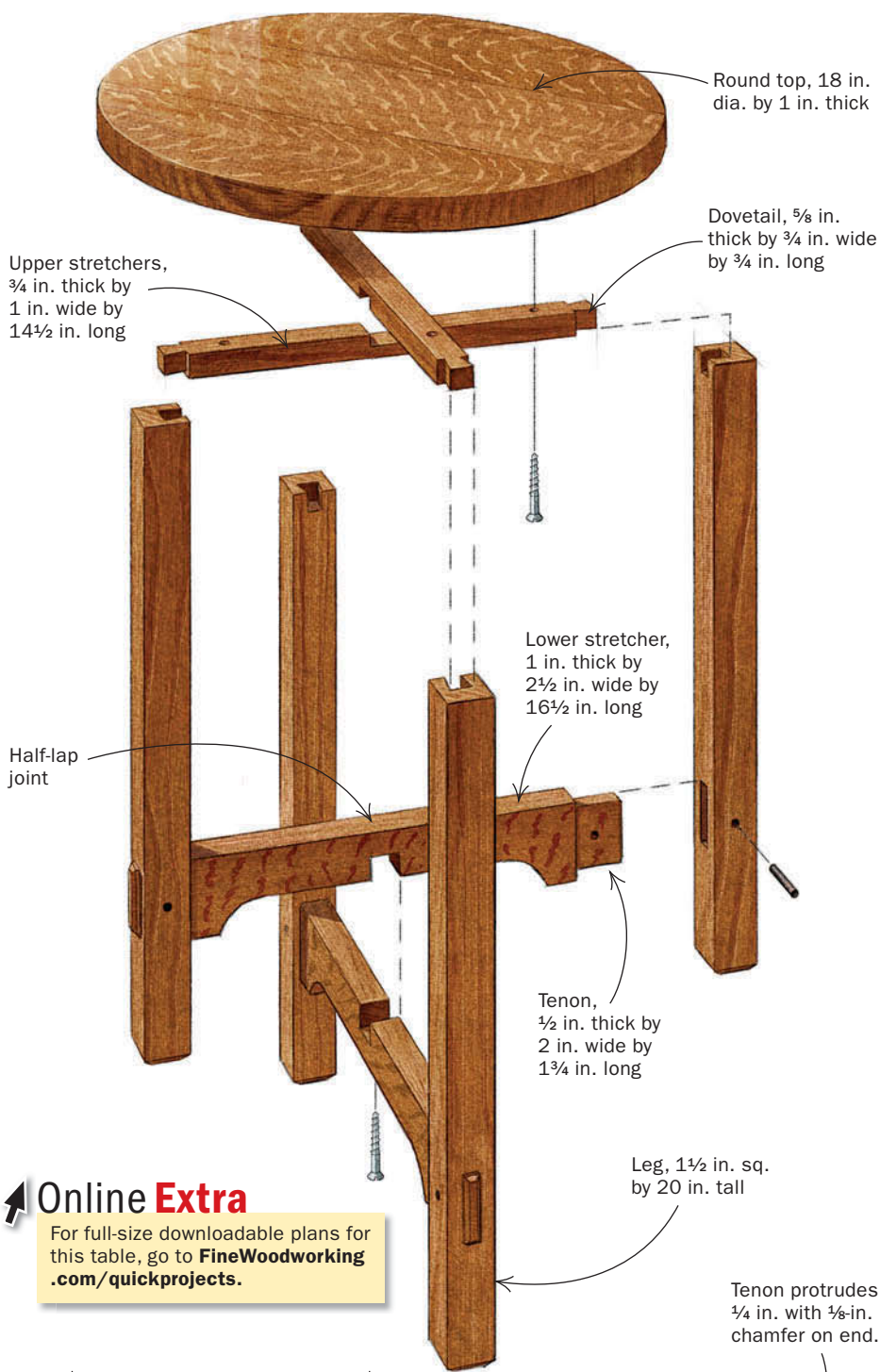
There are many uses for a small table: With slight changes in size, it can sit next to a chair in the family room, serve as a bedside table, or be used as a plant stand. Made from cherry or maple, this design would fit nicely into more modern décor.

This is a relatively simple project that uses little material and can be built with common hand tools and machines. So sharpen your chisels and planes and let's get started.

Lay out the legs and cut the mortises

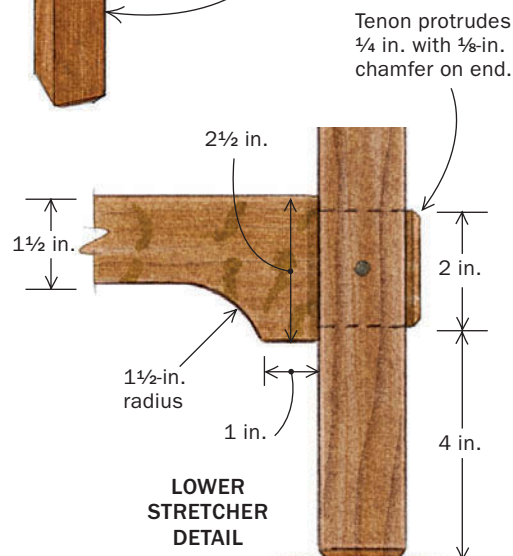
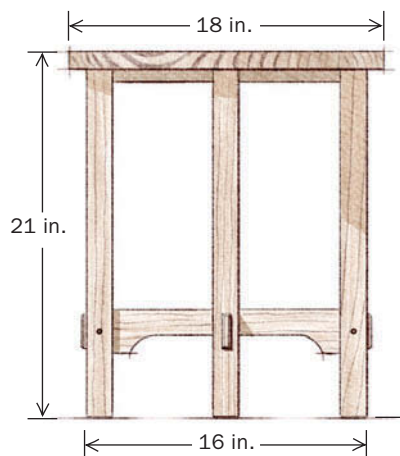
Much but not all furniture in this style was made from quartersawn white oak with its characteristic ray flecks running across the grain on opposite sides of the board. I chose this type of wood for the prominent top of the table, but for the rest of the

Photo, this page: Michael Pekovich; drawings: John Hartman



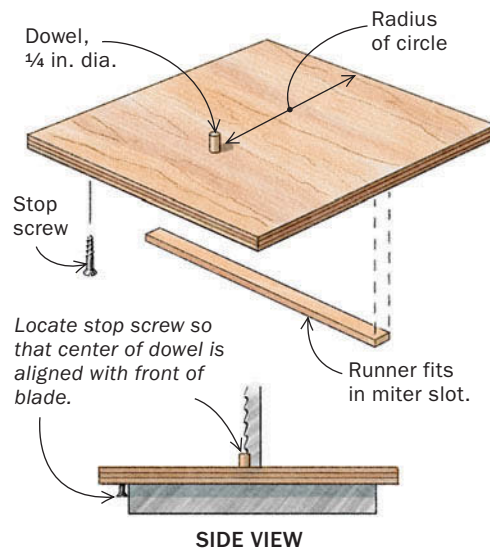
Online Extra

For full-size downloadable plans for this table, go to FineWoodworking.com/quickprojects.



BUILD A SIMPLE CIRCLE JIG

To cut the circular top, Dunton uses a jig that sits in the miter-gauge slot and has a dowel that fits into a hole drilled in the underside of the tabletop. The distance from the side of the jig that touches the bandsaw blade to the dowel equals the tabletop radius. Slide the jig until the front edge of the blade is aligned with the center of the dowel, and insert the stop screw.



Use the circle jig. Place the tabletop on the jig and slide it forward until the stop screw hits the saw table (top). Then rotate the top to cut the circle (above).

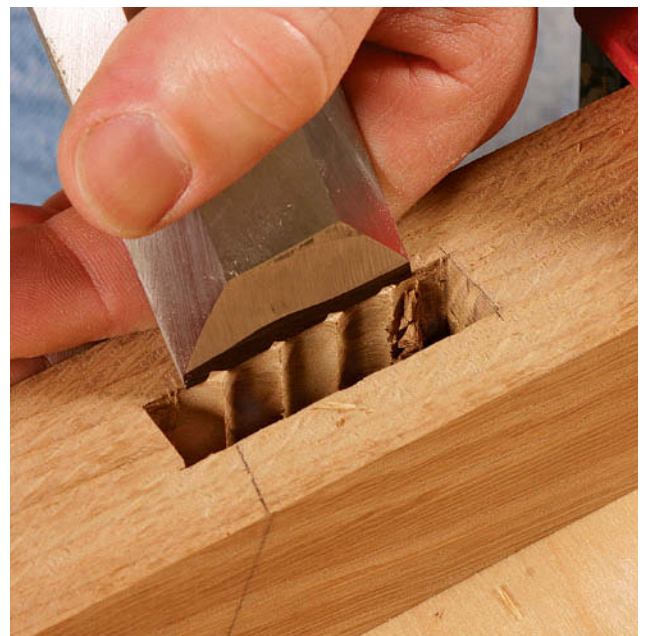


DRILL AND CHOP THE MORTISES

Drill-press jig. To keep the mortises straight and square and to prevent tearout where the bit exits, a jig consisting of a backer board and a right-angle fence (above) is clamped to the drill-press table. With a Forstner bit (inset), you can overlap each hole and remove more waste.



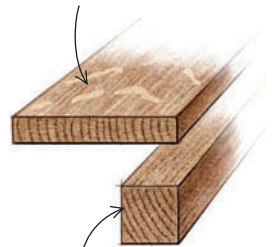
Clean up the mortises. Use a chisel the same width as the mortises to clean up the ends (right), and then a wider chisel on the sides (far right). Creep up to the line. Don't place the tip of the chisel in the line left by the marking knife until you have only a thin slice of wood to remove.



piece I used more readily available rift-sawn boards (see drawing, below).

Because three sides of each leg will have near equal exposure to the viewer, I cut and surfaced the legs to size, and then selected the least attractive side of each leg to face inward. When laying out the mortises, make sure to place them accurately on all the legs and make sure the leg dimensions are identical; this will keep the table square and stable. Because the lower stretchers end in through-tenons instead of the more common

Use quartersawn stock for the top.



Use riftsawn stock for the legs and stretchers.

blind tenons, remember to mark both sides of the legs using the same side as a reference edge. I lay out the mortises using a marking gauge, a square, and a knife. I prefer a knife to a pencil because it gives greater precision and allows you to set the chisel in the knife cut later for the final paring cuts. These joints will be exposed, so take the time to lay out and cut them precisely.

There are several ways to cut the mortises. A hollow-chisel mortiser is the quickest method, but lacking this tool I chose to remove most of the waste at the drill press and then clean up the sides and ends with a sharp chisel. (Drilling by hand is an option, but it is important to drill straight and true.) To hold the workpiece securely and to prevent tearout on the bottom side

CUT THE TENONS AND HALF-LAP JOINERY ON THE TABLESAW



Tenons on the tablesaw. Use a dado set for quick tenons. For accuracy and clean cuts, outfit the miter gauge with an auxiliary fence and a stop block. Through-tenons must look good and fit right, so clean them up with a shoulder plane, a block plane, and/or a chisel.



Cut the half laps. With the same miter gauge and auxiliary fence used to cut the tenons, cut the half-lap joint on each stretcher.



Profile the stretchers. Join the lower stretchers with double-sided tape and then bandsaw the profile.

of each leg, make a small fence consisting of two pieces of plywood or MDF glued and screwed at a 90° angle, which gets clamped to the drill-press table.

Install a bit that is slightly smaller than the width of the mortise, center the mortise on the bit, and then drill out the waste, starting at each end. It's best to use a Forstner bit because you can overlap the holes without causing the bit to wander off course. A second choice is a brad-point bit—cut the holes as close to each other as possible without overlapping.

With the leg clamped to the workbench, clean up each end of the mortise using a chisel that matches the mortise width as closely as possible. Keep the chisel off the layout line until the final cut, which should remove only a sliver of wood. Work into the center from both sides, but try to get the cleanest cuts on the visible outside of the leg. With the mortise ends established, use the widest chisel that will fit the length of the mortise to pare the sides. Work-

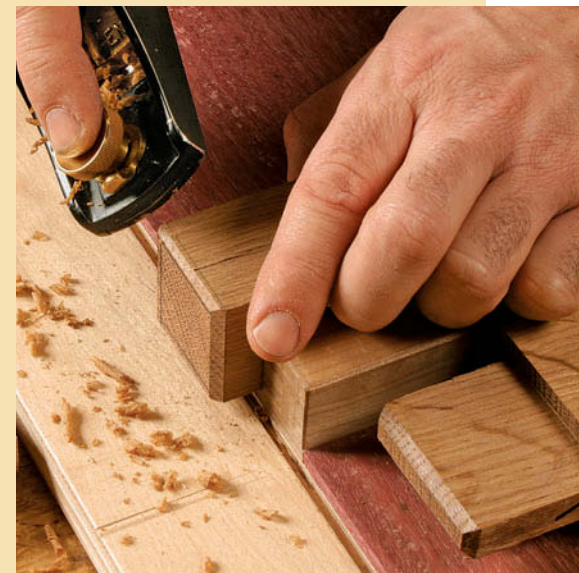
ing with white oak will probably require a mallet and a few trips to your sharpening stones. With patience and determination, you'll soon have clean mortises.

Create the upper and lower stretchers

With the legs nearly complete, turn to the upper and lower stretchers. Both pairs are connected with half-lap joints, but the lower stretchers have a curved profile on the bottom edges and terminate in through-tenons. I used a marking gauge, a try square, and a marking knife to lay out the tenons.

I cut the tenons using a dado blade on the tablesaw. It is helpful to make test cuts on a piece of scrap the same thickness as the stretchers. Check the fit until it is still a bit fat, and then pare the tenons with a block plane, a shoulder plane, or a chisel. In this way you will get a precise fit and nice clean cuts on the exposed tenon ends. Number each joint when you are done.

Now mark and cut the half-lap joints in both pairs of stretchers. Work from the



Chamfer the tenons and legs. A 1/8-in. bevel gives the exposed through-tenons and leg bottoms a softer look and creates interesting shadow lines.



center points of each pair and mark the widths of each at the crossing point. Mark for the depth from the top of each stretcher and label which side is to be removed. Using a miter gauge, make multiple passes on the tablesaw to remove most of the waste. Then pare with a chisel to a perfect fit.

To bandsaw the profile on both lower stretchers at once, join them with double-sided tape. The curve also can be cut with a jigsaw—but clamp or tape a piece of scrap to the upper side of the stretcher to keep the cut as clean as possible.

When the upper stretchers are cut to size, saw a dovetail on each end. A hand-saw and/or tablesaw can make these cuts, leaving just a bit of chisel work. Cut a 1/8-in. shoulder on the lower side. This shoulder can be registered against the side of the leg to transfer the shape of the dovetail to the top of the leg. After laying out the mortises in the legs, remove some of the waste on the drill press, and then clamp the leg in a vise and chop away the rest with a chisel.

The final work on the top stretchers is to drill and countersink screw holes through which to attach the tabletop. To allow for seasonal movement of the top, elongate the holes in one of the stretchers.

Make the round tabletop

It is worth spending time at the wood supplier searching for a quartersawn board with a decent amount of ray fleck in it to form the tabletop. Making the top from

DOVETAIL THE UPPER STRETCHERS

Saw a dovetail onto the ends of the upper stretchers. Dry-fit the table and scribe the location of the dovetail on the top of each leg (above). Saw on the scribe mark (right) and remove most of the waste on the drill press. Clean up the joint with a chisel (far right).



ASSEMBLE THE BASE IN TWO STAGES



Begin base assembly. Glue and clamp the first pair of legs to their upper and lower stretchers. On the second pair of legs, glue only the lower stretcher in place.



Peg the joints. The pegs are inserted from both sides of the leg to avoid blowing out the wood when they exit.



Finish base assembly. Because you need to overlap the two halves of the base, only attach the second upper stretcher after the lower stretchers are together.

three well-matched pieces from a single board is better than using two wider but conflicting pieces from different boards. Prepare, glue up, and clamp the pieces.

There are many ways to cut the circular top. The simplest is freehand, using either a bandsaw or a jigsaw and cleaning up the edge with hand tools and sandpaper. I used the bandsaw, but with a jig that sits in the miter-gauge slot and has a center point that fits into the underside of the tabletop (see drawing, p. 89). Slide the jig until the front edge of the blade is aligned with the center of the tabletop, and rotate the top until the circle is complete. Clean up the edge with a block plane, file, and sandpaper.

Assembly sequence and finishing

To be historically accurate I decided on a fumed finish, which uses ammonia fumes to darken the oak chemically and is best done with the piece dry-fitted. As for a top-coat, whether you fume the oak or prefer a natural look, it is beneficial to prefinish pieces before assembling them.

Sand all surfaces to P220-grit and then carefully wipe a clear finish on all the surfaces that will not be glued, including the ends of each tenon that will protrude from the legs.

Begin assembly by preparing the mortises for pinning. I marked the center points of the mortise sides and drilled all the way through using a sharp brad-point bit with

a piece of scrap under the leg to minimize breakout. After the stretchers are glued to the legs, you'll drill into the existing hole and through the tenon before inserting ebony pins.

Glue the first pair of legs and stretchers and clamp until dry. Apply glue just to the tenons after they have been partially inserted into the mortises to reduce squeeze-out. The second pair overlaps the first, so don't glue in the second top stretcher until after the two pairs of legs are connected. I drove a screw into the bottom of the lower intersecting stretchers. □

Kelly J. Dunton is an associate art director at Fine Woodworking.

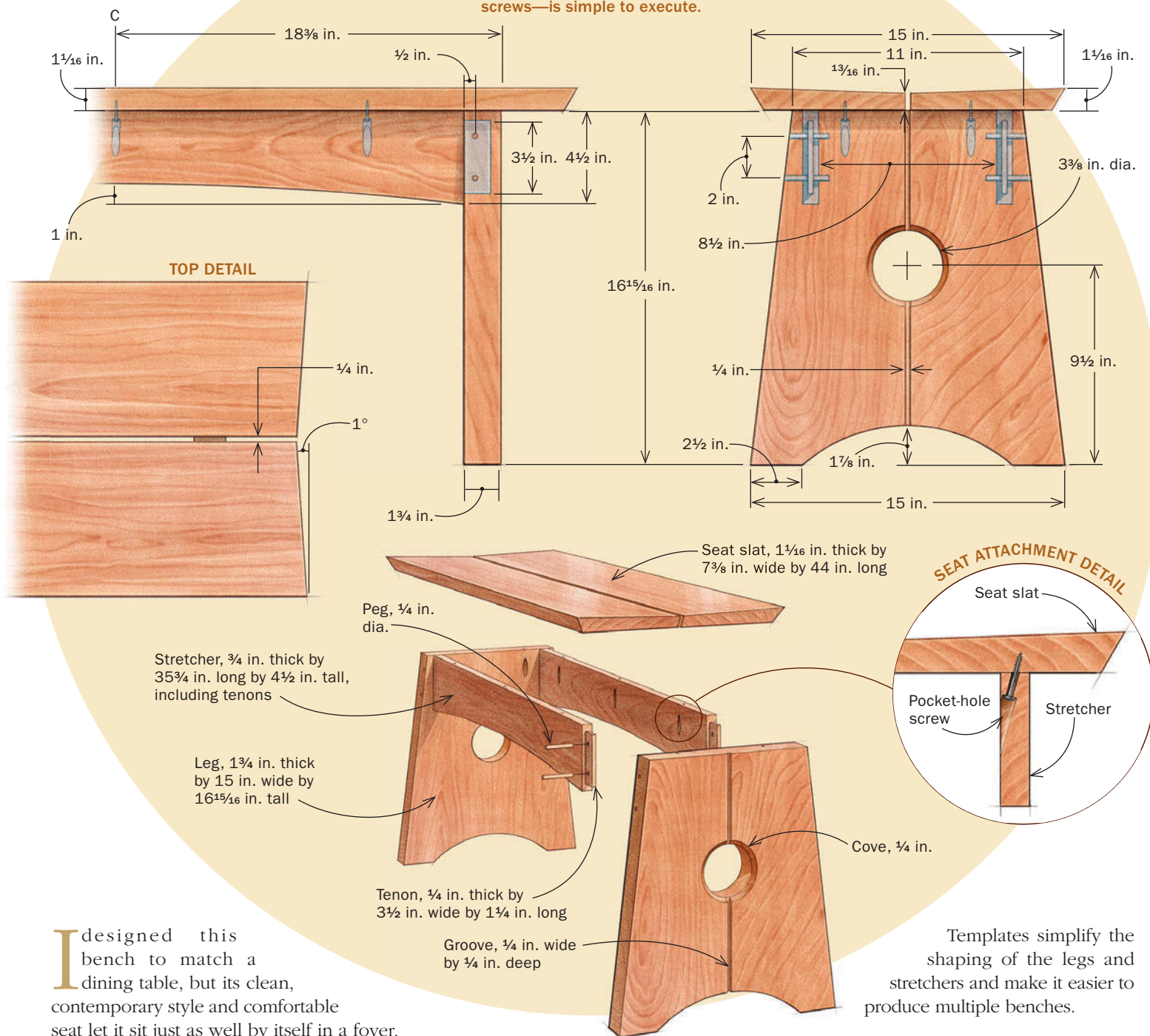
Stylish Bench for Any Room

Tapered seat is cool,
comfy, and easier
than it looks

BY DANIEL CHAFFIN

BUILD IT IN A WEEKEND

Aside from the mortise-and-tenon joints, everything else—from tapers, grooves, and bevels to pocket screws—is simple to execute.



I designed this bench to match a dining table, but its clean, contemporary style and comfortable seat let it sit just as well by itself in a foyer, bedroom, mudroom, or on a front porch. It even works under a tree in the backyard, if made with exterior woods and finishes.

The slight taper on the tops of the seat slats complements their beveled edges. The legs, which are glued up from two boards, have a routed groove that both hides the glue line and ties the legs to the spaced seat slats. The legs also are arched along the bottom, a detail repeated on the stretchers.

These design details seem difficult, but they are surprisingly straightforward. Tapering the seat slats would be tough by hand, but I'll show you how a simple stick turns a planer into a tapering machine.

Make a template for the legs

You could make the legs from a single 15-in.-wide board, but few people have a jointer and planer wide enough to handle it. I recommend using two narrower boards for each leg.

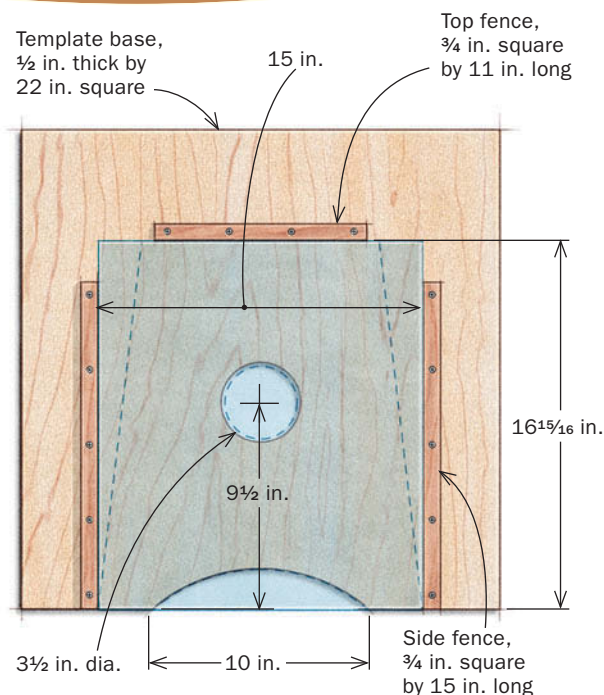
Leave some extra width on the boards. That will help keep the glue line centered so it will be hidden by the routed groove. Keep the boards a bit long as well, so there's room to adjust them for the best grain match. After gluing the boards together, joint one edge and rip the leg to width, keeping the glue line centered.

Making a template for the legs is time well spent. A Forstner bit large enough to cut the hole in the leg will leave tearout on the

A template makes quick work of the legs

This template not only helps lay out the arc and hole before roughing them out, but it also works as a guide for your router, ensuring that both legs are the same and that the hole and arc are accurate and clean.

1 MAKE THE TEMPLATE



Attach three fences—one for the top and two for the sides—to align the legs in the template so that they're marked and routed consistently. After attaching the first two, place the leg blank against them, and use it to align the third.



2 REMOVE THE WASTE BEFORE ROUTING

Place the leg blank in the template, and trace the arc and circle onto its inside face. Cut the waste from the arc, leaving about $\frac{1}{16}$ in. to be routed away. For the hole, Chaffin uses a $3\frac{3}{4}$ -in. Forstner bit, which leaves about $\frac{1}{8}$ in. of waste. Any tearout on the outside is removed by the router.



walls of the hole. The template allows you to drill the hole undersize and rout it to finished diameter with a spiral bit, leaving a smooth surface.

I guide the spiral bit with a bushing, so the hole in the template needs to be $3\frac{1}{2}$ in. dia. to account for the offset and create a $3\frac{3}{8}$ -in.-dia. hole. The arc, on the other hand, is made with a bearing-guided, flush-trimming bit, so it should be actual size on the template. To draw the arc, use a $\frac{1}{8}$ -in.-thick batten made from quartersawn lumber. Register the ends of the batten against two small clamps, push it to its apex, and trace the arc.

Remove the waste at the bandsaw. Smooth the cut by sanding to the line. Bore the hole at the drill press and attach the fences.

Put that template to work

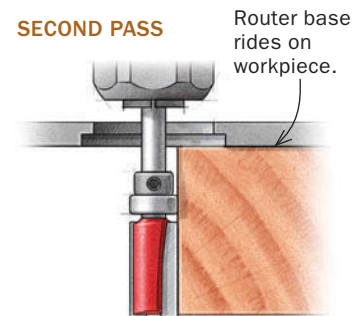
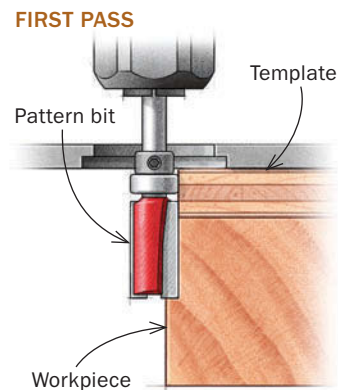
Use the template to mark the arc and hole on your leg stock. Then bandsaw and drill out the waste. Put the leg back in the template and secure it to the bench—I use holdfasts. There's no need for double-faced tape, because the three fences and clamping pressure hold the leg in place. Rout the arc and hole to final size.

I clean up the routed surfaces with a card scraper—using a narrow one for the hole—and sandpaper. While you have



3 ROUT THE ARC AND CIRCLE

Route the arc. Because the legs are $1\frac{3}{4}$ in. thick, it takes two passes with a pattern bit to rout the arc flush. On the first pass, the bearing rides against the template. For the second pass, remove the template and register the bearing against the routed surface (see drawings above).



the router out, rout the cove detail on the show sides of the holes and then groove the center of the legs. Now mortise the legs. I do this before tapering them because I use a hollow-chisel mortiser to cut them, and I want square edges to register against its fence. A router and edge guide would also work.

After all the mortises are cut, lay out the leg tapers with a straightedge and cut close to the lines at the bandsaw. Clean up the cuts with a smoothing plane. Mark the arc on the stretchers. I make a plywood template, using a batten to lay out the arc, so that they're the same. Cut the tenons and trim them to fit. Then cut the arc at the bandsaw and clean it up with a spokeshave.

Simple stick tapers seat

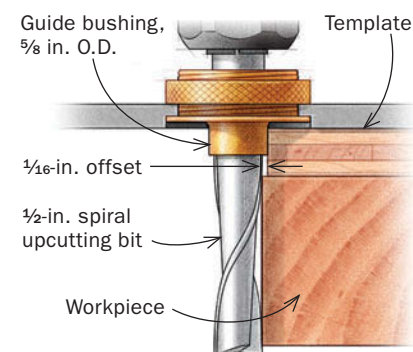
Nearly every surface on the seat slats is beveled or tapered, and it's important to cut them in the right order. First, taper the slats' thickness. Then cut the compound angles on the ends. Finally, bevel the outside edges.

I've tapered the seat slats across their width with a handplane, but it took forever. I've also used an elaborate sled for my planer. Every taper I cut with it had to be fixed with a handplane, so I rethought my approach and came up with a simple solution—so simple, I wonder how I could have missed it earlier.

All you need so that your planer will make this cut time after time is a stick that lifts the inside edge of the slat higher than the outside edge. Ironically, the stick I use is an offcut from the elaborate sled. Attach the stick to the bottom of the slat on the inside edge with double-faced tape, and use a



ROUT THE HOLE WITH A SINGLE PASS



Route the hole. A 2-in.-long spiral bit cuts end grain and long grain cleanly, and is long enough to trim the walls in one pass.

Finishing touches



Cove the edge. A $\frac{1}{4}$ -in. bearing-guided cove bit routs a nice detail on the outside edge of the hole.



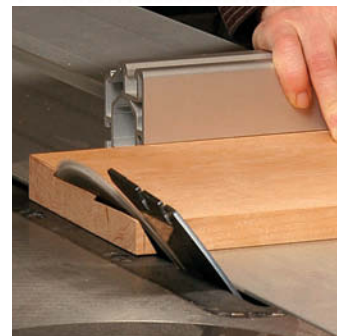
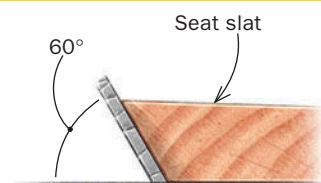
Groove the glue line. Use a $\frac{1}{4}$ -in. straight bit to rout a $\frac{1}{4}$ -in.-deep groove over the glue line.

Taper and bevel the seat

A flat seat isn't comfortable. Taper the slats across their widths so that they are thinner on the inside edge than the outside.

Taper first

Bevel second



Ends get a compound angle. With the blade tilted to 60° and the miter gauge set at 89°, cross-cut the slat to length. The outside edge should be against the fence. For the second cut, move the miter gauge to the other side of the table and turn the board over.



Edges last. Leave the blade at 60° and bevel the outside edge of the seat slat.

TIP

A SIMPLE TRICK FOR BIG TAPERS
All you need to taper the seat slats is a 1/4-in.-square stick. Attach it to the inside edge of the slat with double-faced tape (below). Chaffin puts cross-hatching on the board to gauge his progress (above).

pencil to mark lines over its entire face. When the last bit of pencil has been removed, you're done. It's that simple.

With the ends still square, clamp the slat between benchdogs and plane all the surfaces smooth.

Tilt the tablesaw blade to 60°, adjust the miter-gauge fence to 89°, and crosscut the slats. Move the gauge to the other side of the table and flip the board onto its other face to cut the second end. With the blade still at 60°, bevel the outside of each slat.

Prep all the surfaces for finishing now. If you wait until after assembly, you'll find places that you can't get at well enough to do a good job, like between the stretchers. I use a smoothing plane and break the edges with a block plane. Because cherry is prone to blotching, I lightly sand all the parts

Assembly is straightforward

With only four joints, assembly isn't tough. Glue the base together, then peg the joints.



Glue the stretchers to the legs. Spread glue on the tenons and tap them home. Scrape away the squeeze-out when the glue starts to gel, but leave the clamps on for a few hours.



Peg the joints. Saw off the waste, and use a sharp block plane to bring them flush.



Add the seat. Secure the top with pocket-hole screws. Note the 1/4-in.-thick spacer on the bench keeping the tapered slats flat against the legs.

with P320- or P400-grit sandpaper so that it absorbs the oil finish more evenly.

Assemble and finish the bench

I use pocket screws—located on the inside of the stretchers and legs—to attach the seat slats. Cut the pocket holes before assembling the bench.

Begin the assembly by gluing and clamping the stretchers and legs together, making sure that their top edges stay aligned. Let the glue set for a few hours and then drill holes for the pegs that pin the tenons. I make cherry pegs with a dowel plate, but you also can buy them. Don't use much glue on the pegs. They're a tight fit in the holes, and the pressure created when you drive them in could force glue out through the faces of the legs. Cut the pegs close and plane them flush. Now place the slats on top of the legs, aligning their inside edges with the groove cut into the legs. Drive in the pocket screws and you're ready to finish the bench.

You can build this bench in a weekend, but the finishing might take longer. I applied three thin coats of Tried and True varnish oil, wiping away excess oil after an hour. Allow plenty of time for each coat to dry before applying the next. In Kentucky, that can mean four days between coats in the summer, less in the winter. Buff the first coat with 0000 steel wool, and the last two with a soft cloth. Top it off with a coat of paste wax. □

Daniel Chaffin is a professional furniture designer and maker in Louisville, Ky.

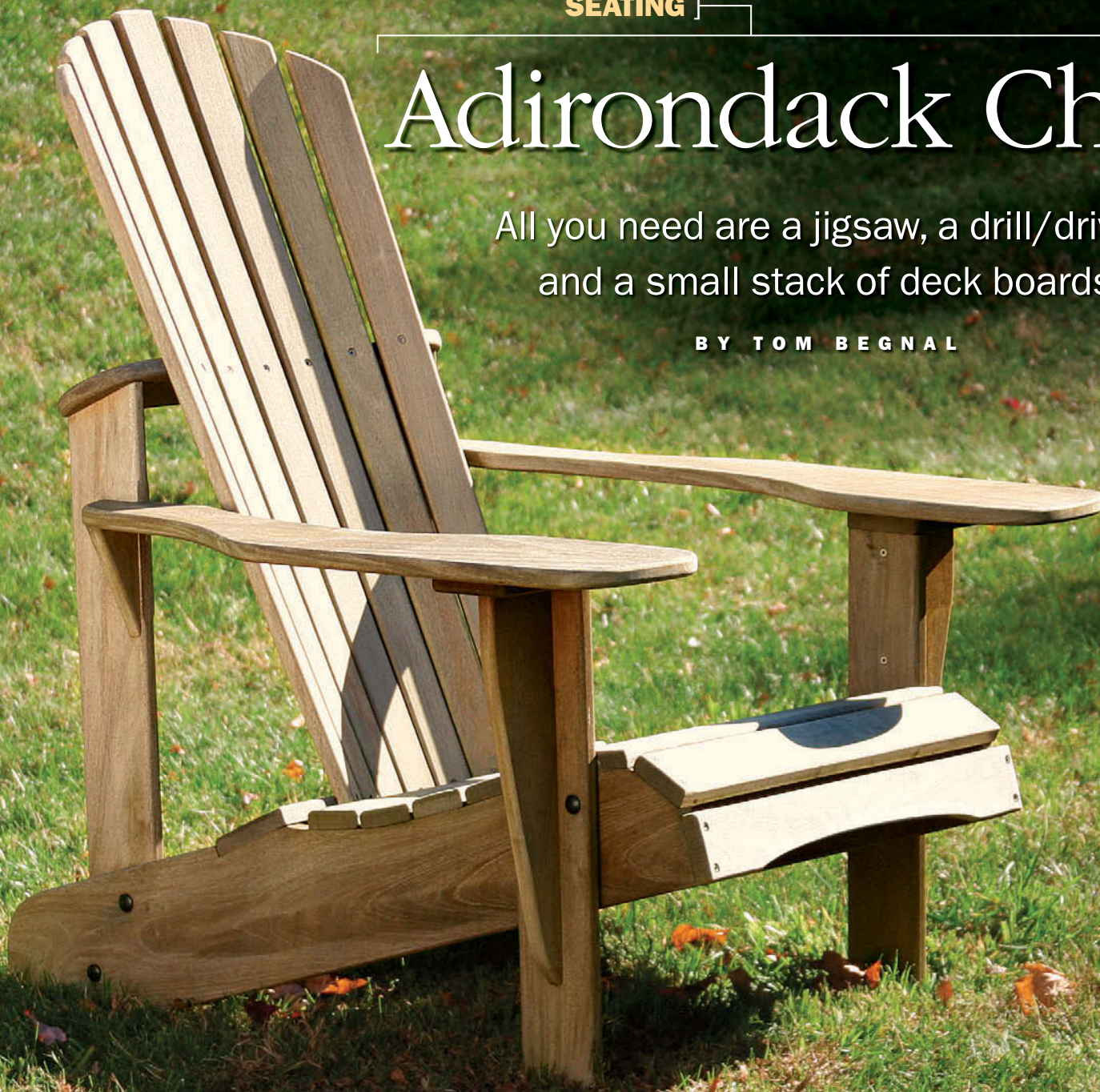


Oil finish for warmth. Three coats of a linseed oil/varnish finish brings out the natural color of cherry, and protects the seat.

Adirondack Chair

All you need are a jigsaw, a drill/driver,
and a small stack of deck boards

BY TOM BEGNAL



This quintessentially American outdoor chair was born in the early 1900s in the Adirondack mountain region of New York state. The generous slant of the seat and back make it an inviting place to relax outdoors. And for those who like to graze while relaxing, armrests the size of small tables offer plenty of room for a plate of snacks and a favorite beverage.

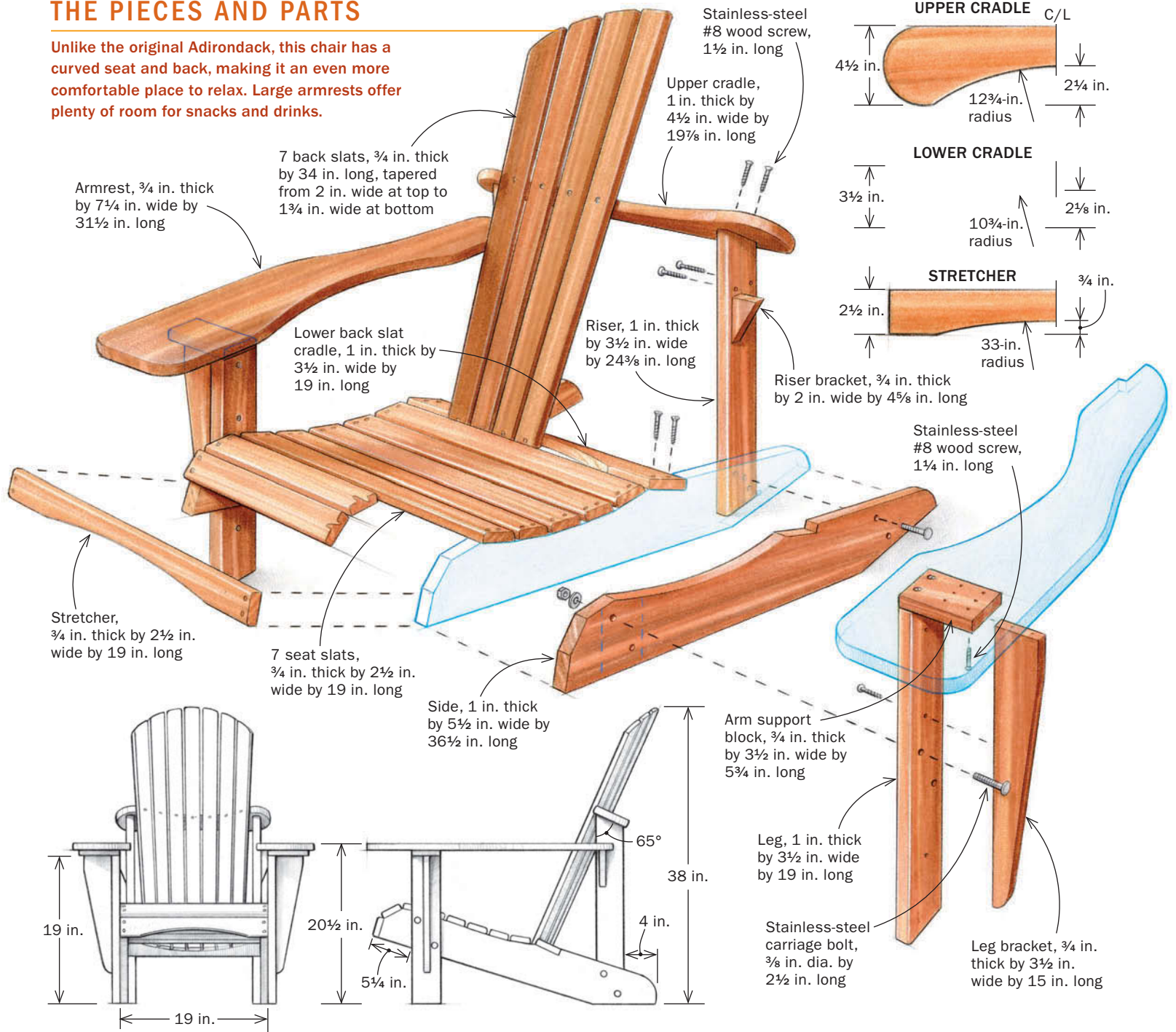
Unlike the original, our chair has a curved seat and back, making it a place where you won't mind spending a lot of downtime. It is made from western red cedar, a weather-resistant, lightweight wood available at most lumberyards. Cypress, mahogany, and redwood also are lightweight and enjoy the outdoors. Ipé and teak are

even more weatherproof, but you can expect a chair made from either to be much heavier to lift. All of these woods are sold as presurfaced decking material (as opposed to roughsawn lumber), which means you won't need a jointer and planer to flatten and smooth the boards. Most of the parts are made from "1-by" stock (actually $\frac{3}{4}$ in. thick after surfacing) but for the parts that carry extra load—sides, legs, risers, and cradles—I used $\frac{5}{4}$ presurfaced stock (ends up at 1 in.). That said, if you use teak, ipé, or any other hardwood, you can build the entire chair from 1-by boards.

The only major tools you'll need are a jigsaw to cut out the parts (a miter saw, circular saw, or tablesaw also would help for

THE PIECES AND PARTS

Unlike the original Adirondack, this chair has a curved seat and back, making it an even more comfortable place to relax. Large armrests offer plenty of room for snacks and drinks.



the straight cuts) and a drill/driver of some kind. If you have a router, use it with a small roundover bit to soften all the edges. Sandpaper would work, too.

Begin with the sides, then the slats and stretcher

The sides are the foundation of the framework. Cut out a pattern from thick paper, cardboard, or thin plywood, transfer it to the stock, and then cut out the actual pieces with a jigsaw (or bandsaw, if you have one). Smooth the sawblade marks on the edges of the sides with a power sander or a sanding block.

Cut the seat slats to size before moving on to the stretcher. To



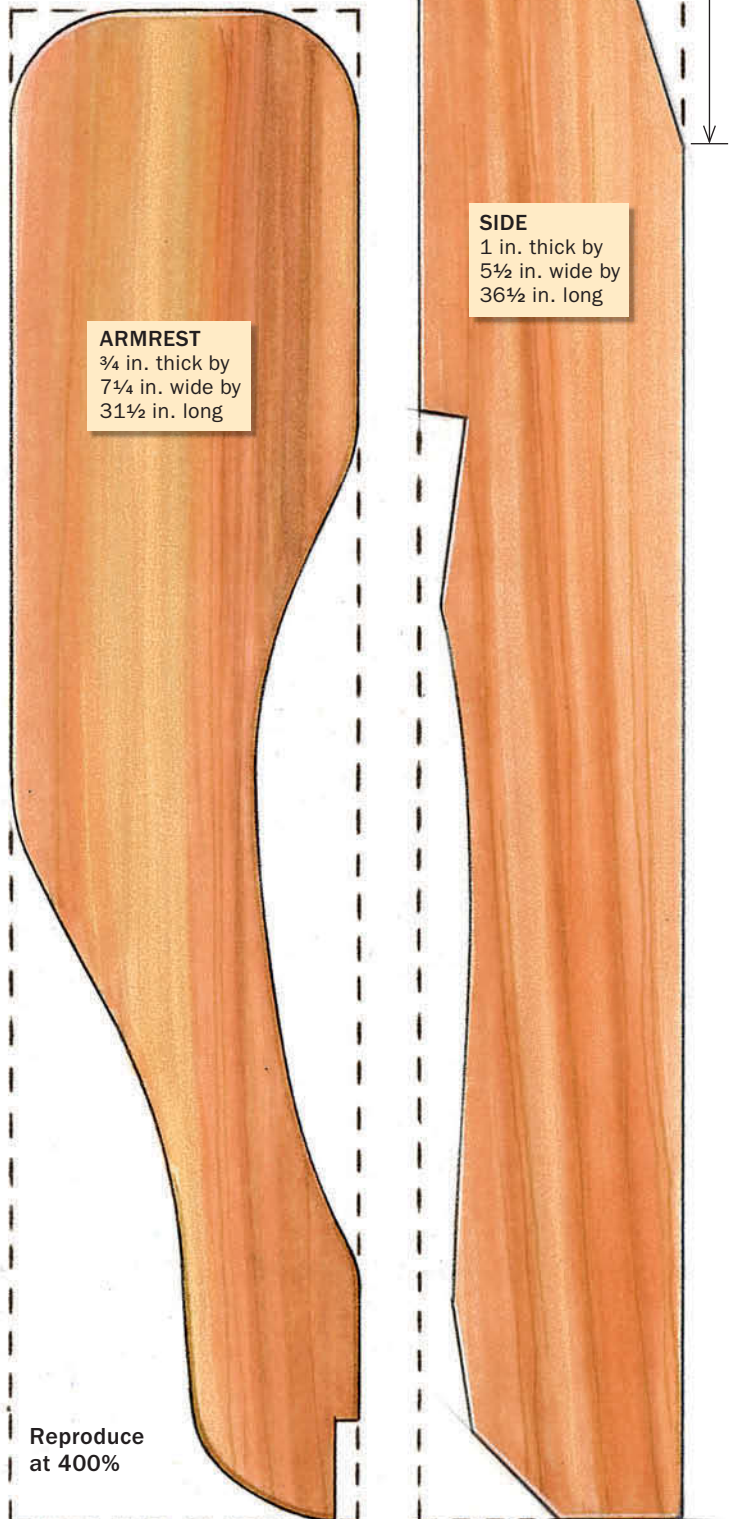
TIP

Make a jumbo compass to lay out the curves. The compass is a strip of wood about 36 in. long. Measure 1 in. from the end, and drill a hole for a nail. Create a pivot point by driving the nail through the strip and into a square block of 3/4-in.-thick stock. The location of the pencil hole depends on the radius of the arc needed.

BEGIN WITH THE SIDE PIECES

FULL-SIZE TEMPLATES MAKE CURVES EASY

Copy these patterns at 400% and use them to create templates on thick paper or thin plywood. Then transfer the shapes to the workpieces.



Trace the shape. Use a thick paper template to outline the side's shape on stock.



Tape sides together. Begnal uses double-sided tape to hold the boards together as he cuts them.



Keep the parts taped together. A file, followed with sandpaper, is a good way to smooth the edges of inside or outside curves. Start sanding with coarse paper, say P80-grit, working up to P150-grit.

lay out the curve along the bottom edge of the stretcher, make a jumbo compass (see the tip on p. 101). Measure 33 in. from the compass pivot point and drill a ⅛-in.-dia. hole to accept a pencil point.

Before scribing each curve on the chair, you should add reference points to the workpiece. Near the center of this stretcher, draw a line ¾ in. from the front edge. That marks the high point of the curve. Square to that line, mark the end-to-end centerline. Now, position the compass so the pencil is on the centerline, right where it crosses the ¾-in. line, and the pivot point is also aligned with that centerline (though 33 in. away). Scribe the arc. Cut the curve using a jigsaw or bandsaw, then smooth the edges.

Again, turn to the jumbo compass to scribe the curved front edge of the lower cradle. Relocate the pencil hole to create a 10¾-in. radius. At a point 2⅛ in. from the front edge of the cradle, draw a reference line along the length of the piece. Then, mark the end-to-end center line and cut the curve with a jigsaw or bandsaw. Again, sand and round over the edges.

TAPER AND SHAPE THE BACK SLATS



Just saw and smooth. The back slats taper $\frac{1}{8}$ in. on each edge, but you can cut the whole $\frac{1}{4}$ in. of taper on one edge. Lay out the taper and then cut it with a jigsaw (above) or bandsaw. Then smooth away the saw marks using a block plane (right) or sanding block.



Move on to the leg assemblies, then the back

Each of the two leg assemblies is made up of a leg, a leg bracket, and an arm-support block. With the parts disassembled, drill all the shank holes in the legs and support block. Use a jigsaw or bandsaw to cut the taper on the bracket, and then smooth it with a block plane or sandpaper. Now, sand all the leg parts and round over the edges. But do not round the edges where parts meet. Screw one block to the top of each leg. For each leg assembly, screw a bracket to the underside of a block and outside of a leg.

The back assembly is made up of two parts: a pair of vertical risers (which support the upper cradle) and a pair of riser brackets. Once the parts are cut, rounded, and smoothed, screw them together. To locate the proper position for the riser brackets, place a leg assembly on the riser with both bottom ends flush, then use the arm-support block as a straightedge to scribe a line across the riser. Position the bracket so that its face is flush with the front edge of the riser and its top edge is at the marked line. Secure each bracket in place by driving three screws through the inside face of the riser and into the bracket.

Make the upper cradle

To create the curved front edge, use the jumbo compass again. This time, though, locate the pencil hole $12\frac{3}{4}$ in. from the nail hole. Again, add a reference point to the cradle. Draw a line $2\frac{1}{4}$ in. from the front edge of the cradle, and then mark the end-to-end center point on the line. Use the compass to scribe the arc.

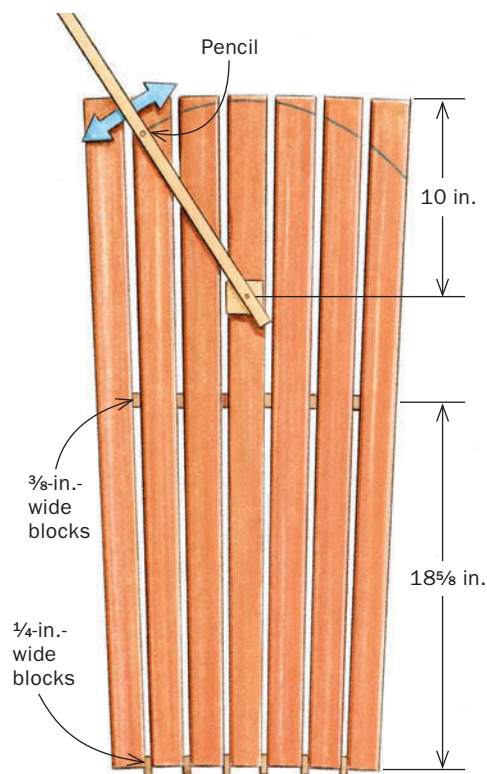
The end curves are next. We experimented with several shapes on the end of a $4\frac{1}{2}$ -in.-wide piece of cardboard. When we hit on one that looked good, we cut out the curve and used the cardboard to trace the shape on each end of the cradle. Use a jigsaw or bandsaw to cut them out, and then smooth the sawn edges.

Cut out the arms and taper the back slats

The arms are the focal point of the chair. Enlarge the drawing on the opposite page to trace a full-size pattern on stiff paper or cardboard. Cut out the pattern and use it as a template to trace the shape on each length of stock. Then use a jigsaw or bandsaw

SCRIBE AN ARC ON THE BACK SLATS

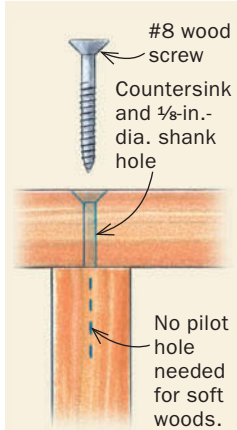
Use the tip on p. 101 to create a jumbo compass. After that, measure 10 in. from the nail hole and drill a $\frac{1}{8}$ -in.-dia. hole—a size just big enough to accept a pencil point.



Mark the arc. A clamp and some light pressure keep the back slats and spacers from shifting while Begnal uses the jumbo compass.



ASSEMBLE THE BASE



SCREW DETAIL



Make a subassembly. Screw the stretcher to the front and follow with the lower cradle.

Add one leg assembly at a time. Use a spring clamp to temporarily clamp each one to a side piece, then square it to the work surface.



Secure the leg assemblies. Once the leg assemblies are in place, drill 3/8-in.-dia. holes through the sides and legs and add bolts, nuts, and washers.



to cut out both arms at the same time. Smooth the edges, round them over, and sand through P150-grit.

There are a number of ways to taper the seven back slats, including a tapering jig on the tablesaw or bandsaw, but the simplest way is just to lay out the taper in pencil and make the long cut with a jigsaw. Then just sand the edge to remove the saw marks.

When the tapered slats are done, you can trace the top curve on all seven of them. Start by placing them edge to edge with a pair of spacers between each. Redrill the pencil hole on the jumbo compass 10 in. from the nail. Position the pivot point 10 in. from the top end of the slats and centered on the middle slat. Scribe the arc across all the slats. Cut out the curved ends with a jigsaw or bandsaw. Sand each sawn edge and sand the faces through P150-grit before rounding the edges.

Assemble all the parts

You are ready to start putting the chair together. Stainless-steel screws (countersunk) and carriage bolts eliminate the need for glue. Start the assembly by screwing the stretcher to the front end



Attach the upper cradle. Use a temporary spacer board to ensure that the risers stay parallel when the upper cradle is attached.

ADD THE ARMS AND SLATS



Arms first. Drive the riser screws (at the back) first to be sure the arm notch fits snugly around the riser. Begnal conceals the screws by driving them in from the inside of the riser and the underside of the support block.



Position the back slats. Start with the center slat, then the two end slats, and work your way in. The slats must be aligned at the bottom of the lower cradle, with even spacing between them.



Layout trick. Place the chair on its back and use spring clamps to level it. This will allow you to rest the slats on the cradles and adjust positioning without slippage.

of each side piece. With the stretcher mounted, add the lower back-slat cradle to give some rigidity to the subassembly.

Now, on each side piece, mark a line $5\frac{1}{4}$ in. from the front face of the stretcher. Elevate the subassembly until the back ends of the sides are flat on the work surface. Then place a leg against the side piece, and use a square to make sure it is square to the work surface and on your mark. Add a clamp to make sure it won't inadvertently shift out of position as you drill a pair of $\frac{3}{8}$ -in.-dia. holes through the legs and sides. Bolt the leg in place, then attach the other leg.

With the legs safely at first base, the back assembly is at bat. At a point 4 in. from the back end of the side, clamp a riser to a side piece. Check for square with the work surface, then drill the holes and add the bolts. Follow the same procedure for the second riser.

The upper cradle is next. Position the cradle so that its back edge is set back $\frac{1}{4}$ in. from the back edges of the risers. Measure and drill for a pair of shank holes at each end of the upper cradle.

After you attach the upper cradle, add the arms, as it becomes a chore to attach them once the back slats are in place. Position each arm so that the notch fits around the riser, and screw through the riser and arm-support block.

The back slats are attached to the lower and upper cradles. Attach the center slat first, then move to the two outside slats and work inward. Before drilling the shank holes, it is important to align them from left to right, up and down, and keep the spacing even to maintain a nice curve on the bottom and the top. Finally, install the seat slats, using spacers as shown at right.

Give the entire project a quick once-over with P150-grit sandpaper, and break any sharp edges. You can leave the chair unfinished and let it weather naturally. Or, three coats of spar varnish provide a finish that will hold up well in an outdoor environment. A fresh coat every couple of years should keep the chair happy and fit for decades to come. □

Tom Begnal is a woodworker in Kent, Conn.



Online Extra

To watch the parts of this chair go together and learn a simple technique for cutting and shaping the arms, go to FineWoodworking.com/quickprojects.

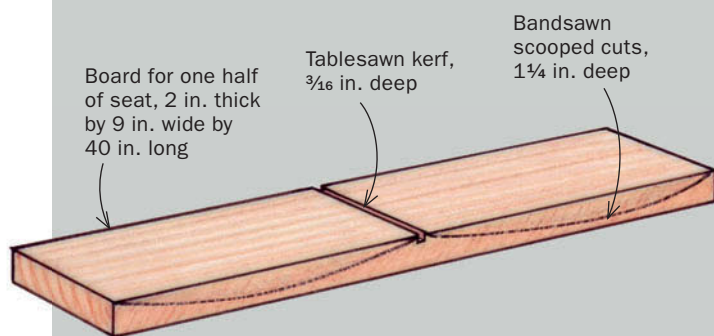
Seat slats are the final step. The seven slats are attached at each end. The $\frac{3}{8}$ -in. spacers between each slat make placement a snap.

Curvy Bench

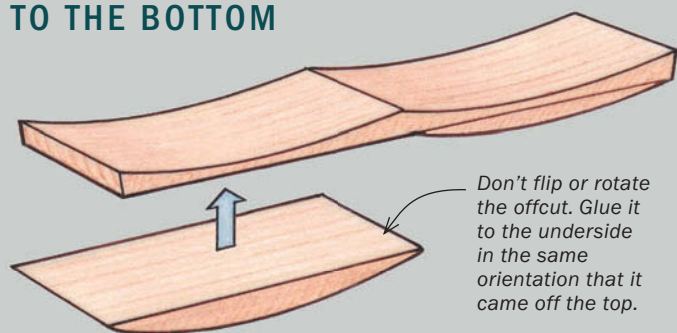
Smart way to make a scooped-out seat

BY JUDITH AMES

BANDSAW THE SEAT PROFILE



GLUE OFFCUTS TO THE BOTTOM



Got clamps? You'll need lots of them. Ames spaces them 3 in. apart and uses shaped cauls to get pressure into the valley where the offcuts meet.

The design for this bench kicked around in my head for several years as I worked out the details. The wait was worth it. Clients love the curvaceous seat and legs, which have a subtle Asian influence. And as a native of New England, where frugality is prized, I take pleasure in knowing that very little wood is wasted when I make the seat. The offcuts from shaping the top are glued to the underside so that the top and bottom curves run parallel, a technique I developed from making rocking-chair seats.

The curves of the seat aren't just for show. Each one scoops out a comfortable place to sit. And I add a gentle curve to the edges—I call them “pillowed” edges—to further soften the look. The simple elegance of the bench is the result of a refreshingly easy technique. The seat is made from two planks. All it takes is two cuts at the bandsaw to rough out the scoops. I then move the offcuts to the underside and glue them in the same orientation. After the two halves are glued together, I shape the legs at the bandsaw, and join them to the seat with angled mortise-and-tenon joints.

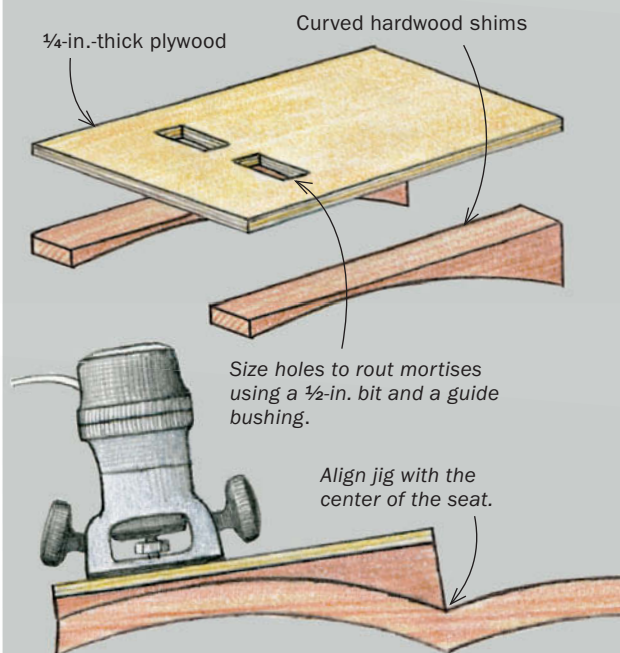
It's a satisfying piece to make. Not only do my clients find the design pleasing, but they find comfort

in it, too. And it pleases my frugal Yankee soul that I'm helping to conserve a precious resource by getting the most out of the wood I use to make the bench. □

Judith Ames designs and makes furniture in Seattle.

ATTACH THE LEGS

Make a jig to rout the angled mortises that attach the legs to the seat.



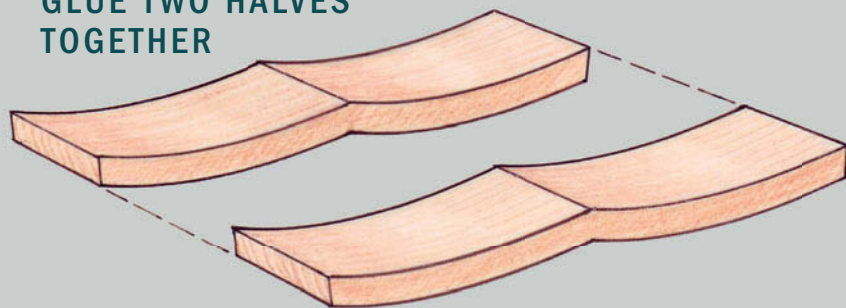


Tablesaw kerf simplifies resawing. When the bandsaw blade enters the kerf (see photo at right), the offcut comes free. Without it, you'd either cut into—and ruin—the second offcut, or have to stop the blade and back out of the cut.



Get help to hold the board upright. Ames clamps the board to an L-shaped plywood support to keep it parallel to the blade, which minimizes the amount of sanding needed afterward.

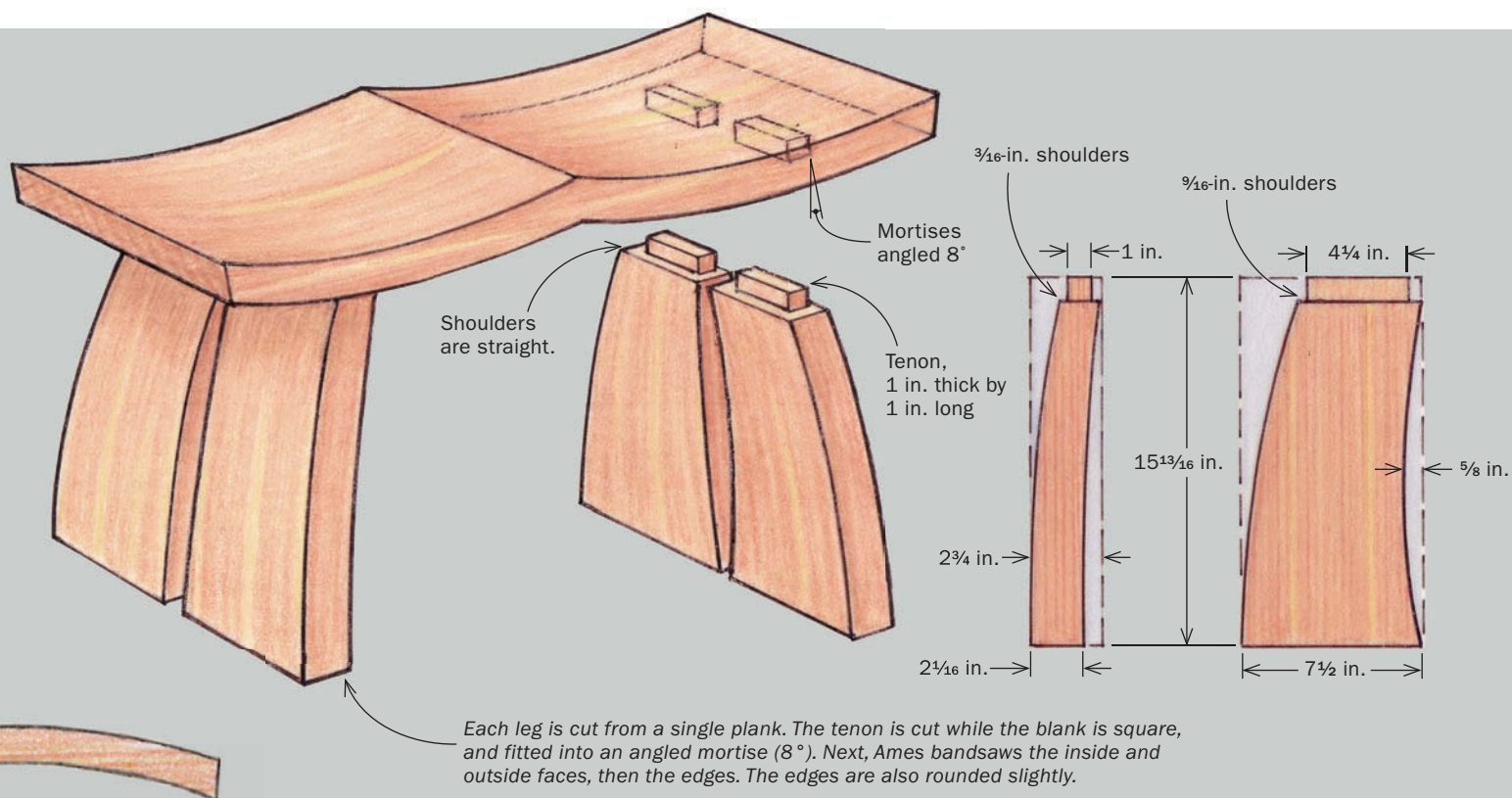
GLUE TWO HALVES TOGETHER



The full width of the seat is made by gluing two boards together. For the best grain and color match, both halves should come from a single longer board.



And smooth the seat. When gluing, Ames aligns the two halves simply by sight and feel. Afterward, she sands across the grain using a shopmade, curved platen that fits inside the belt sander. After sanding, Ames uses a card scraper.



6-Board Blanket Chest



Build it with hand tools like Yankee cabinetmakers did

BY MIKE DUNBAR

This copy of an early 1800s blanket chest—also known as a six-board chest—is an ideal project for new woodworkers to hone their skills. While the chest can be made by machine, its various parts are made equally well (and about as fast) by hand. It was fun to spend a few afternoons making something by hand. It reinforced for me how delightful the shop can be when the only noise is the whisk of sharp tools. I rediscovered how pleasant

woodworking is without hearing, eye, and lung protection. When a storm knocked out the power one afternoon, I was able to keep working. It was delightful—just me, the wood, the tools, and the sunlight.

At first glance, the chest appears to be little more than a nailed box. As you make the project, you'll begin to respect simple joinery that requires mostly rabbets and dados. You'll begin to realize how much today's woodworking has developed construction into a design element. The original chest from which this one was copied has been in continuous use for nearly 200

years and is still solid and very much intact. Its survival is not unique. The chest seems to violate an important woodworking principle, in that the grain of the ends and sides is arranged in opposite directions. One would expect this to cause the front or back boards to split. However, that did not happen to the original example or to the untold numbers of other chests like it. Unlike glue, the nailing allows enough movement to compensate.

The original chest is generally referred to as a blanket chest, underscoring its purpose—to store folded items made of

cloth. However, this was also a utilitarian piece of furniture usually kept in a bedroom against the wall or at the end of a bed. An average house would have several such chests.

The original piece's everyday function dictated a couple of construction choices for the cabinetmaker. Time-consuming joinery, like dovetails, was replaced with equally strong rabbeted joints. The original was made in New England, where white pine is still sold everywhere. Had the cabinetmaker been working in another region, he might have used yellow poplar. I used 5/4 clear white pine. The original box was made when a 1-in. board was a full inch thick. I felt the proportions of the original were important to the chest's overall appearance, which is why I chose 5/4 stock. The exception is the chest's bottom panel, which I made from 3/4-in.-thick No. 2 pine.

Jointing stock, gluing panels

The original chest was made of six wide boards, excluding the three smaller pieces that make up the till, a small lidded compartment within the chest. Today, 18-in.-wide 5/4 pine is rare, so I bought 10-in. boards that could be glued up into six wide panels. Crosscut the stock 1 in. longer than the finished lengths of the panels so that when you glue them together, you won't have to worry about aligning the ends.

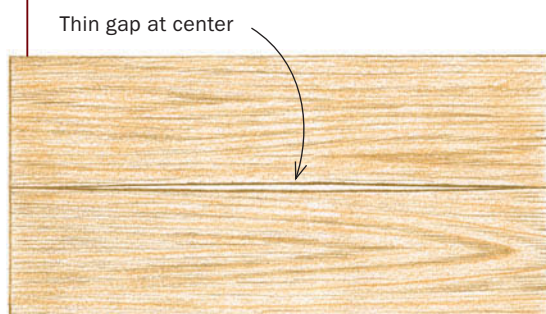
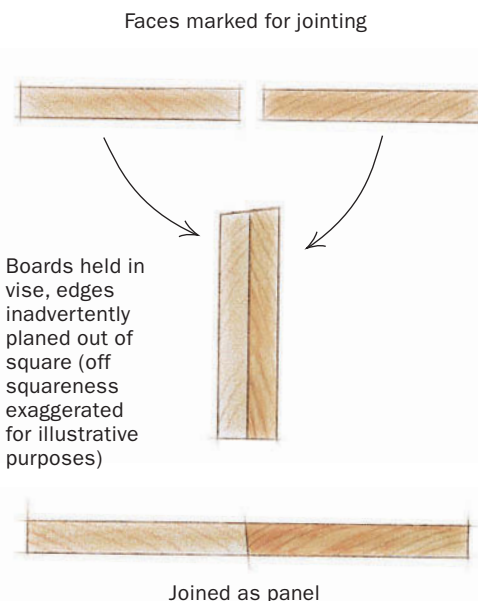
Like all hand-tool operations, cutting with a handsaw is easier when the wood is securely clamped to a bench. For me, it's easiest to follow my pencil line if, with each pull stroke of the saw, I raise the saw's teeth out of the kerf, away from the line, and then push them back into the line with each push stroke. This technique helps prevent the saw from wandering.

Determine and mark the good side of each board—the side you want to face out—and pair up the pieces into panels. Place the paired-up boards together and clamp them in a vise for jointing.

Use a jointer plane to make the edges straight, which may take a little practice. The key is weight transfer; as you start a cut, exert more hand pressure on the plane's front knob. As you push the plane along the length of the board, transfer pressure to your other hand and to the rear of the plane. The long, straight sole of a jointer plane will remove only the boards' high spots. The first several passes

PERFECT JOINTS WITH A HANDPLANE

Boards that will be edge-glued into panels are aligned in a vise so that facing sides are clamped against opposite jaws. That way, any deviation from squareness in the planed edge will be neutralized when the boards are married into a panel.



Spring a joint. With both boards still in the vise, take a final pass that begins and ends several inches from the ends. When placed flat on a bench, the boards' edges will touch at each end and have a two-plane-shavings-wide gap in the middle (above). Now only two clamps are needed to pull the gap together and clamp the entire joint (right).



you take will probably result in less-than-full-length curls of wood. Once you are able to plane a few full-length curls, sight along the boards for straightness or check them with a long straightedge.

Once the boards are straight, take a final pass with your plane, beginning about 3 in. from the front end of the boards and ending about 3 in. from the far end. Called springing the joint, this reduces the amount of clamps you'll need to exert even pressure along the entire glue surface.

Surface the panels and cut them square

Surface both sides of the panels to remove thickness-planer marks and to level the sides. As you plane, you'll find that what seemed like flat boards have lots of hollows. The panels are too long for a smoothing plane. Its short sole will ride down into the hollows in the surface. I prefer a No. 6 jack plane, which is slightly longer and wider than a No. 5. For surface planing, use an iron with a slight crown honed into

it. A crowned iron, as opposed to one with 90° corners between the cutting edge and sides, reduces the likelihood of planing sharp ridges into the surfaces of the panels. Instead, the surface will be very slightly scalloped, a sign of handplaned work.

One at a time, joint an edge of each panel. Use a framing square to lay out the ends prior to trimming. Lay out the finished

HANDSAW TIPS



Trimming an edge and staying square. To avoid breaking a fragile edge, and thus making it difficult to restart a cut, hold the fingertips of your free hand lightly against the thin waste piece. To saw a square edge, stand directly above the cut so that you see the thin top edge of the saw, rather than either side of the blade.

width at the same time. Measure corner to corner to be sure the panel will be square; if the diagonal measurements are the same, the panel has four 90° corners. Cut the panels to size using a rip saw along the length and a crosscut saw on the ends. When ripping, the saw's teeth should just touch the outside of the pencil line. This way, when you joint the edge to remove the saw marks, the panel will not be undersize.

Because the rough length of the boards is very close to the finished length of the glued-up panels, you'll be left with a thin strip to trim off each one. In this situation, I use the fingertips of my free hand to push lightly against the strip to keep it from breaking (see photo, left).

Cut boot-jack ends and the stop joint

The graceful, curved feet of the blanket chest are referred to as boot-jack ends because their shapes are similar to a once-common device used to help pull off boots by jamming the heel into the V.

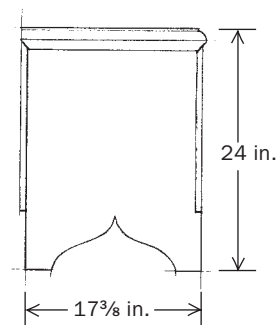
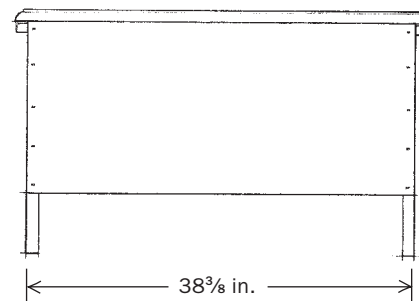
To cut these ends, first make a template half the width of the chest's side and draw a curve that pleases your eye. After tracing the pattern ends of the chest, cut out the pattern using a small bowsaw. The saw works best on the pull stroke. Use two hands and try to create a fluid motion that uses almost the entire length of the blade. Clean up the cuts using a spokeshave and a chisel, working from the center out on each side so as to cut with the grain.

Lay out the stop butt joint using a square and a marking gauge. Cut the return with a dovetail saw. Cut the length of the joint with a fine rip saw. The surface needs to be smoothed with a block plane to remove sawmarks. By skewing a block plane, you can start close to the stop. Straighten out the plane as you continue the cut. Clean into the stop using a chisel. Test the joint with a straightedge.

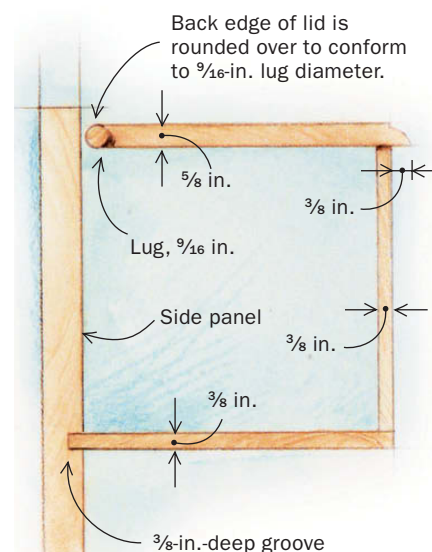
Cut the rabbets and dadoes

The front and back of the blanket chest have a rabbet cut across the grain. An iron rabbet plane has an adjustable fence that regulates the width of the cut. Set the plane to cut a rabbet 1 1/8 in. wide—wider than the 1-in. width of the sides. The face edge will overhang the sides slightly and can be planed smooth after the chest has been nailed together. The plane's depth stop regulates the depth of cut; set it to cut a 1/2-in.-deep rabbet. The plane has a scribe (also called a nicker) under the depth stop. The scribe looks like a rounded cross with one corner missing. Each corner is sharpened and, when placed into the opening, projects below the sole. It is used when cutting cross-grain. The scribe severs the wood fibers ahead of the cutter, eliminating dreaded tearout.

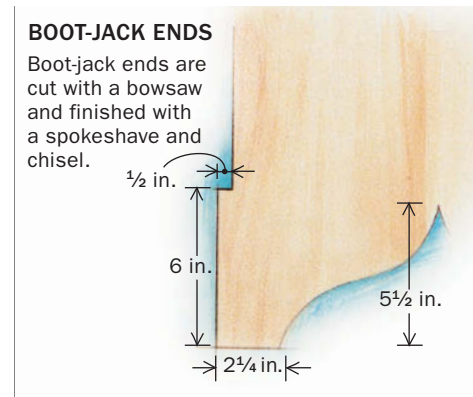
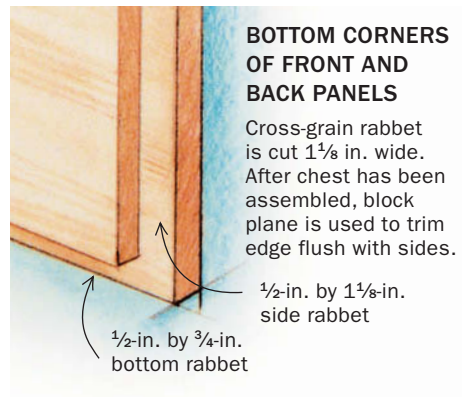
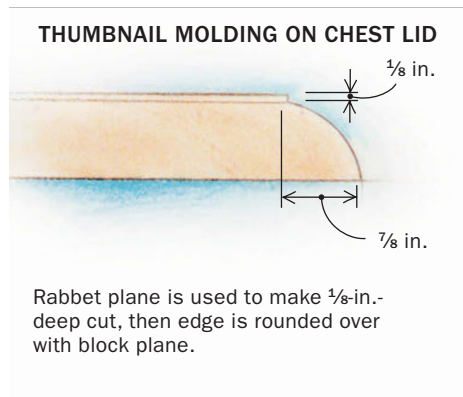
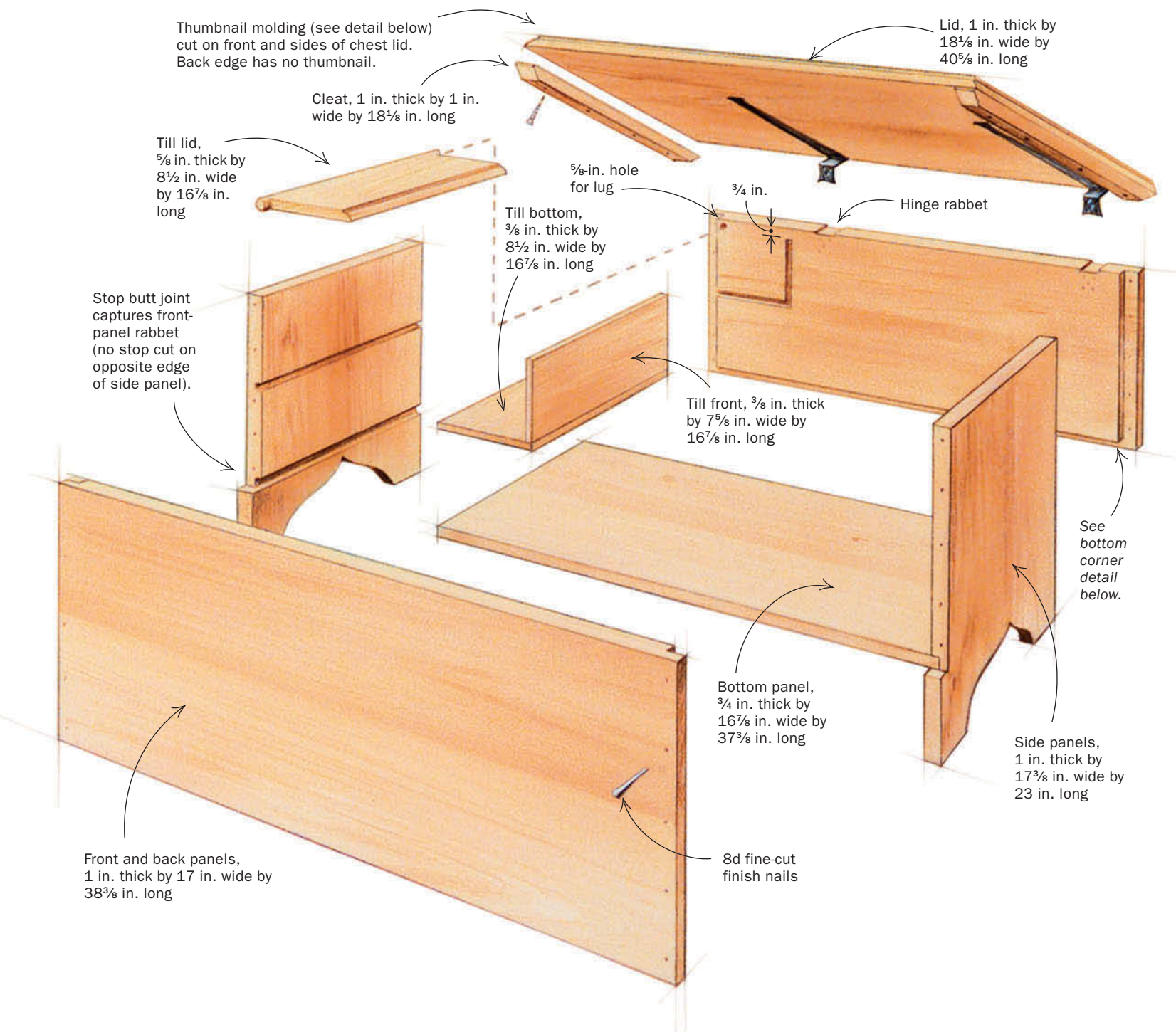
To avoid blowing out the end of a cross-grain rabbet, clamp a strip of sacrificial



TILL CONSTRUCTION



Till front butts bottom. Thumbnail on till lid is smaller than thumbnail on chest lid.



MAKE THE SIDES



Bowsaw is as quick as a bandsaw. A plywood pattern is used to trace the boot-jack end that forms the blanket chest's feet. If the bowsaw jams in the cut, just pop out the waste piece with a chisel blow to the end grain.

wood to the far side of the board you're cutting. And when starting a cross-grain rabbet, draw the plane backward so that the scribe makes a preliminary cut. When you push the plane, be sure to keep it square with the surface and end of the panel. You need to apply as much pressure in and down with the hand supporting the plane as you do with the one pushing it.

As the rabbet nears completion, the depth stop will begin to ride on the panel's surface. Usually, it comes in contact first on the side nearest you, as it is a natural tendency to decrease the pressure on the plane as your arms become extended. Make sure the rabbet has a consistent depth, then test the fit of the side panel into the rabbet. Cut all of the cross-grain rabbets, then cut the rabbets along the bottom of the front and back pieces to accommodate the chest's bottom panel.



Easy dados. Scribe the edges with a knife, then clear the waste with a chisel. Repeat this process until the dado is $\frac{1}{2}$ in. deep.



Router plane is great option. As you scribe the crossgrain edges, continue to deepen the dado with a sharp router plane. This tool will create a flatter, more precise bottom.

The bottom panel of the chest also fits into dados cut in the side panels. In soft white pine, you can cut a dado very easily using a utility knife and a chisel. Lay out the dado and clamp a straightedge along the mark. Score the line several times with a utility knife. Repeat on the other mark. With a chisel, pare the waste from the dado. When necessary, score the dado again and trim to depth.

Making the till

Like most early blanket chests, this one has a till in one end. The till was used for storing small items that would be hard to find if placed in the chest itself. The till fits into stopped dados cut in the front and back panels and in a dado on one side panel.

Thin wood presents a problem when cutting with a handsaw. The saws used in general work are too large and frequently

break the piece. I own a number of small handsaws that are cut with 14 teeth per inch for small work.

The till has its own lid that hinges on two wood pins called lugs, which are made by removing all but a short rounded tenon from the lid's end-grain ends. Lay out the lugs with a try square and trace a $\frac{3}{16}$ -in. circle on the end of each lug. Cut away the long strip of waste with a dovetail saw and a small handsaw. Clean up next to the lugs by paring away with a chisel. Undercut the waste on the corners of the square lugs, and then pare it away to round the lug. Test its fit into a $\frac{5}{8}$ -in. hole drilled in a piece of scrap.

Final assembly doesn't require glue

Use a square to lay out the dados for the till bottom and front, but do not cut them yet. First, test-assemble the chest. This not only allows you to check the fit of your joints but also to be sure that the stopped dados you've laid out will intersect. Run a clamp through the boot-jack ends to hold the bottom in place and the ends vertical. You can easily assemble the rest of the chest from this stage.

Disassemble and make any necessary adjustments. Cut the till dados the same way as those in the end pieces. Drill the $\frac{5}{8}$ -in. holes for the lugs in the locations shown.

When you're sure of the fit, reassemble the chest with the till parts in place and nail the rabbet joints. I used 8d fine-cut finish nails from Tremont Nail Co. (tremontnail.com). These nails look the same as those on the original chest.

Because the nails are visible, their spacing is important; use five nails per joint. Drill a $\frac{3}{16}$ -in. pilot hole for each nail and run the long head with the grain.

Use a low-angle (12°) block plane to trim the rabbets' face edges flush with the chest ends. (Remember that you cut the rabbet joints wide on the front and back panels.)

Make and fit the lid

Cut the lid to size and make the cleats. Trace the beveled ends of the cleats with a bevel gauge set to the desired angle and cut them with a dovetail saw. Strike the bevels with a low-angle block plane to smooth away the saw marks.

To make the thumbnail molding, start with a rabbet plane to cut a $\frac{1}{8}$ -in.-deep



SHAPE THE LID

Start the thumbnail with a rabbet plane; finish it with a block plane. The lid of the blanket chest (and its till) has a thumbnail molding, a popular edge profile from the 18th century, on the two sides and the front. The thumbnail is made in two steps: First, cut a $\frac{1}{8}$ -in. rabbet, then round over the remaining square edge with a low-angle (12°) block plane.



rabbet on the lid's front and side edges. Again, it's a good idea to clamp a sacrificial waste block when planing end grain. Turn the rabbet into a thumbnail by using a block plane to round the square edge (see photo, above). Check to ensure that the profile is uniform along all edges. Attach the cleats using #10 by $1\frac{1}{4}$ -in. screws.

The original chest had snipe hinges, which look like two cotter pins connected by their eyes. The leaves of the snipe hinges were drilled through the chest and

clined over into the wood. Some early blanket chests used butt hinges, while others used blacksmith-made offset strap hinges. Ball and Ball (ballandball-us.com) sells the handsome wrought-iron reproduction strap hinges I used.

The location of the till makes it necessary to mount the hinges off center, a common practice in the 18th century. □

Mike Dunbar teaches Windsor chair making in Hampton, N.H. (thewindsorinstitute.com).

INSTALL THE HINGES



Strap hinges are simple. They require only a shallow mortise in the edge of the back panel, and then they are attached with screws. Hold them firmly while scribing along their edges.

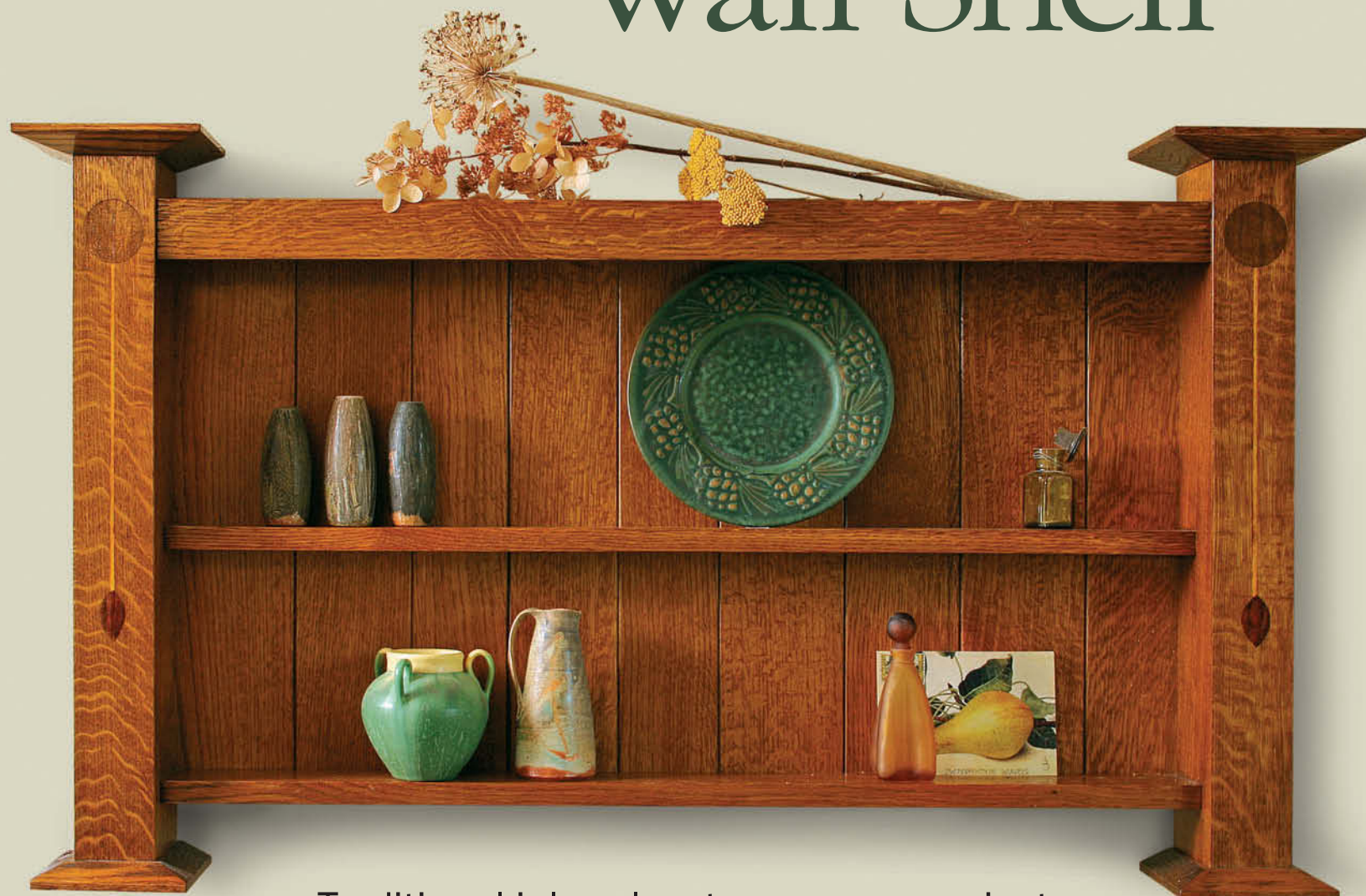


Saw first. After marking the edges, saw a shallow kerf to begin the mortise.



Now pare. Work from both directions with a wide chisel to clear away the waste and leave a flat bottom. Screw on the hinges.

Arts & Crafts Wall Shelf



Traditional inlay elevates an easy project

BY NANCY HILLER

pretations of Arts and Crafts design. Although that cabinet (which inspired this one) had a pair of doors, its shallowness seemed more suited to open shelves.

The design of this cabinet may be simple, but making it involves several interesting techniques, like the mitered joints for the columns as well as the decorative inlay, that are fun to learn. Although my shelf is made from quartersawn oak, the traditional choice for English Arts and Crafts furniture, feel free to experiment with other woods such as cherry or non-figured maple, to see how different woods change the look of a piece. And if you decide

to use oak, check out FineWoodworking.com/quickprojects to learn my easy techniques for a traditional Arts and Crafts look done with a combination of dyes and stains.

Mitered columns showcase oak grain

The columns are the focal point of this piece. They are hollow, made of three vertical boards mitered together at the front corners so that the quartersawn figure is

MITER AND GLUE UP HOLLOW COLUMNS

This method of construction allows the hallmark Arts and Crafts ray-fleck figure to appear on each face.



Attach an auxiliary fence. Using a supplemental fence on a right-tilt saw prevents the thin, already mitered edge from creeping under the sliding rip fence.

visible on each face, with a fourth board inserted as a back filler. Even if you are not using oak for your shelf, these mitered corners will give the columns a much cleaner look than simple butt joints. While you certainly could use a single, thick block of wood for the columns, doing so seems clumsy for a delicate piece of furniture, and the columns would be less stable when subjected to seasonal changes in humidity.

Cut the miters in one pass on the table-saw, holding the board down firmly all the way along the cut. If it lifts even a little or wanders away from the fence, the mitered edge will not fit tightly.

After cutting the miters, you can go ahead and cut the pieces to length. Dry-clamp one of the columns to work out any kinks in the process, and then you're ready to glue them.

There are a number of ways to approach this glue-up, but the method I use has proven efficient and easy for somebody working alone, and it yields great results. I use Ulmia picture-framing miter clamps (amazon.com) because they are lightweight and easy to handle. While the pointed ends of the wires do leave small indentations in the wood, the coarse grain of the oak distracts the eye enough that the marks disappear when filled with wood putty.



Start clamping at the front of the column. Because the pieces that form the column are now cut to length, make sure to get the ends level with each other.

If you don't want to buy Ulmia clamps or if you are using a finer-grained lumber such as maple or cherry, you can use tape or picture-framer's miter clamps to avoid these marks.

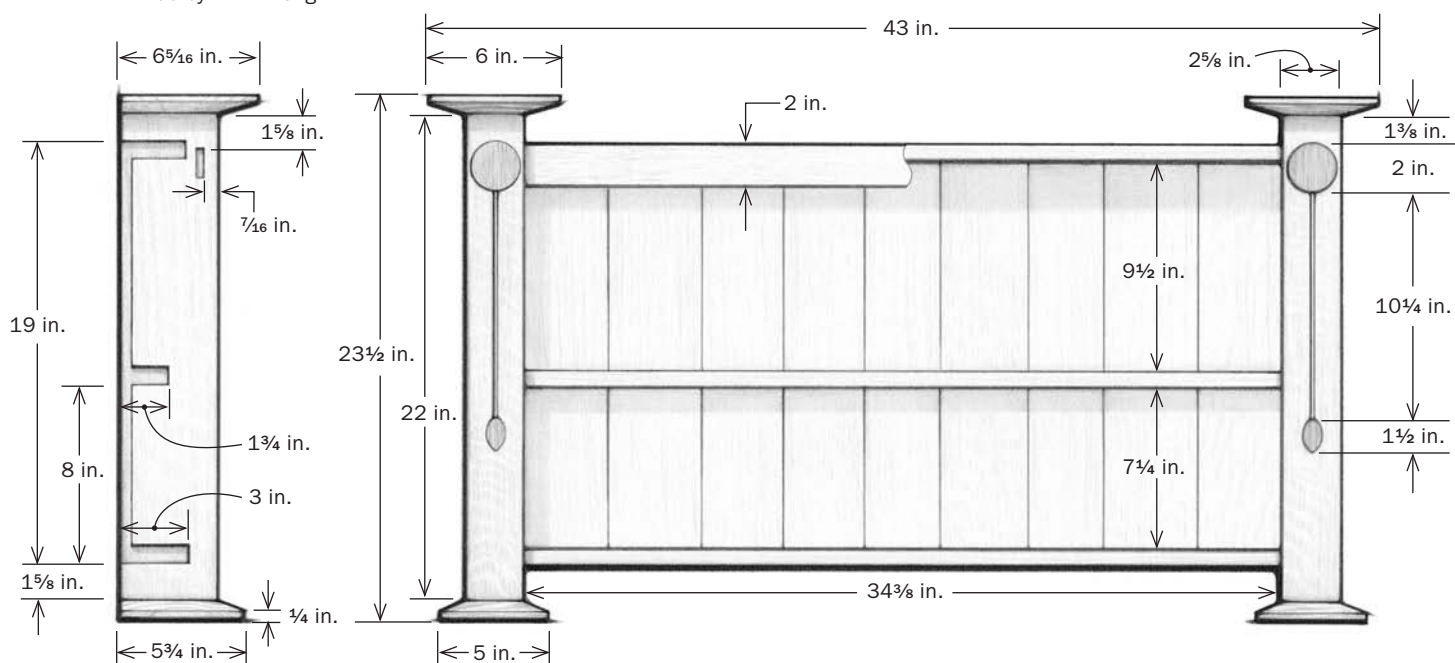
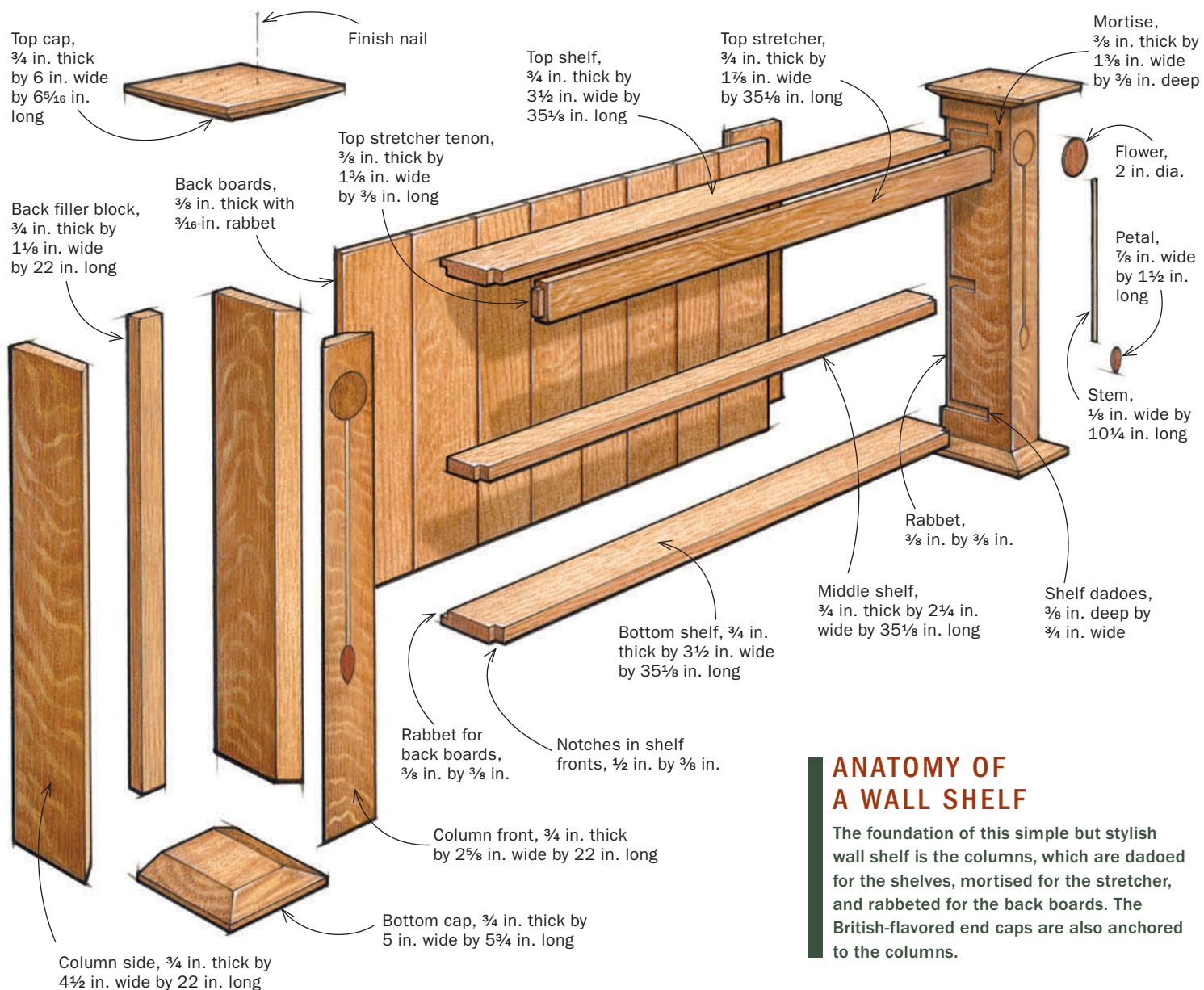
As soon as each column's miters are clamped, insert and clamp the filler board at the back. After the glue is dry, run the back face of each column over the jointer to level the joints.

Rout the shelf dados, rabbets, and stretcher tenons

The shelves will be housed in stopped dados routed into the columns. Mark the columns and rout the dados while the two columns are clamped together. When marking the dados, there are two things you must remember: Because the center shelf is set back more than the other



Insert the filler piece in the back. Once the back is in place, use bar clamps to apply pressure.





CUT THE DADOES AND RABBETS



Rout shelf dados while columns are clamped together. Clamp a straightedge to the columns to guide the router (left). Use a chisel to square up the front edge of the dados by hand (above).

shelves, its dado begins farther back than the dados for the top and bottom shelves; and all of the dados are stopped short of the shelf fronts to accommodate the notch in the front of the shelf.

Cut the dados in one or two passes using a $\frac{3}{4}$ -in. straight bit, guiding the router with a straightedge clamped to the work. With a chisel, square up the front ends of the dados. While milling stock for the shelves (after you have finished cutting the dados), be attentive when you get close to $\frac{3}{4}$ in. thick and keep checking the stock against the dado. The fit should be hand-tight, requiring some pressure to push the stock home but not so tight as to need heavy pounding with a mallet.

Next, rout a rabbet for the backboards on the underside of the top shelf and on the upper side of the bottom shelf. The columns also need a rabbet to hold the backboards. When cutting the rabbets in the columns, stop them in the upper and lower shelf dados. Check how everything lines up.

The top stretcher will be tenoned into the columns. The small mortises for these stub tenons can be cut using a router guided by its own fence or just drilled out and then finished with a chisel. I cut the stub tenons by hand with a backsaw.



Rout a rabbet for the backboards. A rabbeting bit works well, with the guide bearing running against the side of the column. Stop the rabbet in the shelf dados.

Fit the shelves

When the piece is finished, there will be three distinct shelf setbacks. The top shelf will have a stretcher in front of it, so even though the top and bottom shelves are cut to the same depth, the top shelf will sit nearly at the front of the column. The bottom shelf, which has no stretcher, will be set back about $\frac{3}{4}$ in. more, and the center shelf will be the farthest back.

Cut the shelves to size, remembering to rip the center shelf narrower than those at the top and bottom in order to accommodate the extra setback as well as the backboards. Mark out for the notch on the

front edge and use a backsaw to remove the waste, or you can cut these notches and the joints for the stretcher on the table-saw. Test-fit the shelves in their dados.

Create the decorative inlay and assemble the case

I do my inlay (see p. 118) with the aid of a magnifier that mounts to my workbench. The first step is cutting out templates (using cardstock) for the flower and leaf. Select a species that will show up against the background wood.

With the inlay done, the piece should be ready to dry-fit. First, sand all of the parts

A simple inlay technique



1
Score the outline. Press lightly at first to avoid getting caught in the grain, then more deeply a second and third time.



2
Remove most of the recess. Rout close to the inlay border, leaving a bit of waste to clean up by hand.



3
Pare to the line. Carving gouges make it easy to clean up and shape the recess accurately.

Prepare the inlays by resawing stock (on the tablesaw or band-saw) to $\frac{3}{32}$ -in. thickness. Regular commercial veneer is too thin and doesn't leave any margin for error.

Trace the outline onto the inlay stock and cut each part to shape, using a scrollsaw or a coping saw, files, and coarse sandpaper. After the inlays are shaped, mark the position of the flower and leaf on each column, taking care to center them in the width and align each element with the other. You can use double-sided tape to ensure that the inlays don't slip out of position while you are scribing around them. Score the outline with a sharp knife or awl. Carefully rout out the main portion of the recess, using a $\frac{1}{4}$ -in. straight bit set at just less than $\frac{3}{32}$ in. deep.

Pare away the remaining waste with carving gouges and a knife, making sure the bottom of the recess is uniformly flat. Cut the recess for the stem using a $\frac{1}{8}$ -in. straight bit (also set at slightly under $\frac{3}{32}$ in.), and a router equipped with a fence.

Using yellow glue, with cauls to distribute clamping pressure, glue in the flower and leaf. After the glue is dry, sand them flush. Finally, trim the stem to fit and glue it in place.



4
Rout for the stem. After routing the groove, rip stock to fit tightly into it.



5
Glue in the flower and leaf. Use a caul to apply even pressure. Newspaper prevents the caul from sticking to the inlay.



6
Insert the stem and finish up. Glue and clamp the stem in place (above). Once the glue is dry, scrape and sand the inlay flush (right).



ASSEMBLE THE SHELF



Clamping the case. Use enough pressure to pull the shelves into their housings, but avoid excessive strain on the hollow columns (left). Apply finish to the parts before screwing the back boards in place (above).

to P180-grit. Dry-fit first and then glue the front stretcher and the shelves into place at the same time. The stretcher should also be glued and clamped to the front edge of the top shelf. When the assembly is dry, sand the entire piece to P180-grit.

While the columns are the visual anchor, the beveled end caps give the piece its British flair. Cut the caps and bevel them on the tablesaw.

Now mill the backboards, rabbeting alternate edges on the tablesaw. Sand the backboard faces and use a block plane to work a small bevel on the front edge of each board. Apply finish to the backboards separately. Once all the other parts also have been finished, attach the backboards using small screws.

When the shelf is completely assembled, rout the slots for keyhole hanging and install the hardware. Attach the caps to the columns with finish nails. □

Nancy Hiller owns and operates NR Hiller Design Inc. in Bloomington, Ind.

Online Extra

To learn how to achieve this traditional finish without fuming with ammonia, go to FineWoodworking.com/quickprojects.



Rout two depths for hanging hardware. The first step will hold the hardware, while the deeper step allows the hanging screw to be inserted.



Attach the end caps. Countersink the finish nails and fill the holes with matching wood putty.

Finish in a day

OIL, SHELLAC, AND WAX ARE A FOOLPROOF COMBO

BY JEFF JEWITT

I've had to learn to do quick finishing jobs and make fast fixes in my refinishing business. This method is both fast and attractive, whether you're working on a gift on Christmas Eve or you just prefer no-fuss finishes. I came up with the technique based on necessity, but I'm sure it will save you when time is tight.

This finish is ideal for a low-build, "in-the-wood" look, where durability is not the key factor. However, you can build the shellac to increase the level of protection. The ingredients—boiled linseed oil, denatured alcohol, a can of amber shellac, and a few rags—are easy to find. The wipe-on technique avoids the hassle of most oil finishes, which can take days to complete. In fact, it works so well that it might become your favorite finish.

A thin coat of oil lays the foundation

For surface preparation, scrape, plane, or sand the wood with the grain to P220-grit. Wipe with naphtha or denatured alcohol to remove dust, dirt, and sanding

debris. The solvent will highlight potential problems like glue spots and scratches.

Applying boiled linseed oil is the first step in French polishing, a more time-consuming technique from which this finish is derived. In fact, you could call this a "down and dirty" French polish.

I'm a big fan of boiled linseed oil for this step, because it contains driers that cause it to cure faster than tung oil. Pour a small amount onto a small cotton cloth. Apply just enough to make the wood appear "wetted," about a teaspoon per square foot depending on wood species. Don't use the "flood on, let sit, then wipe" method. If you do, the oil will seep from figured areas through the thin shellac that is applied in the next step.

Remove excess oil with a clean rag, then lightly buff the surface with a gray synthetic abrasive pad such as 3M Scotch-Brite or Mirka Mirlon. The pad will pick up residual oil and will smooth the wood surface further.

Pad on shellac right away

Normally, you'd let the oil cure for 24 to 48 hours. You can wait, but if



Three-step finish

Oil, shellac, and wax are easy to find and just as easy to apply using this simple, three-step process. Don't be surprised if this fast finish becomes one of your favorites.



Begin with a light coat of linseed oil

Because this finish does not provide time for the oil to dry, compensate by using a whisper-thin coat—just enough to bring out the beauty of the wood. Immediately remove any residual oil with a clean, lint-free cloth (left). A good rubdown with a synthetic pad (below) will smooth the surface and add a nice sheen.

you go directly to the shellac application, it will speed things up and the oil will provide a bit of lubrication for the shellac. The thin coat of oil cures fine below the shellac.

Plain, orange, waxy shellac (sold in a can as amber shellac) works well and is easy to find. The brand I use comes in a 3-lb. cut that I dilute by mixing 2 parts denatured alcohol with 5 parts shellac. Put the mixture in a squeeze bottle with a dispensing spout.

I use a padding cloth to wipe on the shellac. It should be as absorbent, clean, and lint-free as possible. Old, clean T-shirts work fine. Cotton is preferred, because polyester does not hold or absorb liquids as well. Wad up the cloth so that the bottom part is smooth and free of wrinkles. Make the pad a manageable size. Large pads are great for big, flat surfaces but don't work for smaller and more intricate projects.

Dispense about 2 oz. of denatured alcohol into the pad and compress the pad with your hand several times to work the solvent through it. Then squeeze the pad to remove excess solvent. Pour about 1 oz. of shellac solution onto the pad bottom.

Padding shellac simply means wiping it on thinly with this cloth pad. It is best to practice on a flat surface to get a feel for applying it smoothly and evenly.



Finishing different surfaces requires an assortment of techniques

For flat surfaces, bring the pad down lightly near one edge and drag it across the top and off the opposite edge, like an airplane landing and then taking off again. Come in from the other side and repeat the stroke. Continue down the board in alternating stripes, with the grain. When you've reached the bottom, start again at the top. One of the great benefits

of shellac is that it dries quickly enough for you to repeat the sequence rapidly. Work the sides and edges in a similar fashion. As the pad starts to dry out, reload it with shellac.

For complex surfaces such as furniture interiors, tight corners, or other challenging areas, you'll need to modify things a bit. Start with the pad anywhere that's convenient and move it toward corners, right angles, and





2 parts
alcohol

5 parts
shellac

Wipe on shellac

Thin the shellac you'll use by mixing 5 parts shellac with 2 parts denatured alcohol. This thinner shellac is easier to apply, especially on small or intricate surfaces. Wipe it on thinly with a cloth pad, starting with flat surfaces (left) and then working the sides and edges (center). Use 600-grit sandpaper to smooth out application marks or remove debris (right).

such. Keep the pad moving. When you recharge, make sure you don't put too much shellac in the pad or you'll pool it. Bring the pad down on the surface and immediately begin to move it using just the pressure of your fingers or the weight of your arm.

To finish routed or other three-dimensional surfaces, wad up the cloth and compress it into the profile of the edge. Use a small, well-wetted portion of the pad to get the shellac into small or tight areas. But again, make sure that you don't get the pad too wet or you'll create problems.

It probably took you longer to read about the shellac application than it will to actually do it. For a medium-size project like a small cabinet or table, I spend only about 30 minutes with the shellac. Smaller projects are a little harder, because you risk returning to an area before it dries, and dragging the gummy shellac. Move the pad more slowly, or try using a smaller pad.

You may encounter streaks or fibers in the sticky shellac. Any application marks or debris can be rubbed out with

some 600-grit (CAMI grade) sandpaper followed by 0000 steel wool after the shellac has cured for about eight hours. Because there are no "coats" of finish in the conventional sense, just keep applying the finish to achieve the look you want.

Applying the final touch

Near the end of the process, if you use all the shellac in the pad and keep

rubbing with the dry pad, it will burnish the surface and give it a nice soft glow. For a lower luster and extra protection, wait a day and then apply some paste wax with 0000 steel wool. Buff the wax with a soft cloth. □

Jeff Jewitt is a professional finisher and author of Taunton's Complete Illustrated Guide to Finishing (The Taunton Press, 2004).



Finish with steel wool and wax

Paste wax adds a more even sheen and a nice feel to your project. Apply it with 0000 steel wool. When the wax appears hazy, buff it with a soft, clean cloth.

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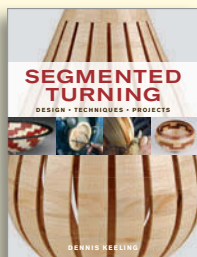
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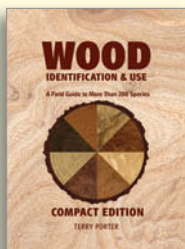
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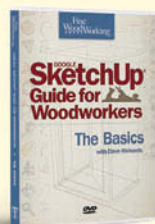
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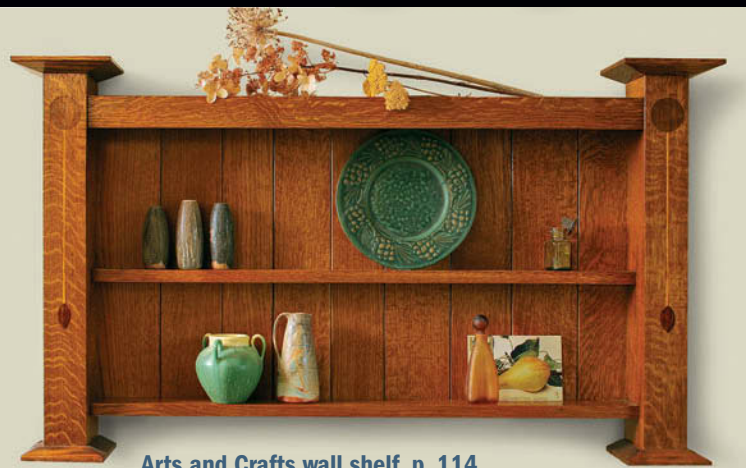
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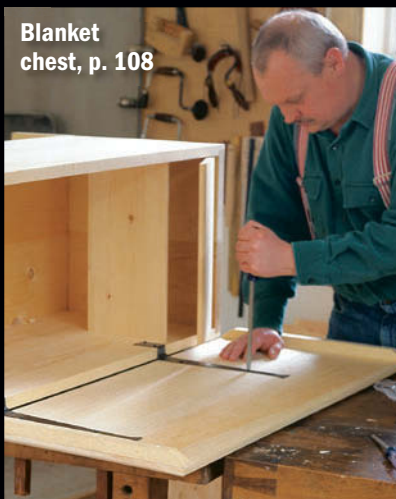
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