SMALL WOODWORKING PROJECTS

Editors of *Fine Woodworking*

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The Taunton Press

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ABOUT YOUR SAFETY: Working wood is inherently dangerous. Using hand or power tools improperly or ignoring safety practices can lead to permanent injury or even death. Don't try to perform operations you learn about here (or elsewhere) unless you're certain they are safe for you. If something about an operation doesn't feel right, don't do it. Look for another way. We want you to enjoy the craft, so please keep safety foremost in your mind whenever you're in the shop.

DEDICATION

Special thanks to the authors, editors, art directors, copy editors, and other staff members of *Fine Woodworking* who contributed to the development of the chapters in this book.

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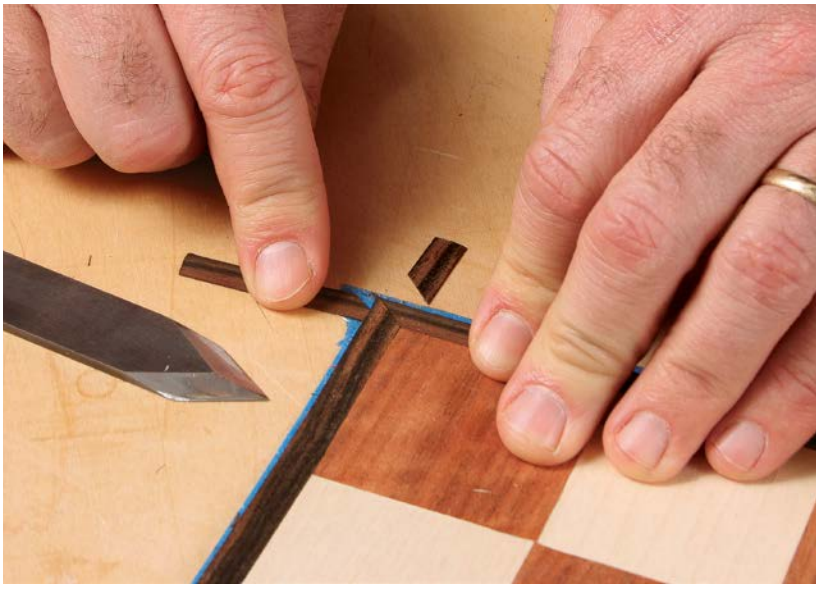


PART THREE

Tools

PART FOUR

Furniture

Introduction

Woodworking is a wonderful hobby. There's nothing like spending hours in the shop building something for your home or for your family. No computers, phones, bills, or other distractions. Just me, my tools, and some sweet-smelling wood.

But it is time-consuming, with some projects taking weeks or even months to complete. That's tough, especially if, like me, you have a full-time job, children, and family responsibilities, such as coaching sports, helping with homework, and doing the usual housework and yard work. Wouldn't it be nice if you could build a project start to finish in a weekend or a few days?

Well, *Small Woodworking Projects* is here to help. This collection of furniture projects from *Fine Woodworking* magazine features a number of tasteful projects that are perfect for time-constrained woodworkers.

Inside you'll get a variety of box-making techniques and projects, from simple boxes that can be made in bunches (great for gifts!) to an American classic, the Pennsylvania spice box. You also get instructions on how to make some great home accessories, such as a cutting board like no other, simple picture frames, and a couple table lamps. We've even included some small shop projects, like a mallet and an oak tool chest for your benchtop. But there's also big-time furniture in this small projects collection. You'll get step-by-step instructions for building a handy step stool, a Shaker side table, and a blanket chest, to name a few.

Best of all, you can start any of these projects today. All the planning is done for you. All you need to do is buy the wood and get to work. Enjoy your time in the shop.

—Tom McKenna
Editor, *Fine Woodworking*

A Box Worth Repeating

LAURA MAYS

I first made this box several years ago as part of a series for an exhibition organized by the Crafts Council of Ireland called "Of Colour in Craft." Artisans in various disciplines were asked to make pieces that used color prominently. I chose to make identical boxes in 10 species, each a different color.

Boxes are a great vehicle for exploring design ideas in a series (see "Designing in matched sets is a balancing act," p. 10). Small and simple in form, they can easily be grouped to create an arrangement with a strong character of its own. Making boxes also is a good way to spend time between bigger projects, to use leftover wood, or to make gifts.

This square, dovetailed box is half as tall as it is wide, with a drop-on lid that is slightly pillowed. The lid has small handles to lift it off and help hold it in place. This project offers a chance to practice hand skills and to execute the small-scale details that make all the difference. It is very satisfying to make.

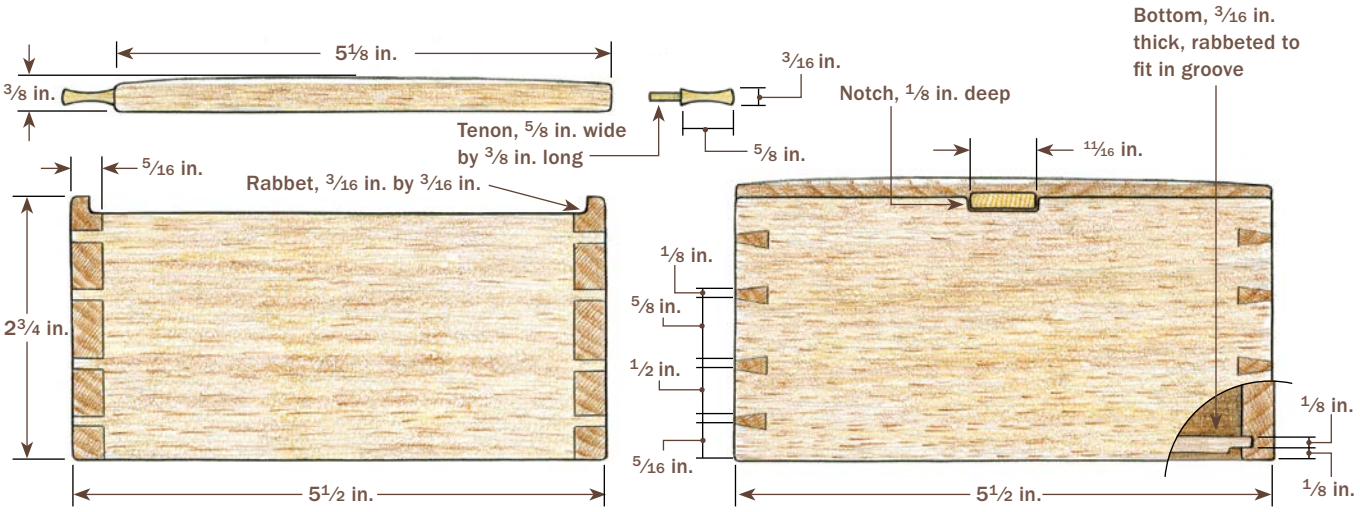
Mill and mark, then cut the joinery

This box only uses about half a board foot of lumber. If you're making a set like mine, you'll want variety. Trawl through your scrap pile (and those of your friends), and scour the odds-and-ends bin at the lumberyard for pieces with great grain patterns.

Rough-mill the stock oversize by about ⅛ in. in thickness and width. Don't crosscut the sides to length yet; they'll be too short to go through the planer for final milling. Sticker the wood and let it sit for several days before thicknessing to final dimension. After-

Fine Dovetails

The foundation of the box's beauty lies in careful grain selection and neatly executed dovetails.



How to find the best grain. Simple cardboard window frames help Mays select and mark out the material for the box sides and lid.

ward, lightly handplane what will become the internal surfaces of the box to get them very close to final prep. This is also a good point to confirm the orientation of the workpieces to avoid confusion when cutting the joinery.

At the tablesaw, rip the sides to width and crosscut them to just over finished length. I trim them to exact length on a shooting board, then check the ends for square. If they're out of square, the box will be too.

When dovetailing, I cut pins first, using a story stick for fast, consistent layout. After sawing the pins, I use a coping saw to remove most of the waste, then pare to the scribed shoulder line with a chisel.

To hold the pins securely on the tail board while I transfer the layout, I clamp a wide piece of scrap vertically in the vise. Next, I clamp one of the tail boards to the benchtop, with its end butted against the piece in the vise. Finally, I clamp the mating pin board vertically to the stock in the vise with its end grain resting on the tail board, thus firmly locating the pins above the tails. I saw the tails and pare them to fit.

Just a hair wider. To mark out for the shoulders, Mays sets her marking gauge just wider than the thickness of the stock. This makes the tails and pins protrude slightly beyond the outside surfaces of the mating pieces.

Saw the pins. Mays uses a saw that has no teeth at the front or back of the blade (Glen-Drake Toolworks; www.play-glen-drake.com). The design lets the saw build momentum before engaging the teeth in the work.

Transfer the layout. Clamp the pin board to a piece of wide stock held in the vise. Blue tape on the backer board shims the pin board forward so it aligns with the scribed baseline.

Small details make a big difference

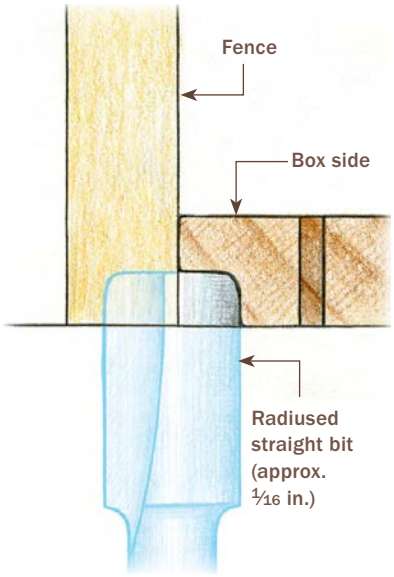
With the dovetails done, it's time to prep the sides to accept the bottom and lid. The bottom is rabbeted into grooves routed into the sides. Dry-fit the box and plane the bottom edges flush for a consistent reference when routing the grooves. On the tail boards, the grooves are stopped; mark out their ends with the box together.

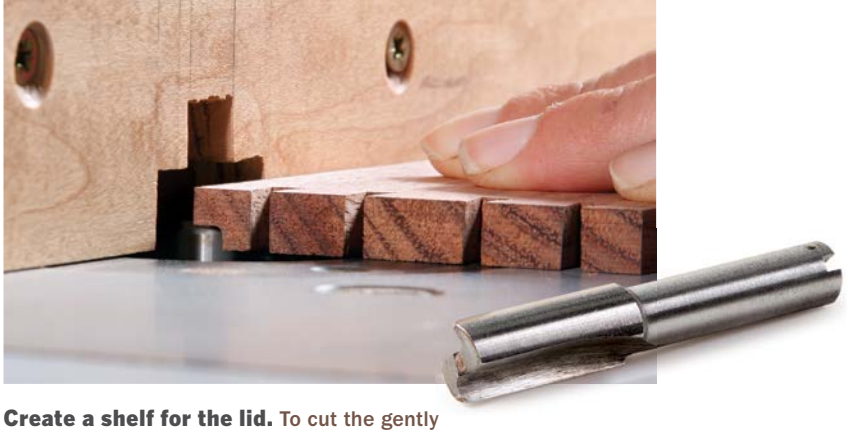
To hold the top, I routed a rabbet on the top edge of each tail board. I used a straight bit and rounded the cutters for a slightly radiused inside corner. The lid handles rest in notches in the top of each tail board. To create them, hog away the waste at the bandsaw and clean up the sawmarks at the router table. Before gluing up, prepare and prefinish all the inside surfaces, and both sides of the bottom, with shellac and wax. After glue-up, clean up the outside surfaces with a plane or scraper, and sand as needed.

Flush the bottom edges. Dry-fit the box and flush the bottom edges so the box sits level.

Radiused Rabbets

Before gluing up the box, Mays routs grooves for the bottom and gently radiuses rabbets to hold the lid.





Create a shelf for the lid. To cut the gently rounded recesses for the box lid, Mays uses a high-speed steel straight bit (at right) onto which she has ground a slight radius.

Notch for the handle. After marking out the notch (above), Mays removes most of the waste at the bandsaw, then cleans up the cuts at the router table (right).

Topping it off

After cutting the lid to length (but leaving it wide), I use a ⅛-in. straight bit to rout the handle mortises.

For the handles, I started with rectangular blanks about ¼ in. thick and 2½ in. wide. At the router table, rout a shallow dado that starts ⅝ in. from the edge of the workpiece. Next rout a matching dado in the opposite face. The stock that remains between the dadoes is the handle tenon. Test its thickness against the mortises before finishing the handles. Now rout a shallow cove, top and bottom, across the grain, and sand it to fit comfortably under the thumb.

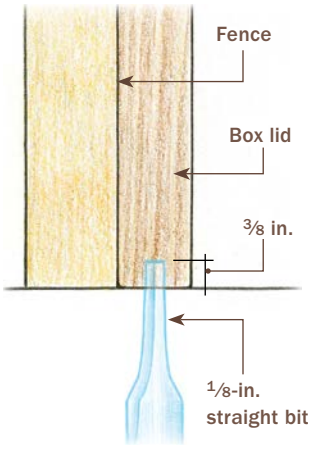
Two edges of the lid rest on the sides. To make room, trim those two box sides flush with the bottoms of the rabbets on the adjacent sides.

Clamp thoroughly. Mays applies pressure in both directions on each joint, checking for square and adjusting the clamps as needed. She uses cork-faced cauls to accommodate the protruding tails and pins.

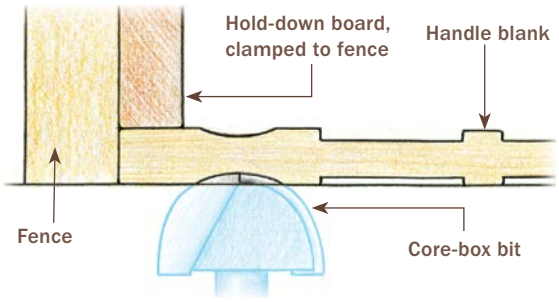
Shape the Handles

Mays cuts multiple handles from a single blank. The handles help lift the lid, and because they are recessed snugly into the sides, they align the lid precisely and hold it in place.

STOPPED MORTISES



Handle mortises. Set the lid in place to mark the mortises for the lid handles (above). Using a straight bit at the router table, make stopped cuts into the lid's edges to create the mortises (right).



Create the fingerhold. After routing shallow dadoes to shape tenons into the pull blank, Mays uses a core-box bit to create the thumb depressions in the pull's body.

Fine-tune the shape. After routing and further shaping the thumb depressions, use a block plane and sandpaper to round the front surfaces on the handle blank.

Cut the handles from the blank. After ripping two rows of handles from each blank, crosscut the individual ones free from each row.

Create the shoulders. Saw away the waste on each end of the tenon. Then pare the excess flush.

Pillow the lid. Dry-fitted handles locate the lid precisely, so it can be marked and cut to width for a perfect fit. The pillowed top starts with four planed facets, which are then sanded smooth into a gently sloping surface.

Get a handle on the fit. After dry-fitting the handles and setting the lid on the box, invert the lid and box to mark the lid for cutting to width.

The lid is a pillow. To create the rounded surface of the top, use a block plane to create facets that slope gently toward each edge of the lid. Start by working across the grain (left). Then plane with the grain to create the remaining facets (below left). Afterward, scrape and sand to blend the facets into a gentle curve.

To shape the lid, I started with a round-over bit at the router table to gently ease the edges of the underside for a snug fit in the radiused rabbet. To pillow the top, draw a pair of diagonals across the surface and a depth line on all four edges. Now plane an angled facet in each quadrant that slopes gently from the center down to the layout line on the edge. Scrape and sand to blend the facets into a gently curved shape.

Finish the lids and the exterior with shellac and wax, and glue in the handles.

Designing in matched sets is a balancing act

In our craft, we repeat actions over and over, plane stroke by plane stroke, gaining muscle memory, trying to build the action into our very being. In this there is sameness, yet there is also change. We constantly seek feedback from our actions, altering our stance, shifting pressure, reversing direction.

This interplay between sameness and change is one reason I'm drawn to making objects in series, matched sets where the pieces aren't identical copies of one another but variations on a theme.

Each series of boxes shown here starts with an idea that is very simple but gains complexity and subtlety in the making. The pleasure is in the possibilities: "What if I do the same thing but just change this . . . ?"

The key to making a series work lies in finding the right balance between change and sameness. Too much sameness and the series becomes overly repetitive and uninteresting; too much change and it becomes a set of separate objects.

CHANGING COLOR

With the color series, I kept everything the same except the wood species. The basic form of the box is very simple. To have altered other aspects or to have had a more complex base object would have distracted from the main point. The series as a whole is one object, made up of a number of separate objects.

ALTERING FACETS

When I was first learning woodworking in Ireland, our instructors gave us an exercise in which we made a small dovetailed box and then planed away some of the surface to reveal the interior of the joinery. Any undercutting on the pins and tails, any ragged shoulders would be revealed. For this series, I explored the idea further by removing planar facets in different configurations, this time from small madrone boxes. Using the same species throughout puts emphasis on the different arrangements of facets. I chose madrone because it is close pored and holds detail very crisply.

RUNNING RIDGES

This series experiments with a ridge or narrow raised band running over the exterior of the boxes. The first one has two intersecting ridges, the second has a curved ridge, and the third has a ridge that runs around the short dimension. I feel like this series is not over—there are more variations I would like to add.

Two Fast Ways to Build a Box

BILL NYBERG

One of the challenges of building a small, decorative box is deciding how to align and attach the top to the base. The most common way is hinges, but they can be time-consuming and fiddly to install. The simple rabbet joint works fine and leaves an attractive, clean look, but it can be troublesome, too.

The traditional method is to create a solid box, cut off the lid on the tablesaw, and then use a bearing-guided rabbeting bit to rout a rabbet on the inside of one piece and the outside of the other. You finish the joint by either squaring or rounding one set of corners and finessing the joint for a good fit. Simple to explain, harder to accomplish. Cleaning up and fine-tuning the inside rabbet is tedium defined and is done mostly by hand-sanding. I'm sure that's what kept my father, Helge Nyberg, an extremely accomplished woodworker, from using a rabbet joint on anything but the fanciest box. The joint is seductive, however.

My cousin Carl taught me a way to streamline the traditional method for a rabbeted lid, and then I came up with a radical new way that I call "the inside-out box." Either technique is much simpler than cutting the rabbets after the box has been glued up. The inside-out method works so well that I use it for functional boxes as well as for fancy work. I'd bet even old Dad would consider it.

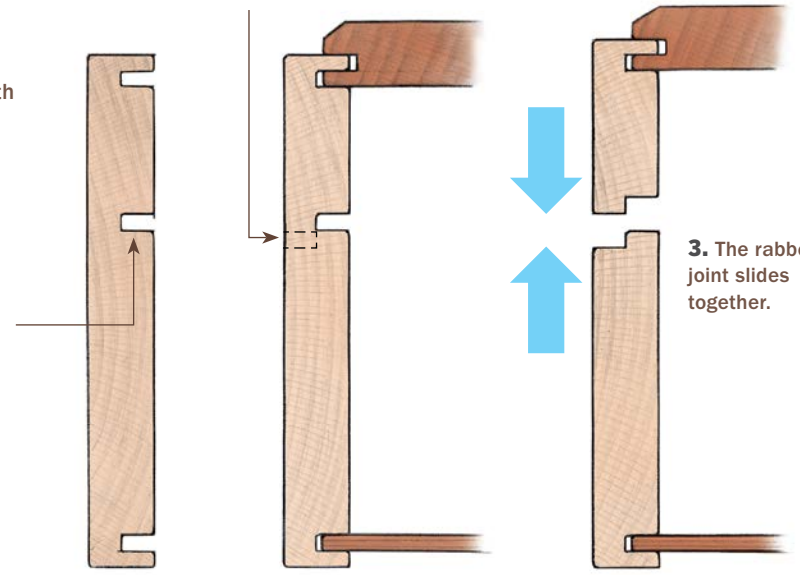
The Traditional Method, Streamlined

The traditional method is to cut the box apart on the tablesaw and then rabbet the two parts, which is tedious and fussy. This method combines those steps into one. Also, because the section you need to take out is only the width of a single sawkerf, you can use wood with figure or swirly grain, and you'll end up with almost no jump in the pattern.

1. Before mitering the sides, cut grooves for the top and bottom in the normal way. But cut an additional groove on the tablesaw to serve as the inside part of what will become the rabbet joint.

2. After the box is glued up, cut the outside rabbet on the tablesaw. This cut also separates the lid from the base.

3. The rabbet joint slides together.



The Revolutionary Inside-Out Box

Even the streamlined version of the traditional method leaves an inside rabbet in the lid that is difficult to clean up. But Nyberg found a way to build the box inside out, letting him sand the rabbets before assembly. The downside of reversing the box and lid is poor figure and grain continuity. So choose fairly straight-grained boards. Vertical patterns such as tiger maple or small, random figure such as bird's eye also work well.

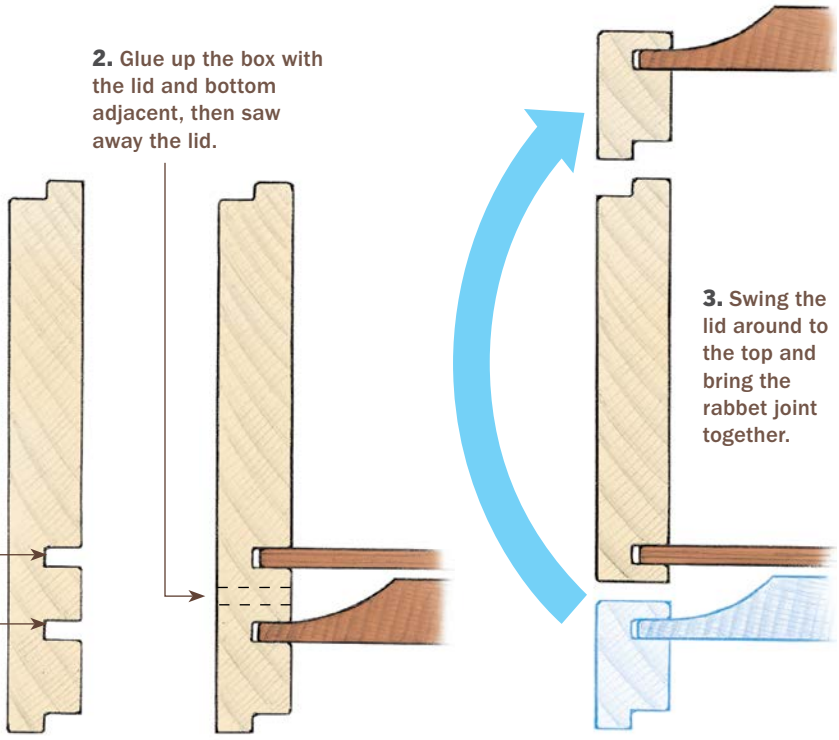
1. Cut and smooth both rabbets on either side of the board when the box sides are one long piece. Also cut the grooves for the top and the bottom.

Groove for bottom

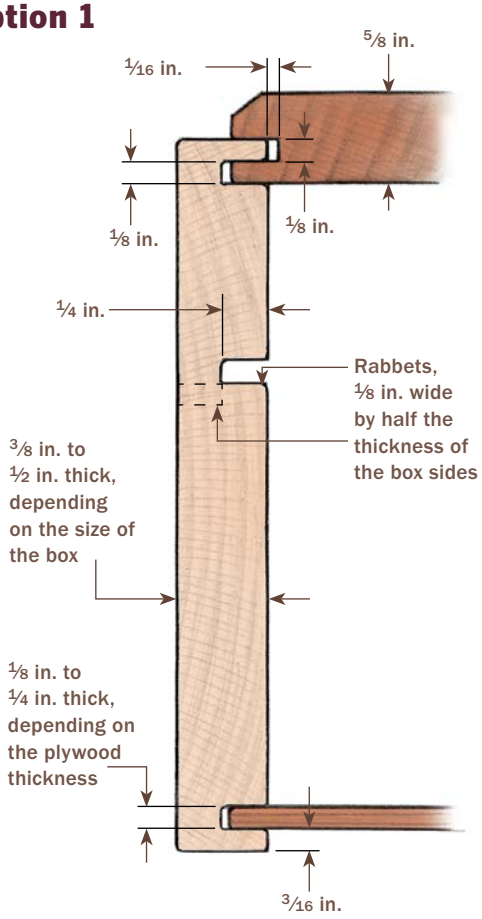
Groove for top

2. Glue up the box with the lid and bottom adjacent, then saw away the lid.

3. Swing the lid around to the top and bring the rabbet joint together.



Option 1



One piece, three grooves. While the sides of the box are one continuous piece, cut grooves for the top and bottom panels, and then cut a third groove that becomes the inside rabbet. Use a rip blade for these cuts; it leaves a square kerf.

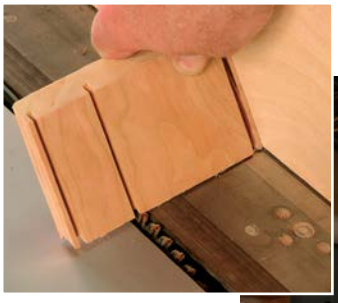
Cut the miters. Use a tablesaw or chopsaw to miter the sides of the box.

Option 1: Cut one rabbet before assembly, one after

Take all four sides from one board. Mill it to the right thickness and width (taking into account the width of the rabbet), but leave it a little long to allow for planer and jointer snipe and possible re-dos when mitering.

While you're at the tablesaw, instead of just cutting grooves for the top and bottom of the box, cut the inside rabbet along the entire length of the workpiece. Now miter the corners and assemble the box, inserting the top and the bottom. You can use the masking-tape clamping method or 45° clamping cauls, as shown. Once the glue has dried, use an offcut from the box sides to set the tablesaw fence so that the kerf creating the outside rabbet will be alongside the inside one. Also use the offcut to set the blade height so that it just meets the inside rabbet. Make the cut on all four sides, separating the lid and creating the rabbet joint at the same time.

Assemble the box. You can reinforce the miters with biscuits. In any case, apply glue to the mitered ends, place the top and bottom panels in their grooves, and assemble the box (left). Use 45° blocks, glued to ¼-in.-thick medium-density fiberboard (MDF), to align the clamping force with the joint. Use light force from clamps resting on the bench to align the cauls with the box sides and then apply the upper clamps, which are more centered on the joint (above).

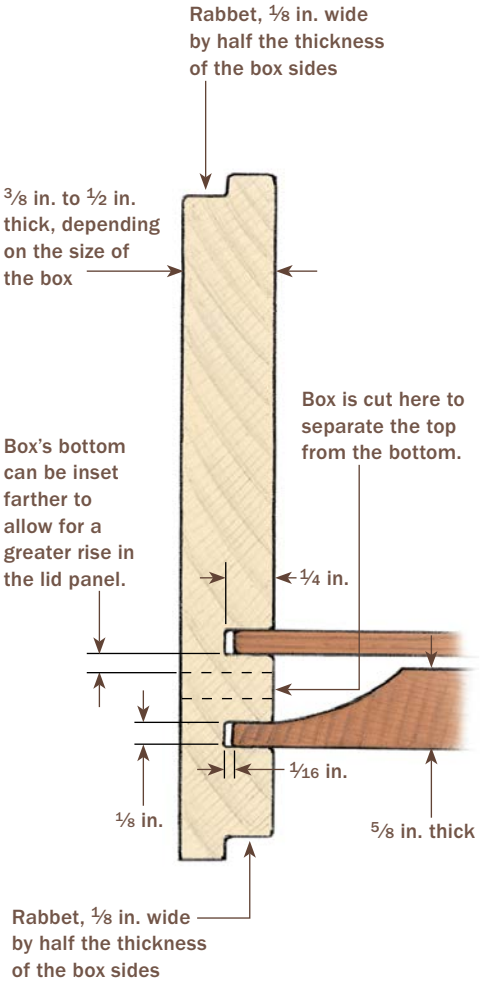


Align the rabbet joint. Use an offcut from the box sides to set the tablesaw fence so that the outside rabbet will just touch the inside one.

Cut the outside rabbet. Run all four sides across the blade, maintaining steady pressure against the fence. A tall auxiliary fence provides greater stability.

The rabbet revealed. Once the fourth side has been cut, the lid will come away, revealing the two halves of the rabbet joint. Sand or plane the rabbets to clean up the sawmarks and fine-tune the fit.

Option 2



Cut rabbets and grooves. Cut the two parts of the rabbet joint on opposite edges of the board (above left). Then cut the grooves for the top and bottom panels (above right).

Easy cleanup. Trim and clean both continuous rabbets with a shoulder plane and a sanding block. Use a short section cut from one end to tell when the rabbet joint comes together flush.

Option 2: Make the rabbets before making the box

Mill the board to the same specifications as the first method. Cut a rabbet along both long edges, but on opposite faces, the way you do when shiplapping boards. You can do this with a bearing-guided rabbeting bit in a router, with the same bit or a straight bit in a router table, or with either a regular or dado blade on the tablesaw. Set the depth of the rabbets to just under half the thickness of the wood.

Next, cut grooves for the top and bottom panels. Their precise location is determined

Assemble the box inside out. Because the box is open, you can use a spring clamp to hold the cauls to the box sides. Place the top and bottom panels in their grooves, with the outsides facing each other, and assemble the box. Align these miter joints carefully, as any inaccuracy will affect the fit of the rabbets.

Cut the box in two. Set the blade height just greater than the thickness of the sides, and cut between the hidden top and bottom panels in a carefully marked location

by the design of the box and the thickness of the lid panel. A full-size drawing is sometimes helpful to decide exactly where to cut the grooves and where you'll eventually cut apart the box. Before mitering the sides, use a shoulder plane and/or a sanding block to trim and clean up the two fully exposed continuous rabbets. Now assemble the box.

After the glue dries, cut apart the box between the top and bottom panels, switch the positions of the two pieces, and fit them together. If the fit is not perfect, it can be adjusted easily by trimming the half with the exposed rabbet. The interior rabbet is already finished and can be left alone.

Among the benefits of this method is that when the bottom and top are separated on the tablesaw, minor inaccuracies are easier to deal with than if the cut had formed the joint. Joints leave little room for error, but nobody knows if you sand away another fraction of an inch of the top or bottom.

The inside-out box. With the cuts complete, the top and bottom of the box are revealed (top). Sand away the sawmarks on the top and bottom edges (bottom). The rabbets should need very little trimming.

Build a Sturdy and Striking Box

DOUG STOWE

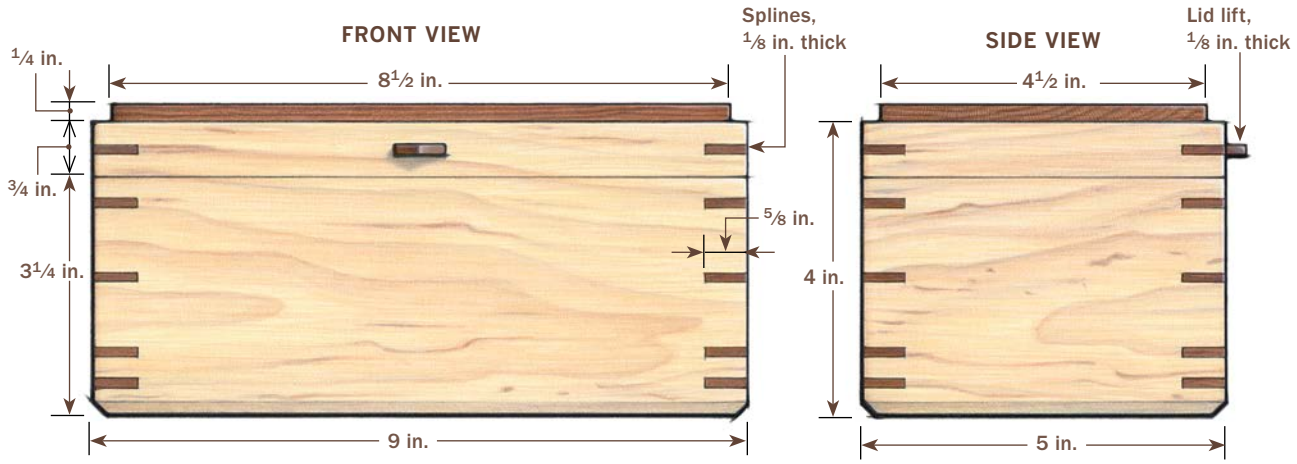
I began making and selling boxes in the 1970s, and I've made them in all sorts of sizes, shapes, and styles. This one, though, has always been a favorite. I've made it in a variety of woods, and I like how the sides create a visual contrast with the top and miter splines. I also like the top: It's a floating panel but that's not obvious at first. The secret is a groove in both the top and the 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 ⅜-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 1⅛ in. thick. It should be about 4½ in. wide and at least 16 in. long, a little longer than the length of the box front and one side.

A Better Way to Build Boxes

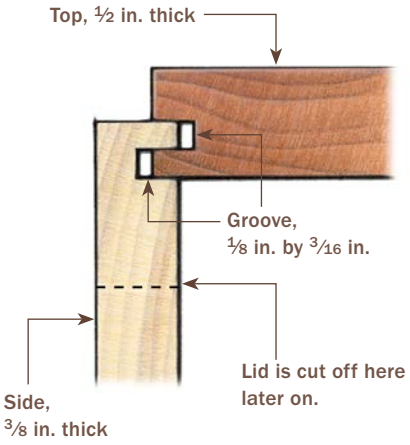
A great box gets its cachet from several sources: beautiful woods, the right proportions, and attractive joinery.



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

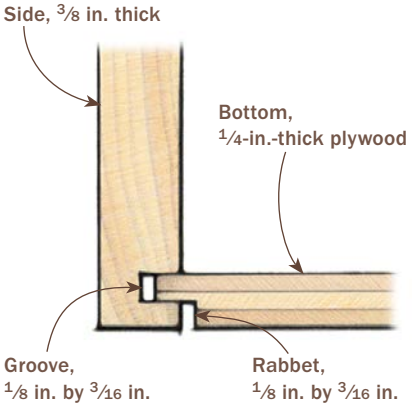
Groove the sides. Using the tablesaw rip fence to guide the stock, cut a shallow groove along the top and bottom edges of the four sides to accept the top and bottom of the box. For safety's sake, use a push stick.

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.

Using a bandsaw, resaw the stock into two pieces, each just over ½ 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 ⅜-in. thickness.

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

No-clamp assembly. 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.

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 ⅛ 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 piece. Repeat on the second resawn half. Finally, reposition the stop block and cut the two remaining side pieces.

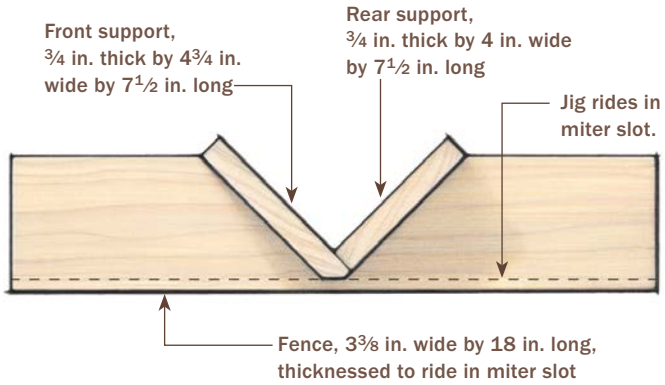
A groovy trick for top and bottom

For this box, I made the top from ½-in.-thick mesquite and the bottom from ¼-in.-thick Baltic-birch plywood. To get the size of these

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

Splines Add Strength and Style

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

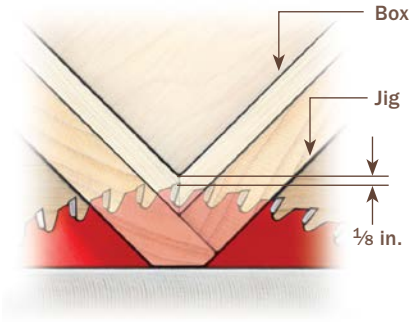


Story stick dials in setup. Use a pencil to mark the slot locations on one corner of the box, then transfer the locations from the box to a thin, narrow stick. After that, use the stick to position a stop block on the jig.

parts, temporarily tape together the box, measure the interior length and width, and add ¼ 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.

Cut the Slots

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.



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.

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, 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 ⅛-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 ⅛-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 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 1/32 in. less than the thickness of the sides.

A flip stick is the 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 ¼ 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.

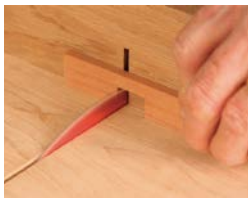
Raise the tablesaw blade so it's just slightly below the barrel of a hinge. Standard butt hinges typically require the midpoint of the barrel to be on the edge of the stick, but the hinges I use have built-in stops, so the entire barrel must be outside the stick. Now, make a series of cuts to create a notch.

Install a 3⁄16-in.-dia. straight bit in the router. Adjust the bit height until it's 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 below.

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.

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.

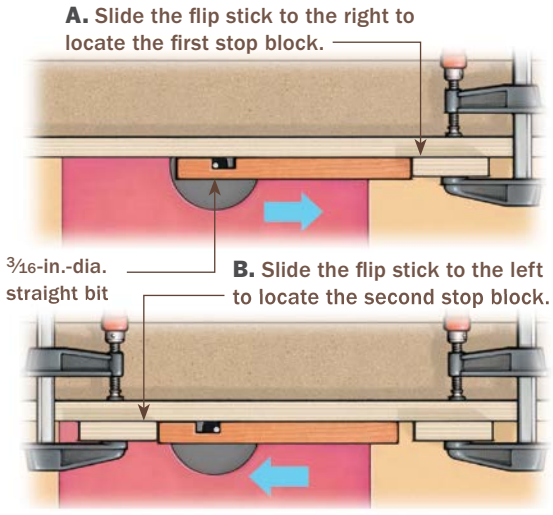


Notch the stick. Stowe uses his tablesaw to cut a precise notch to accept the leaves of the hinge.

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

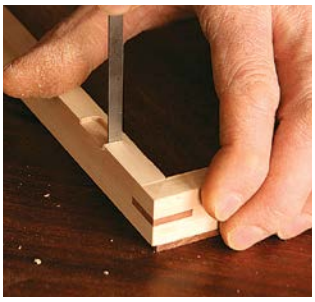
2. USE THE STICK TO SET UP THE ROUTER TABLE

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



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.

Cut the lid from the box in four steps. Raise the blade to a height that's 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).

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 ⅛ -in.-deep cut.

For the lid lift, I use the router table and a ⅛ -in. straight bit to rout a ⅛ -in.-deep by ½ -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.

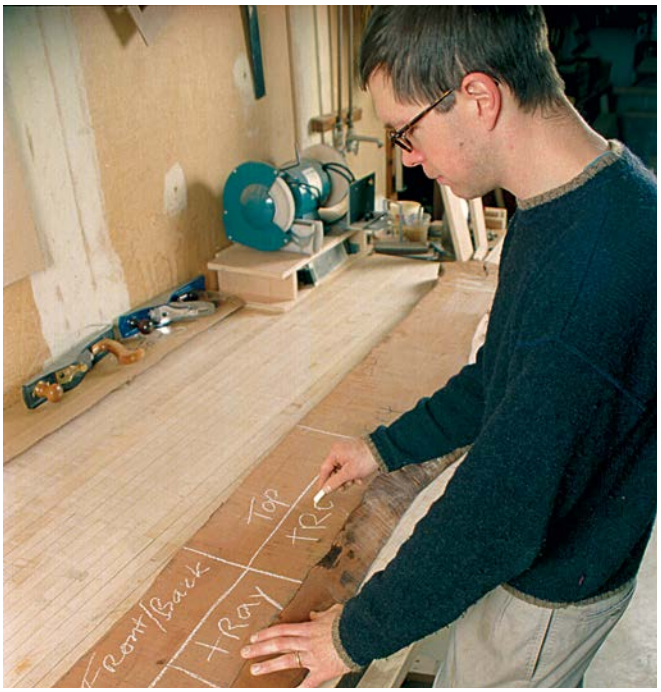
After adding the hinges (see "A flip stick is the secret to perfect-fitting hinges," p. 23), I gave the piece a final light sanding with 320-grit sandpaper and finished it with three coats of Deft® Danish oil finish.

An Elegant Jewelry Box

STROTHER PURDY

Simple, rectangular jewelry boxes are easy to make. What's difficult is making them look nice. Without the benefit of curves, complex patterns, or inlays to give a box definition, the wood, joinery, and proportions become the all-important elements of the design. This box is made of curly Swiss pear, lined with apple on the inside and fitted with a walnut pull. The luscious grain and color of Swiss pear don't need additional embellishment to look stunning. I chose the apple and walnut primarily because they look good with the pear.

For the joinery, hand-cut dovetails with skinny little pins are classic, but they look like butt joints from the top and bottom edges. For a drawer, this detail doesn't matter. But on a jewelry box, framing the lid that way does not look attractive to my eye. To solve this problem, I mitered the dovetails on the lid and the bottom of the box (see "Mitered dovetails refine the look of a box," p. 30).

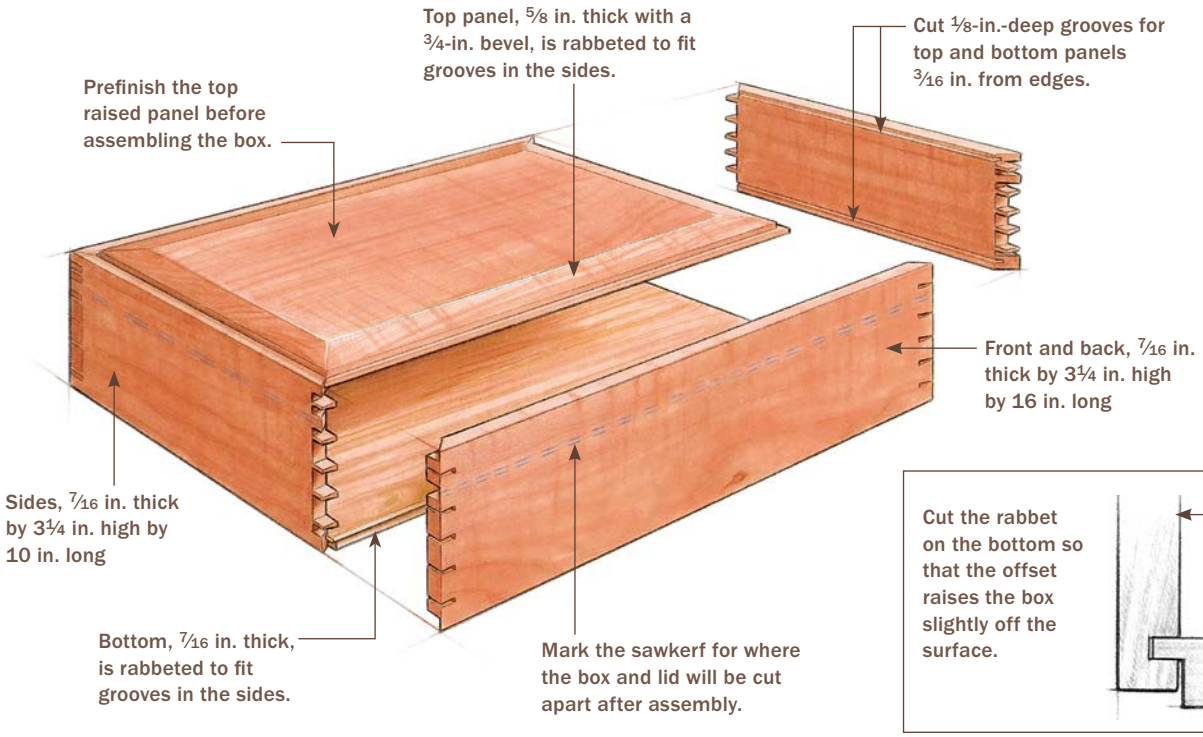


One board, one box. A single source for the outside parts of this project ensures a more even grain and color match to the finished box.

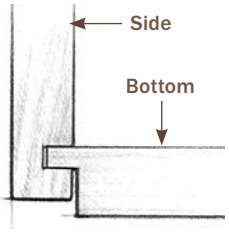
Resawing offers two benefits. By cutting thinner pieces of the same board, you can get book-matched panels and waste less lumber.

Assemble the Box, Then Saw It Apart

The box and lid are constructed as a single unit and then cut apart after glue-up. This method guarantees a perfect fit between the box and the lid.



Cut the rabbet on the bottom so that the offset raises the box slightly off the surface.



Mitered dovetails add interest and formality to the box without drawing undue attention to themselves.

As for the design and overall proportions, this jewelry box has shallow trays, so it should be relatively flat compared to its width and length. For the proportions, I used dimensions based on the golden rectangle, with a width-to-length ratio of about 1:1.6.

Mill the lumber for the best match

A box is a great project to eat up some of the scrapwood lying around the shop. But there's nothing like making a box from a single, thick board. The color and grain will be very consistent, and by resawing you can book-match panels. For this box, you'll need a board about 2 in. thick by 9 in. wide by 4 ft. long.

First, chalk out the parts, looking for the best grain patterns for the top and the least exciting for the trays. It's possible to resaw a 2-in.-thick board twice, making slices 5/16 in. thick, and get three identical pieces with two options for book-matching.

Lay the boards on edge for a few days, with air circulating between them. This will help release any residual stresses in the wood. After that, mill the sides and top to dimension and glue up the top panel.

Finish the top and bottom panels before assembly

For the top of the box, book-match the nicest pieces of wood and raise the panel. A raised-panel top softens the look of the box. For the bottom, use whatever wood is left over and leave it flat.

After cutting the dovetails and dry-fitting the sides of the box, take the dimensions for the top and bottom panels from the inside measurements, figuring in the added depth of the grooves. You can make the panels fit just so along their length, but across the width you need to account for changes in the relative humidity and subsequent shrinking or swelling that will occur. Rabbet the edges of the raised field, making them slightly too thick to fit the grooves, then fine-tune the fit with a shoulder plane, scraper, or sandpaper. Chamfer the top edges with a block plane—if you want machinelike precision, use a tablesaw or router.

Sand and prefinish the panels before assembling the box. A prefinished panel won't show an unfinished edge when it shrinks out of its groove. Also, lightly sand and prefinish the inside of the sides (I give them a few coats of shellac). The apple lining will cover most of the inside of the box, but not all of it.

Glue up the box (I use yellow glue), clamping evenly across the faces of the joint. Even pressure is important to avoid putting tension in the box. Later, when you saw apart an unevenly clamped box, the top and bottom could twist in different directions, making a bad fit. If the pins protrude from the tails, you'll need to make clamping cauls with fingers that put pressure only on the tails.

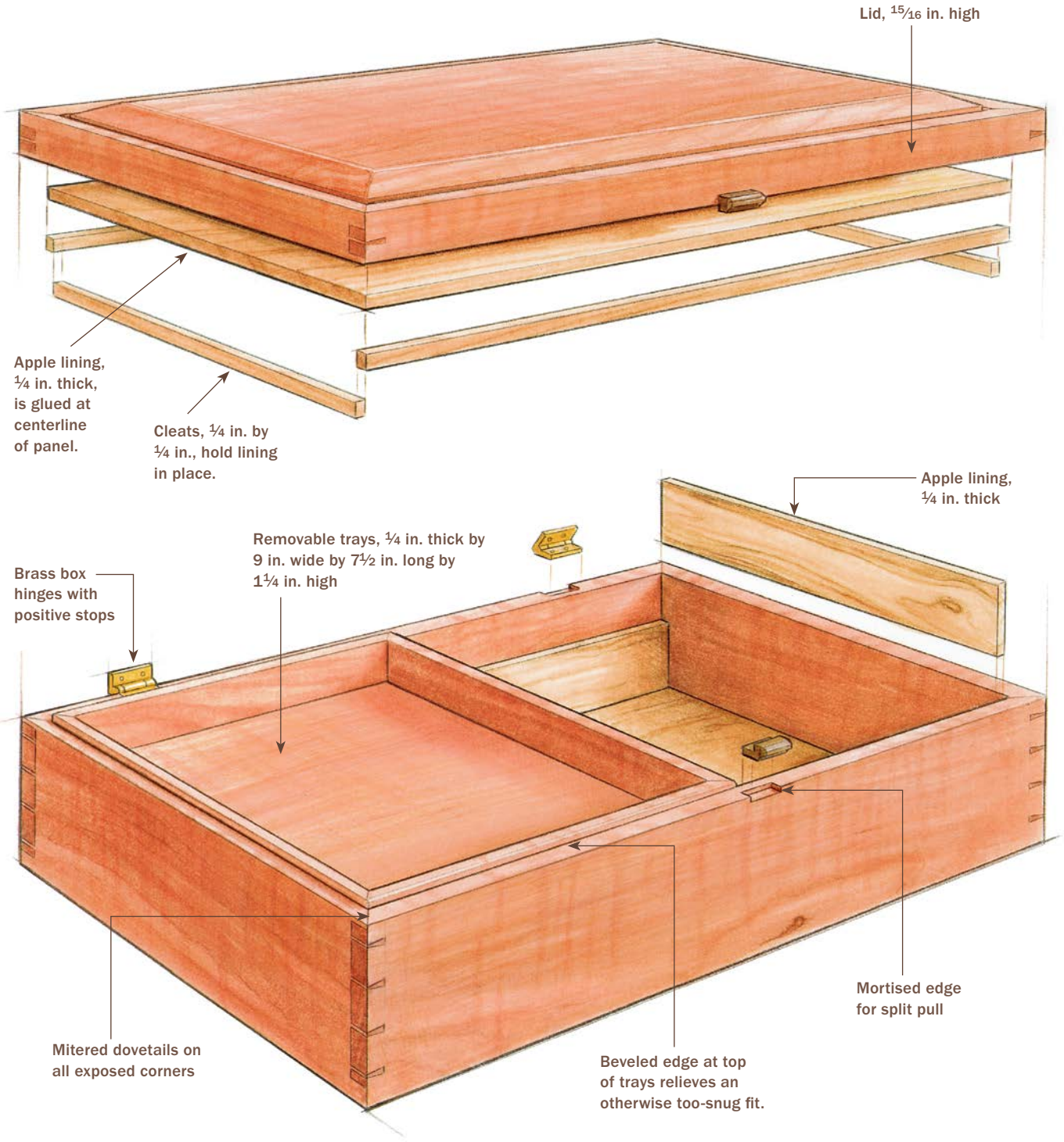
Let the glue cure thoroughly, then sand the exterior of the box to about 320 grit. Separate the lid from the bottom on the tablesaw, sawing the box in two parts along the layout lines. Clean up the inside edges with a block plane, scraper, or sandpaper until the lid and bottom fit together seamlessly. The edges don't have to be perfectly square—I find they're easier to fit if they're angled in slightly. Sand the box to 400 grit, and finish it as you did the top panel.

Fit hinges to the box and lid

Small box hinges (Brusso® brand) are perfect for a project like this. The hinges are well made, and they have a positive stop when opened a little more than 90°—so you don't have to add a chain to keep the top from flapping open too far.

Clean Lines and Simple Details

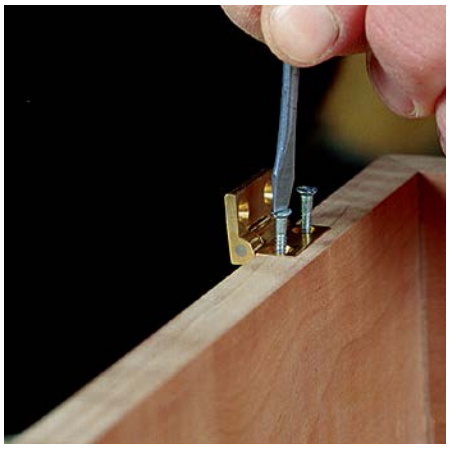
Stunning wood, accomplished joinery, and pleasing proportions give this box a visual appeal. The shallow dimensions and removable trays on top make it easy to access the contents.



A tablesawn joint needs a little help. After setting the fence to the layout lines marked on the box, add masking tape around the outside of the box to minimize tearout during the cut. Clean up the sawn edges with a block plane, scraper, or sandpaper.

Leave a little breathing room for the lining. After scraping off the shellac from the center of the underside of the lid, Purdy adds a bead of glue to secure the lining.

Trim to fit. The side pieces are cut to fit and secured with a spot of glue.



Installing hinges. Brass screws wear out easily, so it's best to use steel screws to temporarily fasten the hinges. Steel heads are less prone to stripping. Use the brass screws only for the final fit.

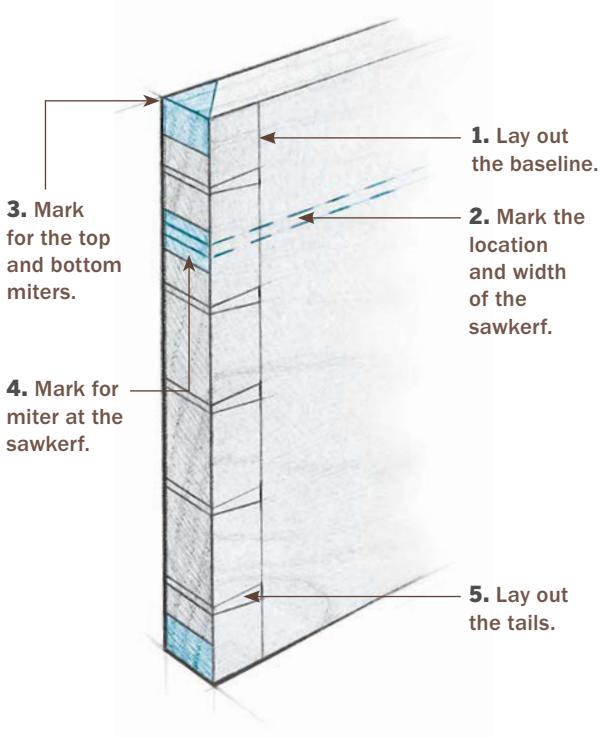
Use a marking gauge and a knife to lay out the position of the hinges. With a sharp chisel, chop out the waste, paring as necessary until each hinge leaf fits tightly. Now attach the hinges with two #3 steel screws. Instead of drilling for the screws—because they're so small—I made a pilot hole by tapping a small brad into the wood. When fitting the hinges, don't use the brass screws that come with them because the brass is so soft that the screws will either break or their slots will get mangled. Put the brass screws in once and only once, after everything is done.

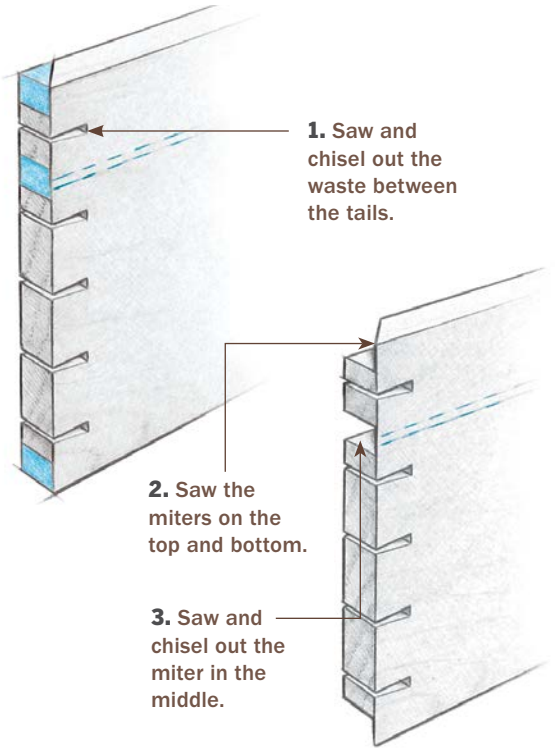
Line the inside and add the trays

The apple wood I used to line this box came from a dead tree in my backyard. Without such a source, I would have used another light-colored wood, such as cherry or maple. The lining should be thin enough to take up little interior space but not so thin that it warps—about ¼ in. thick is a good compromise.

Mitered dovetails refine the look of a box

Dovetails with mitered edges are cut much like garden-variety dovetails, but they require a few extra steps. You have to be more careful marking the pieces, and they take a little longer to lay out and assemble.





LAY OUT THE TAILS

Use a marking gauge to lay out the baselines on the faces of the boards. Lay out the sawkerf that will separate the lid from the box. Mark for the miters about ⅜ in. from the top and bottom edges. These lines represent the height of the miters. Now scribe a line ⅛ in. above and below the sawkerf. Continue these lines from the baseline and around the edges on the inside faces of the pieces only. Finally, scribe the 45° angle on the top and bottom edges.

The mitered ends take the place of the traditional half-pins. There isn't room for a complete tail above the sawkerf, so you need to cut two half-tails. Below the sawkerf, divide the space equally to get three whole tails between four pins. I like to place the tails very close together, leaving only the width of a backsaw blade between them.

CUT THE TAILS AND MITERS

To clear out the waste between the tails, use a fine-toothed backsaw because you need to leave a very smooth surface on the inside. You can't go back later and clean it up with a chisel—there simply isn't room. After you cut one side, start the saw in the same kerf, angled the opposite way, to cut the second side.

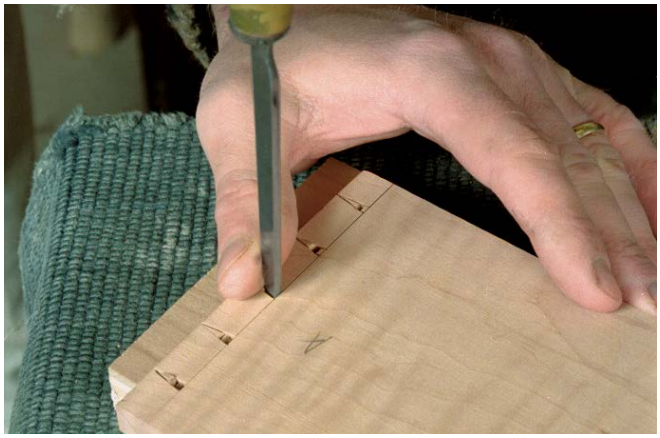
To cut the miters on the edges, saw slightly off the line both from the edge and from the inside face. Cutting out the miters in the middle (where the lid and bottom will be cut apart) is a little harder. You can cut them only on an angle from the back, so you have to chisel out the waste. Pare the faces of the miters flat and smooth. You can make a jig to guide the angle of your cut if you prefer, but I find it's easier to do freehand.

Cut the tails. A fine-tooth backsaw makes a clean and narrow kerf and offers good control over the cut.

CUT THE PINS AND THE GROOVES FOR THE PANELS

Just as you would for a regular set of dovetails, transfer the locations of the tails to the pin boards. At the same time, transfer the locations of the miters and cut them as you did on the tail boards.

Now is also a good time to cut the grooves for the panels. Put a rip blade in the tablesaw that cuts a flat-bottomed kerf. Set the blade to the desired depth and groove the panels along the inside top and bottom edges.



Chop out the waste. The tight spaces left for very small pins require a ⅛-in. chisel to clean them out.

Mark the pin boards from the tail boards. A clamp is worth as much as a steady hand when transferring the locations of pins.

Rough-cut the outside miters with a saw. Then pare them to your pencil line with a chisel.

Make all necessary saw cuts in the pin boards. Chop out the waste between the pins (left). Pare the miters with a chisel (above).

Mill all of the lining pieces you'll need. Glue up panels for the inside of the lid and the bottom of the box if you don't have pieces wide enough. Sand them and apply several coats of shellac. These pieces need to be finished so that the bare wood does not come in contact with the contents of the box. Because wood is acidic, it will tarnish jewelry and ruin any valuable papers.

Fit the linings for the lid and box first, with a spot of glue in the center. Cut them so that they fit tightly along their lengths, but be sure to leave a little space on their sides to allow for wood movement. Cut the side pieces for the lid and box slightly long and press-fit them in place. Fit the long sides first, then the short sides. If the wood is especially flexible, spot-glue the liner parts in place.

The trays are simply smaller boxes made from the pear wood. Don't bother with fancy joinery for them—miters on single dovetails at the corners are fine. You can cut grooves for the bottoms, if you wish; but because these trays will never take much weight, simply gluing on the bottoms works quite well.

The height of the trays is critical. They sit proud of the seam between the box and the lid and form an airtight seal, keeping dust out of the box. Chamfer the top edges of the trays so that they are not abraded every time the lid is closed. To test-fit them, put the trays in place and open the lid. If the trays rise with the lid, they're too tight. Plane or sand the top edges until the trays stay in place when the lid is opened.

A pull with a twist

The small split pull I designed for this box doesn't call attention to itself, but it adds interest to an otherwise plain-looking front. When closed, the pull looks like one piece, but it's actually two pieces—one attached to the top edge of the box, the other to the underside of the lid. To open the lid, you need to twist your fingers one way. Trying it the other way makes it seem as if the lid were locked.

Make a slightly oversize rectangular piece of walnut for the pull and saw it in half. Mortise the two pieces so that they come together just so when closed, then glue them into place, unfinished. Cut and sand them to shape after they're installed.

Finish the outside of the box with a Danish oil mixture, shellac, varnish, or lacquer. Let the finish cure for a few days, then give the surface a good coat of wax and buff it to a high shine. Put the hinges back in, and your box is done.

Elegant Veneered Boxes

SETH JANOFSKY

When I have a bit of time to work on a special project, I like to make a beautiful box. It's manageably small yet involves a fair amount of interesting detail work. One of my favorite designs is covered in a parquet of figured-maple squares.

I originally made boxes like these for collectors of netsuke (small carved objects of stone, wood, or ivory), but of course they can be used for just about any collection of small things.

The box itself is built much like a drawer, with tongue-and-groove joints for the corners and the bottom held in a groove. You can make everything, including the veneers, on the tablesaw.

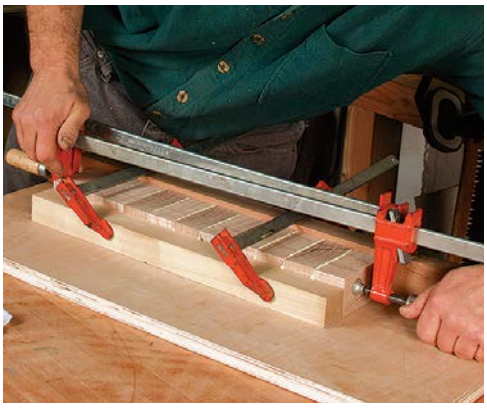
Although conceptually simple, a parquet pattern can be difficult to execute precisely. In theory, you could cut many squares of veneer and piece them together into a sheet. But I find advantages to cutting blocks of maple, gluing them together, and then cutting that piece into strips of parquet that are glued into sheets.

Start with the veneer. If you use a parquet pattern made up of squares, the veneer sheets you make will determine the final dimensions of the box. With plain veneer, on the other hand, you can make the box carcase first and cut the veneer sheets to fit.

This method keeps the veneer squares in an orderly sequence relative to the piece of wood from which they came. It creates a surface made more interesting by its display of multiple grain, figure, and color patterns. This box has three patterns at work even though it uses only one type of wood. The first pattern comes from the primary grain lines at right angles to each other in the parquet squares, the second from the maple's fiddleback figure, the third from the difference in color between the sap and heartwood areas.

Of course, parquet isn't the only covering for an elegant box. You also can use plain book-matched or slip-matched veneers, or you can create a unique scrollsawn marquetry design.

There are a number of ways to configure a box. The one described here has a top rabbeted to mate with the bottom, with the joint about two-thirds of the way up the side. I use binding—a narrow strip of white oak glued along all the edges—which harmonizes nicely with the maple veneer.



Block becomes veneer strips. Maple blocks are stacked so that the edge grain is alternately horizontal and vertical. Then they're glued and clamped in a simple fixture (top). Once completely dry, the glued-up block is ripped into strips 1/16 in. thick (bottom).

Make the sheets of veneer first

This box starts with the parquet veneer. The parquet began as a piece of figured maple about 1¾ in. thick by 3½ in. wide by 20 in. long. The quartersawn side had the most consistent figure, so it was the face that yielded the parquet pattern.

A piece this size will produce enough veneer to cover a box approximately 10½ in. wide by 15 in. long by 4½ in. tall in a pattern of 1½-in. squares. The exact size will be determined by the actual dimensions of the parquet sheets and the width of the oak edging.

An ingenious clamp. Scrap blocks and weights keep veneer sheets from buckling. Wedges tapped in place between the veneer and fence provide clamping pressure.

The second glue-up. Veneer strips are edge-glued a few at a time. Old newspaper keeps veneers from sticking to the gluing jig. The strips are staggered to create the checkerboard pattern.

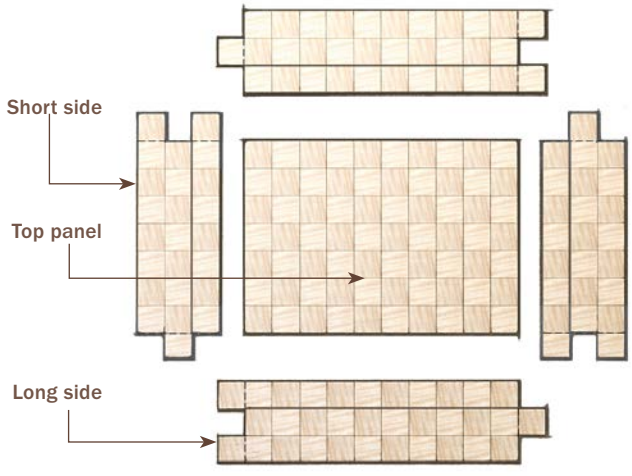
Spreading the sheets. Once the parquet panels have dried, lay them out and arrange side panels to match the grain pattern with the top panel.

After milling the maple board perfectly flat, straight, and square, mark the working face with a long triangle that will help keep the pieces in order. Then crosscut it into two equal lengths.

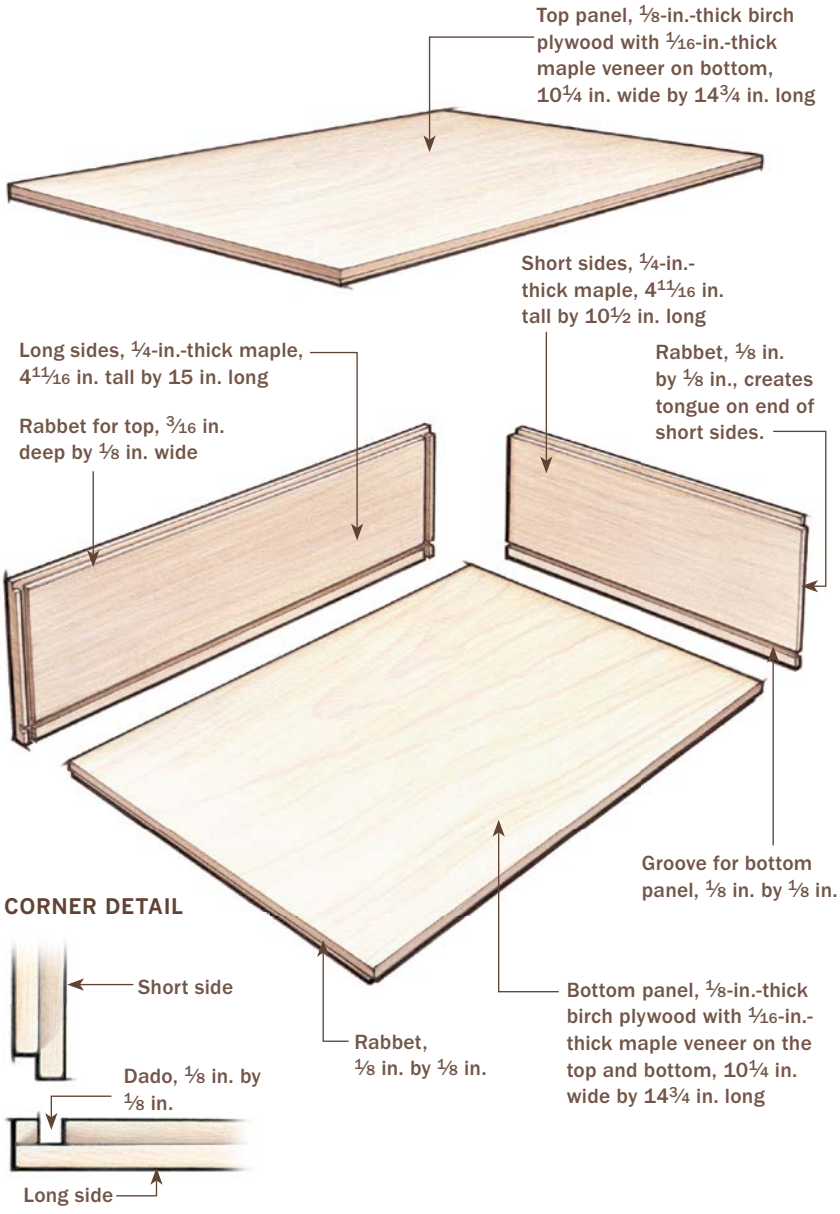
Plane one piece to exactly 1½ in. thick and cut it into six blocks exactly 1¾ in. long. Set them aside, in order. Crosscut the other length (still 1¾ in. thick) into five blocks exactly 1½ in. long and set them aside, in order.

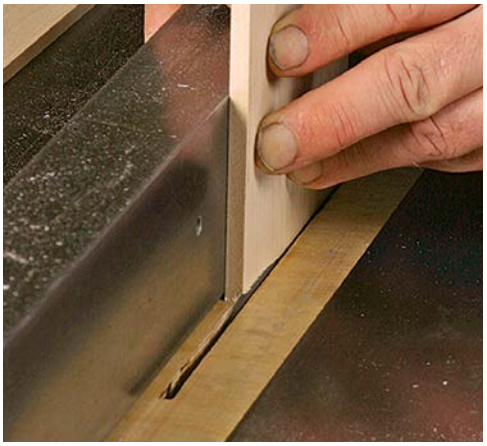
Next, intersperse the blocks into one line, one from the first set, one from the second, and so on. Rotate the blocks from the first set 90° so that all 1½-in. faces abut. You'll have a strip of 11 blocks, 1¾ in. thick, that when viewed from the edge is made from 1½-in. blocks of alternating grain.

Nineteen Strips Make the Parquet Top and Sides



Construct the Box Carcase





Small, simple joints in thin stock. Use the tablesaw to cut the joints for the box carcase. Begin by making a ⅛-in.-deep dado in the long side pieces (top). With the same fence and blade-height settings, cut the mating rabbets in the short sides (above).

Open the box. This is the final step in assembling the box carcase. Progressively deeper cuts on the tablesaw separate the bottom section from the top.

Glue the blocks together, in order. I push them against a piece of scrap screwed to a piece of plywood or medium-density fiberboard (MDF), which helps keep them aligned while I clamp them together. Coat all the mating surfaces with glue to ensure the pieces will hold together.

Next day, when the strip is thoroughly dry, carefully square up two faces, then rip and

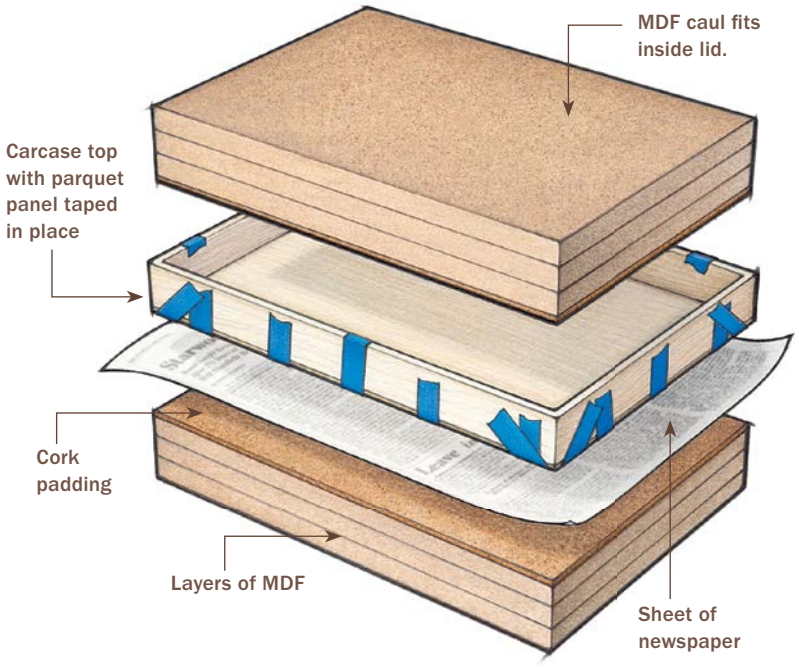
Begin veneering at the top. Liberal amounts of blue tape hold a veneer sheet securely in place on the top of the carcase.

Veneer the sides. The sides of the top and bottom sections are veneered separately. The T-shaped jig, clamped into a bench vise, supports the workpiece and also serves as a clamping caul.

A box-size caul. The top is clamped in an antique book press while the glue dries. A caul, made of layers of MDF with cork padding on one face, provides even pressure. If you don't happen to own an antique book press, a pair of cauls and lots of clamps will do nicely.

Apply the Veneer

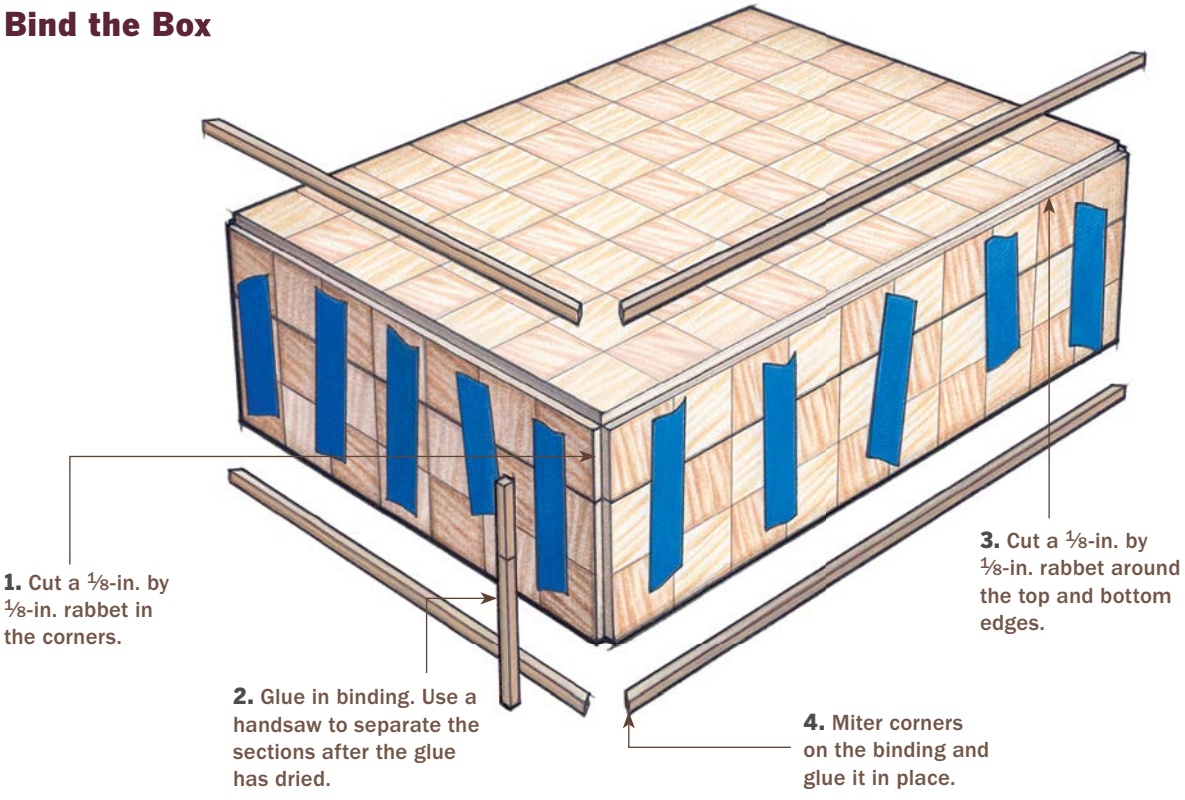
Cauls provide even pressure when clamping.



plane the piece to exactly 1½ in. thick. Now it's ready to be sawn into veneer strips 1/16 in. thick. This box uses 19 strips of veneer: seven for the top and three for each side and end. I prefer to use a well-tuned tablesaw with a clean, sharp, thin-kerf blade because it makes a cleaner cut than a bandsaw.

With the strips of parquet stacked in the order they came off the saw, glue them together edge to edge several at a time. I use a fixture

Bind the Box



consisting of an MDF base and two fences. To keep the strips from buckling, I hold them down with exercise weights. And to apply clamping pressure, I tap opposing wedges in place between the last strip and one fence. As I glue up the strips, I offset every other square to produce the checkerboard parquet surface. The extra squares will get trimmed away later. To assemble large sheets of veneer, you'll have to move one of the fences.

If you've done your work neatly, the veneer sheets will need just a little light sanding or scraping to make sure there's no dried glue on the surfaces.

The parquet determines the box size

The box carcase is very straightforward—¼ -in.-thick solid maple with tongue-and-groove joints for the corners, a groove to hold the bottom panel, and a rabbet to house the top panel. For a box of this size, both the top and bottom panels should be veneered with a core of ⅛-in.-thick birch plywood for dimensional stability.

Figure the exact dimensions based on a top 10 squares long and 7 squares wide, with sides that are 3 squares tall. The oak binding is approximately ⅛ in. thick. So the carcase should be the same width and length as the top veneer sheet; make the carcase 3⁄16 in. taller than the side veneer panels, mainly to account for material sawn away when the box is cut open.

Because the finished sheets may be slightly larger or smaller than their nominal size, measure the sheets before cutting the pieces for the carcase. Don't assume the sheets will be an exact multiple of 1½ in.

Glue plain 1⁄16-in.-thick maple veneer to both faces of the bottom panel, but only

Grooves for binding. With top and bottom sections taped together temporarily, Janofsky cuts a shallow rabbet into each corner to hold the binding—thin strips of white oak.

Corners first. Binding strips are glued into the corner rabbets and held with tape. Janofsky uses a Japanese handsaw to separate the sections after the glue has dried.

Top and bottom next. Rabbets are cut in the top and bottom for mitered pieces of binding. These pieces are cut slightly oversize, then planed flush.

to the inside face of the top panel. Once the veneers have dried, rabbet the bottom panel to create a ⅛-in. tongue around the edge, which will fit in the groove cut in the sides. Cut all the grooves and rabbets on the tablesaw. After all the pieces are cut, sand and finish inside surfaces with shellac and wax.

Glue the box sides together as neatly as possible with the bottom installed; I use a simple jig of scrap wood to hold it square while it dries. When it's dry, plane or sand the corners perfectly flush and clean. Finally, glue the top panel in place.

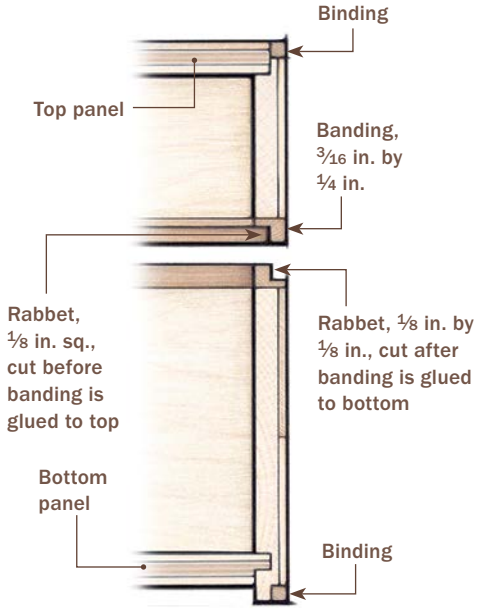
Applying the veneer

With a smaller box, I sometimes apply the veneer to the surfaces before cutting the top from the sealed box. But this box is too large for that because the sides and top will bow under the clamping pressure if not supported on the inside. So, after identifying exactly where you want the top to separate from the bottom, stand the box on edge on the tablesaw and cut through all four sides, making several light cuts until the pieces separate. It's a good idea to mark the parts to keep their orientation.

Then begin applying the veneer. I start with the top of the box. Spread the top with glue and tape the veneer in place securely. Hold the assembly in a press with a cork-faced caul on the inside of the top, or with cauls and clamps on both sides.

When the top has dried, glue the veneer to the sides, first on the top and then on the bottom. Try to keep the parquet squares aligned as perfectly as you can where the top meets the sides and ends. For this part of the work, I use a sort of upside-down caul that clamps into my bench vise and another caul clamped on the inside of the sides.

Opposing Rabbets Lock Bottom to Top



A rabbet meets its mate. Banding, mitered and glued to the lip of the bottom section, will mate with similarly rabbeted banding on the top section. Make a series of light cuts to sneak up on a tight fit.

Binding the box

The last major job entails applying the binding strips to all of the corners and edges and also to the edges where the top joins the bottom. The latter will incorporate two small rabbets that key the halves of the box to each other.

Cut the rabbets on the tablesaw. At the same time, rip the small pieces of binding. (*Binding* means a trim piece that fits in the corner where two veneer sheets meet; *banding* means trim along the edge of veneer.) To allow for any small variations, make the bindings slightly oversize. Once they're glued in, they can be planed flush.

When the corner bindings are in place, cut a rabbet all around the top and bottom for the binding there. These cuts also will trim the ends of the corner bindings. I like to cut and fit the pieces for the opposing sides of the box, mitering the joints with a small handsaw and shooting the miters with a block plane. Once I've glued these in place, I fit the binding in the remaining sides.

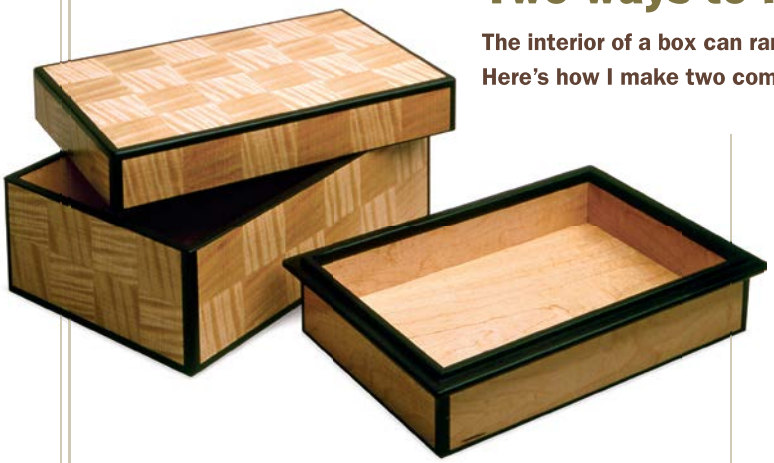
The bandings at the junction of the top and bottom are a bit more complicated. First, make a rabbeted banding about 3/16 in. thick by 5/16 in. wide and glue it to the underside of the top so that the rabbet faces the inside of the box. Miter the ends.

Then glue more 3/16-in. by 5/16-in. banding onto the top of the lower part of the box. These pieces are rabbeted after they've been mitered and glued in place. I make the rabbet on the tablesaw, using a flat-tooth blade. Make a series of shallow cuts until the banding just mates with the rabbet in the top. If possible, leave it a bit tight to allow for final sanding and fitting.

The hard part is over. On a box like this, it's a pleasure to sand the surfaces and edges to a fine polish that invites the touch of a finger and brings out the patterns created by the wood's figure and colors. The final finish can be as simple as a couple of coats of Danish oil and a coat of wax buffed to a high luster.

Two ways to fill a box

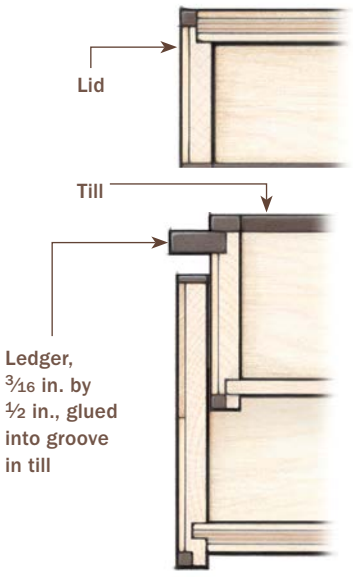
The interior of a box can range from a simple grid to complex, partitioned trays. Here's how I make two common interior fillers.

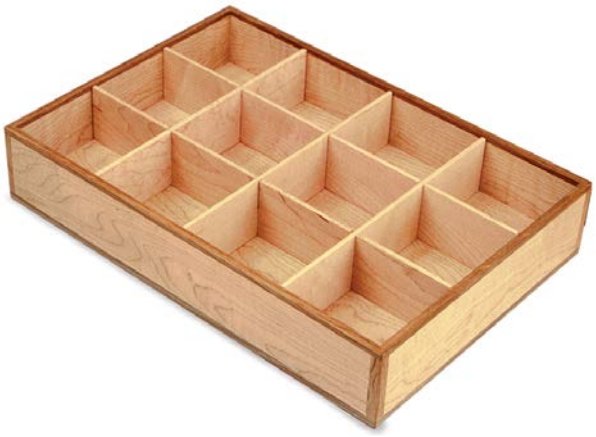


THE TILL

A simple tray, or till, serves as the registration between the two halves of the box. Put mitered edge-banding, about 1/16 in. thick, on the top and bottom sections where they meet. Then, using 1/4-in. stock, make a tray that fits inside the lower section; use edge-banding, as on the box itself. Cut a groove about 3/16 in. wide and 1/16 in. to 1/8 in. deep around the perimeter of the tray, aligned so the edge of the groove just meets the edge-banding around the top of the tray. Into the groove miter a ledger, made from 3/16-in. by 1/2-in. strips of the same wood as the bindings.

TRAY ALIGNS THE TOP AND BOTTOM

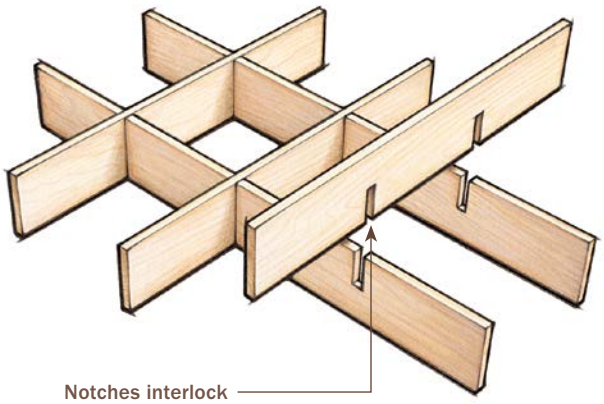




THE SIMPLE PARTITION

To make a grid, mill stock to slightly more than 1/8 in. thick. Using a crosscut sled and a stop block, cut several pieces to fit snugly across the length and width of the box. Then, still using the sled and a stop, cut several notches halfway up each piece. Finally, slide the pieces together.

INTERLOCKING PIECES MAKE A GRID



Pennsylvania Spice Box

STEVE LATTA

When I decided to build a piece to celebrate my tenth wedding anniversary, I had two important goals. I wanted it to be on an intimate scale and I wanted a piece that could be personalized.

This spice box seemed a perfect fit. It's compact enough to sit on a dresser or in an alcove, and it's great for storing jewelry and small treasures of all kinds.

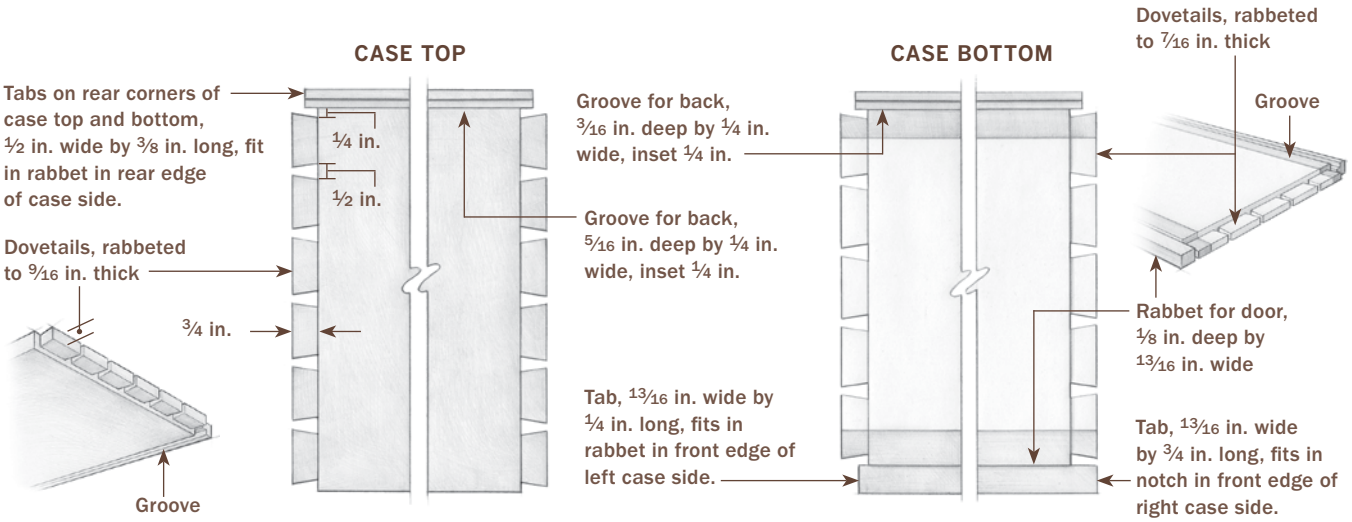
This design is typical of those popular among Pennsylvania Quakers throughout the 18th century. Fitted with banks of small drawers and often hidden compartments, they were displayed as symbols of prosperity. The cases typically were made of walnut, the doors or central drawers veneered or inlaid with combinations of maple, boxwood, holly, cherry, walnut burl, locust, and red cedar.

Dovetailing the carcase. Rabbeting the dovetails makes it easier to lay out the pins and also makes the tails easier to hide with moldings. Clamp a wooden fence onto the router to make the rabbets.

Bury the bit. Pivot the fence into the bit to create a zero-clearance cavity that thwarts tearout. Adjust the fence to cut rabbets of varying depths with a single ¾-in. bit.

Transfer the layout. Mark the appropriate corners of the top and bottom panels (left) and cut them to fit into the side rabbets. Then scribe the pin layouts (right).

An Array of Tabs and Dovetails

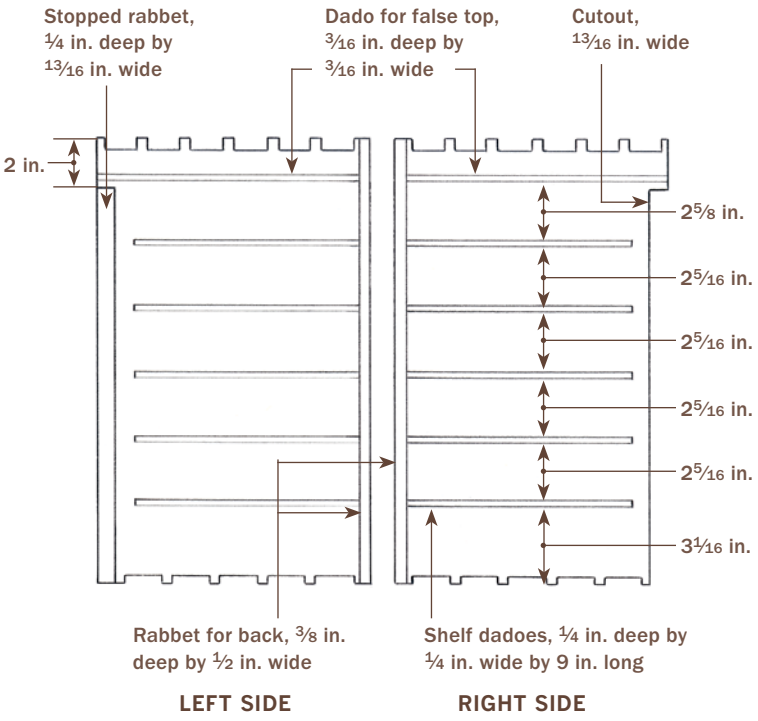


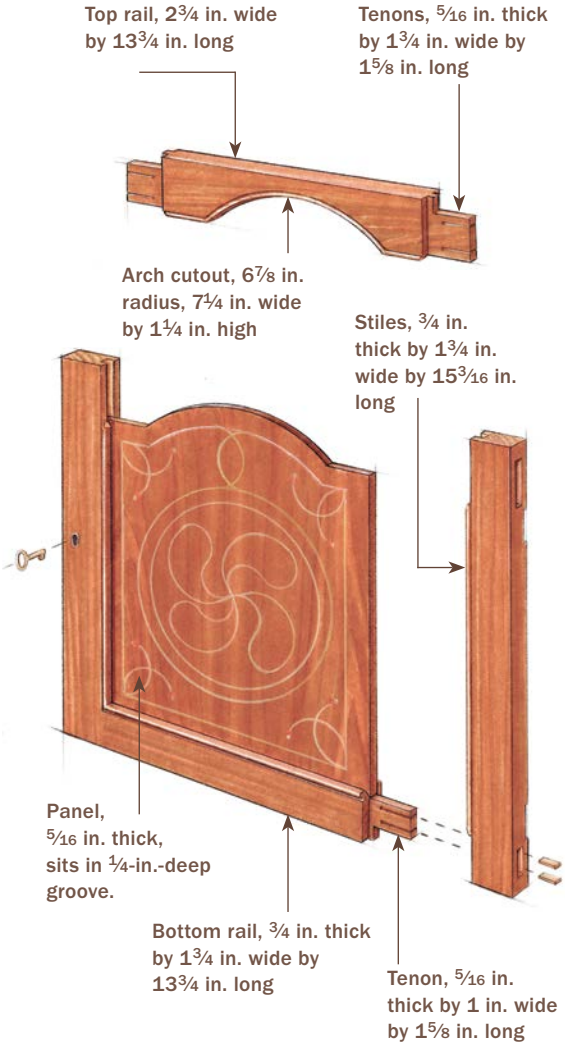
An Intricate Treasure Chest

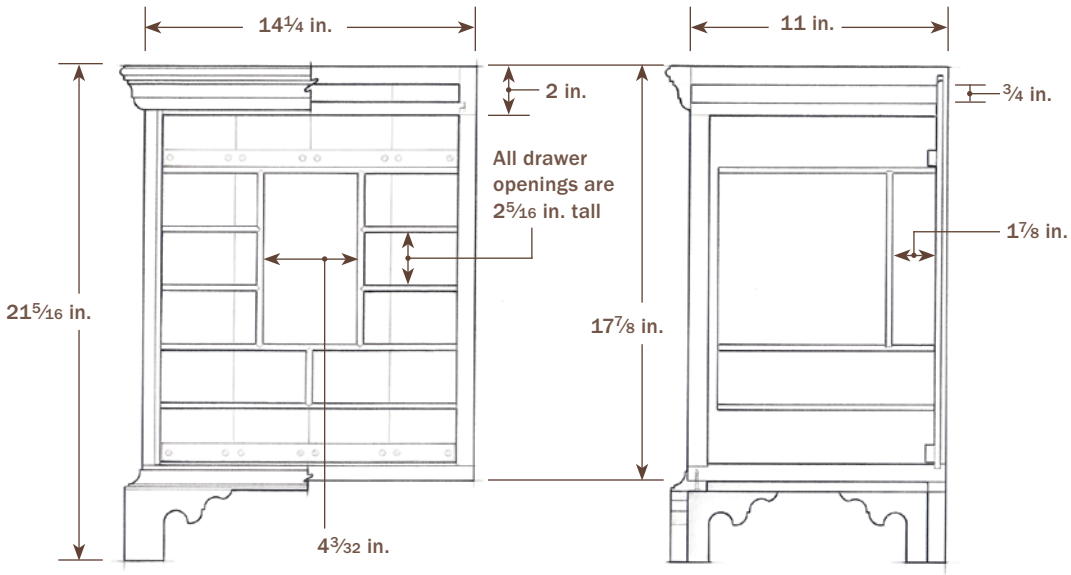
The box houses 11 dovetailed drawers with veneered fronts, and two secret compartments. The case, door, and trim are from a single walnut board. The bottom and interior partitions are poplar, glued up with a walnut strip at the front; the back is ash. Hardware is from Londonderry Brasses (www.londonderry-brasses.com).

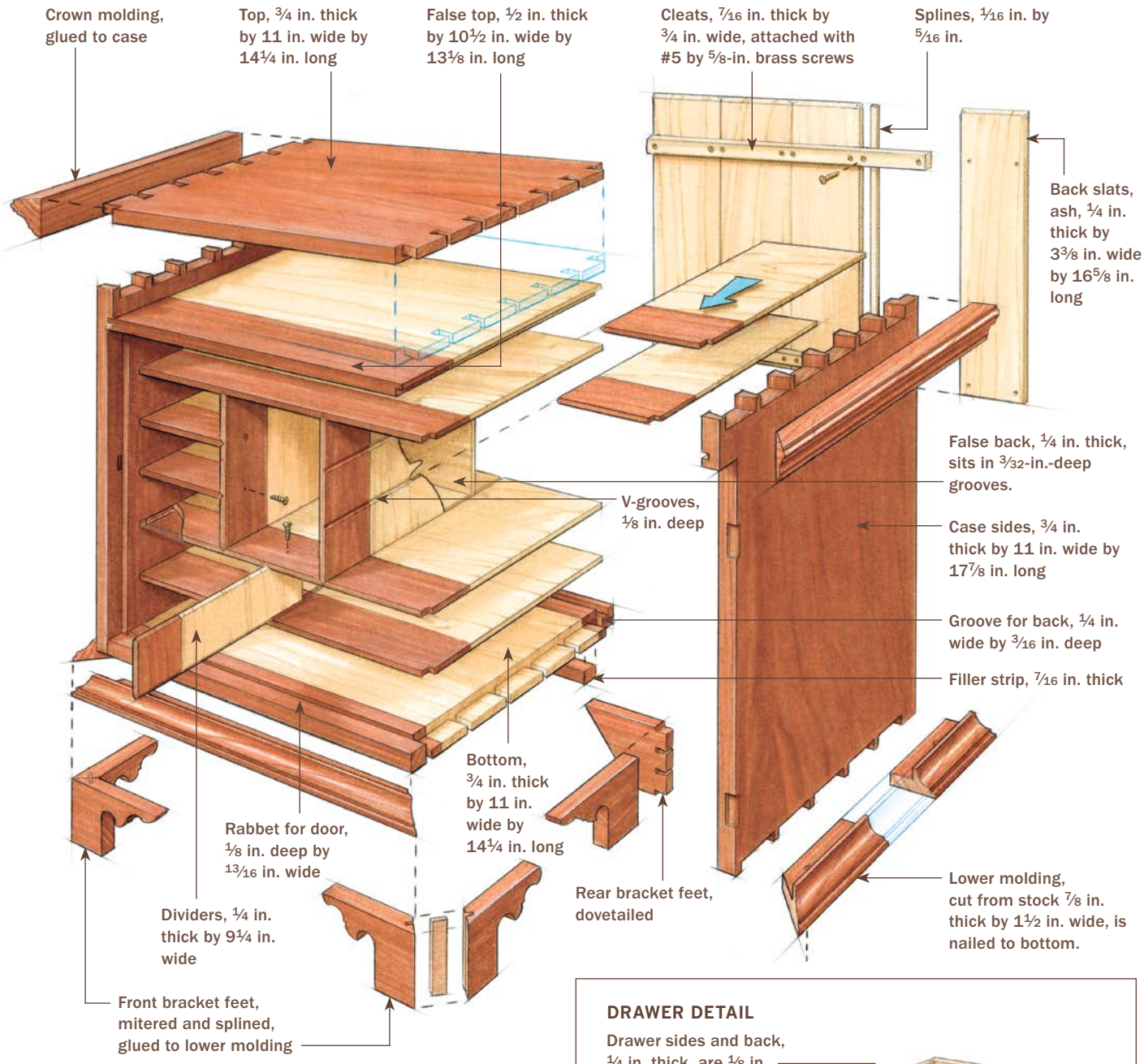
ASYMMETRICAL CASE SIDES

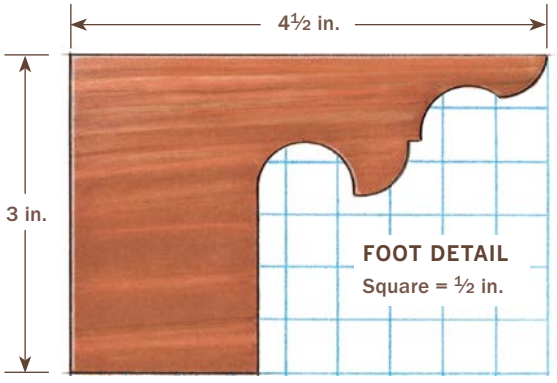
The case sides look very different up front. The door rests in a rabbet on the left side and overlaps a cutout on the right to swing out of the way of the drawers.





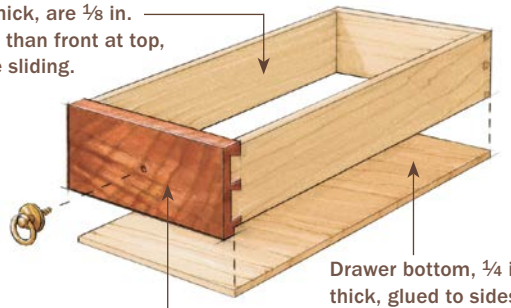






DRAWER DETAIL

Drawer sides and back, ¼ in. thick, are ⅛ in. shorter than front at top, to ease sliding.



Drawer front, ½ in. thick, with veneered face

Drawer bottom, ¼ in. thick, glued to sides and back, is left ¼ in. long in back to act as a drawer stop.

Case assembly. For clean, precise stopped dadoes, build this jig. Its fence mates with the rabbet on the workpiece edge, preventing tearout at the entrance to each dado. A notch in the stop block prevents trapped sawdust from shortening the cut.

Picture of a calm glue-up. Latta leaves the bottom dry-fit while gluing up the top, sparing himself the panic of getting the whole case together at once.

Start with the case joinery

The case is dovetailed and the various rabbets and notches for the door and the back complicate the joinery a little. Lay out and cut the dovetails (but not the pins yet), keeping in mind all those insets and rabbets. Next, mount a ½-in. or ¾-in. straight bit in a handheld router and bury the bit in a fence clamped to the base. Set the router to cut a rabbet that is ⅜ in. deep by ½ in. wide and use this setup to rabbet the rear, interior edges of both case sides. These rabbets will receive the back.

For the front of the case, you now need to cut a stopped rabbet on the interior of the left side. When closed, the lock side of the door will fill this recess, which should be ¼ in. deep by 13⁄16 in. wide. Adjust your fence and bit depth, then cut the rabbet, stopping 2 1⁄16 in. from the top. Don't square the rounded end of the rabbet just yet. The squared end should be trimmed flush with the bottom of the false top, so wait until you've fitted the false top before taking this step. On the hinge side, the door sits in a notch 13⁄16 in. deep that stops 2 1⁄16 in. from the top.

The next step with the router is to rabbet the dovetails. Reset the router fence to cut the length of the tails. For both pieces, be sure to rabbet only the dovetails, not the notches in front and back. Before transferring the tail layouts to the end grain of the pin boards, trim the tabs at the rear of the top and bottom pieces so they fit into the side rabbets for the back. Also trim the front tab on the bottom to fit in the left-side rabbet for the door (see "An Array of Tabs and Dovetails" on p. 43). Cut the pins.

Next, along the inside edges of the top and bottom, cut the grooves to receive the back panel. Cut the groove in the bottom ¼ in. wide by 3/16 in. deep. The top groove should be slightly deeper—5/16 in.—to facilitate the back panel sliding up and dropping into the bottom groove. This can be done with the router-and-fence setup or with a dado blade.

With that, all of the main carcase joinery is cut and the pieces are rabbeted and notched to accommodate a back and a door. But before glue-up, you need to start on the interior of the case.

Prep the case for the partitions

Inside the case, lightweight and delicately joined partitions create space for 11 drawers and two secret compartments. The first of these—a hidden file space ¾ in. deep—is created by a false top hidden behind the crown molding. The false top should be crosscut to length but left wide until after its joinery is cut. To hold it in the case, use a router to cut a through-dado in each case side, 1½ in. from the top. Crown molding will cover these. Using a dado blade buried in an auxiliary fence, cut a notch along the ends of the false top to fit into the dadoes.

The horizontal drawer dividers are joined to the cabinet sides with stopped dadoes ¼ in. wide by ¼ in. deep. These dadoes should stop 5/8 in. back from the front edge on the hinge side and the rabbet on the lock side. I cut these using a router jig that stops the cut and eliminates blowout along the back edge.

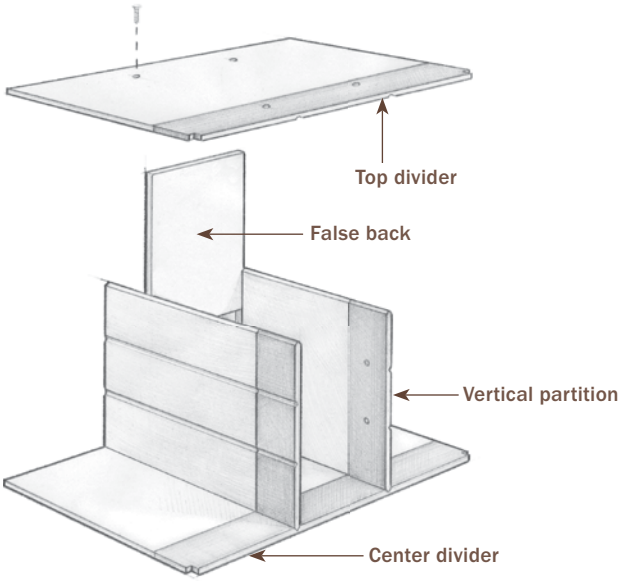
Once the dadoes are cut, glue up the case with the false top.

Partitions. Cut partition joinery on the router table. Set up a 90° V-groove bit to cut halfway through the stock's depth. The widest part of the groove should match the stock's thickness. Next, bury the bit in the fence to chamfer the mating ends, which should come to a point that is centered on the stock.

A preventive measure. The partition joinery will be secured in several places with wood screws. Before installing the partitions, predrill and countersink the screw holes to avoid splitting the stock.

Preassemble the Central Gallery

Because the false back is captured by grooves on all four sides, you must preassemble the central gallery and slide it into place in one piece.



Partitions slide in from the back. Latta dry-fits the interior, fitting the pieces to one another, then removes and prefinishes the pieces before final assembly. Screws hold the assembly together.

Fitting the central partitions

The lightweight partitions are joined to each other with chamfered ends fitted precisely into shallow V-grooves. These V-joints, combined with the stopped dadoes, allow everything to be slid into the case from the back. The divider fronts are slightly rounded over and these roundovers meet seamlessly at the V-joints.

Leave the partitions wide until all of the notches, V-grooves, and front details are completed. Start by cutting the three main horizontal dividers to length. This dimension should be the side-to-side distance between shelf dado bottoms, minus 1/32 in. to make them slide easily. Next, cut V-grooves into the faces of these dividers to accept the vertical partitions that run between them. Use a 90° V-groove bit mounted in a router table, riding the partitions against the fence. The bottom of the V-groove should be exactly halfway through the stock. If you have a little flat at the groove bottom, use a chisel to bring it to a point.

Now slide the three dividers into their respective dadoes and measure for the length of the vertical partitions. When you cut these partitions to length, leave them a little long.

Next, bury the V-groove bit in the fence and set it to chamfer precisely halfway through the end of the partition stock. Chamfer the bottom and top edges of the vertical partitions to a point so they fit into the V-grooves in the three main panels. Slide the partitions into their slots and, using a straightedge, check whether the horizontal partitions are bowed. If so, shorten the verticals with a light pass of the block plane and rechamfer. A good fit is critical.

Each of the long vertical partitions now needs a pair of V-grooves to accept short horizontal dividers. Lay out the grooves to align with the side dadoes and cut them using the V-groove bit in the router table. Slide the partitions back into the case.

Determine the length of the short horizontal dividers by measuring from the bottom of the V-grooves to the bottom of the dadoes cut into the sides. Cut these dividers to length and chamfer the inside edges. Next, notch the ends of the horizontal partitions to fit over the ends of the stopped dadoes in the case sides. This creates a nice, clean termination of the partitions into the sides. Mark the notches with a chisel or knife and cut them with a handsaw and chisel.

Once everything fits, use a 5/16-in. roundover bit and a router/router-table setup to round the front edges of all of the partitions. Use only a small portion of the cutting edge to apply a shallow roundover. This makes for a really clean look.

You can now cut the partitions to width on the tablesaw.

Fit the hidden compartment

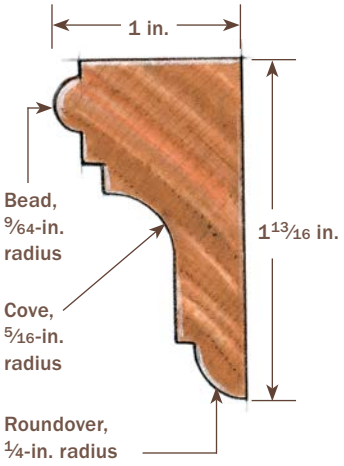
A small box, accessible only from the back of the case, fits behind the large central cavity. Consequently, a false back made from ash, the same material as the real back, needs to be fitted in that section. Using a 1/4-in. straight bit chucked into a handheld router with an auxiliary fence mounted to the base, cut a groove to receive the false back. It is cut on the inside faces of the two main vertical dividers and between the two V-grooves on the top two horizontal dividers. Size a cutoff from the back to fit into the recess.

Next, screw all of the partitions and dividers together using #3 or #4 by 5/8-in. wood screws. Predrill and countersink to avoid splitting. Small nails would work great also.

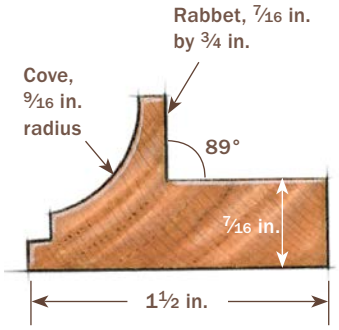
At this stage, you should have a box and its false top glued together. All of the internal dividers are dry-fitted and cut to the right depth, with their front edges nicely detailed.

Attach the crown molding. Cut a shallow V-groove along the molding's bottom edge to capture excess glue and reduce squeeze-out. Molding cutoffs serve as cauls to create a square clamping surface.

Crown Molding



Base Molding



The cove molding is notched. The lip provides a nailing surface for attaching the molding from underneath. Make the first tablesaw cut a degree out of square for a snug fit against the case.

Making the back

The back is made from four ¼-in.-thick ash slats with chamfered edges, splined and battened together. Cut a shallow groove, about 3/16 in. deep, in the edges where the boards meet, using a 1/16-in. tablesaw blade. After the panel is glued up, use a block plane to cut a chamfer along the inside of the top edge of the back panel. This chamfer allows you to lift and tip the back panel into position and then drop it into the lower groove.

Making the crown molding and feet

I copied the crown molding from an 18th-century box, using a shaper and a cutter I ground to match. The molding can also be made with a combination of router bits.

The cove molding at the bottom is made from stock measuring 7/8 in. thick by 1½ in. wide. Using a cove cutter mounted in the router table, scallop out the top of the molding. Cut the fillet next, using a slot cutter

Bracket feet. The front feet are mitered. For glue-up, place a piece of 2-in. packing tape over the outside of the joint (above top). Pretreat the end grain with a light layer of glue. After adding more glue and folding the miter together, insert the spline (above bottom).

Clamp the assembly. Latta uses a wide, double-wrapped rubber band to clamp the assembly. He uses the negative-image offcuts from the scrollsaw as cauls for gluing the feet to the cove molding.

with the tip buried into an auxiliary fence. Following this sequence reduces the likelihood of tearout.

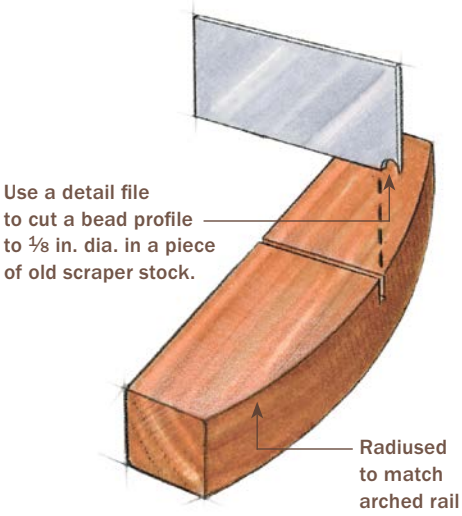
This molding needs to be notched so that it covers the lower dovetails and lips underneath the case. Glue a filler piece measuring 7/16 in. thick by 1 in. wide along the lower back edge of the case between the moldings. It provides a level surface for mounting the feet.

The flat bracket feet are made from ½-in.- to ⅝-in.-thick stock that's 3 in. wide. I prefer to use a straight grain that brings the eye to the center of the piece. The front feet are made from sequentially sawn pieces that are mitered and splined. Cut the groove for the spline on the tablesaw using a 45° block mounted to a miter gauge. Cut the spline from ⅛-in. stock whose grain runs parallel to the grain orientation in the feet. After the miter joint is cut, lay out the foot detail and cut it out on the scrollsaw. The rear feet are dovetailed. I broke from tradition and used primary wood for the rear return because the back of the chest would be visible. After the four foot glue-ups are dry, glue them to the lower cove molding, making them flush to its front edge.

Making the door

Mill the door stock in stages and leave the stiles and rails a couple of inches overlong and at least ¼ in. to ⅜ in. extrawide, even after reaching final thickness of ¾ in. Cut the arch in the approximate center of the top stile. Lay out the curve and cut it with

Shopmade Beading Tool



Arched door. This scratch stock is built for curves. The block is shaped to match the radius of the door's arched top. Stop the bead short of the corner and clean it up with a chisel.

Miter the beaded corners. A simple cutting guide makes it easy to pare the corners cleanly at 45°.

a bandsaw; clean up the sawmarks with a card scraper.

The straight inside edges of the door frame are beaded first—on both the inside and outside faces. To cut the beads, I use my slicing gauge and define the inner line on all of the components; then I use a detail file to rough in the radius on the edges. I use a shopmade scratch stock to define the bead. With a white-lead pencil, mark what will be the top of the bead and scrape only until the lead disappears. This helps guarantee an even bead without too many high or low spots.

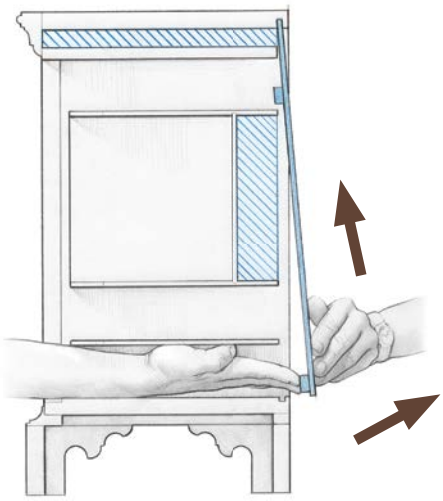
For the arched rail, bead the flats on both sides of the arch, being careful not to run all the way to the corners. Remount the scratch stock into a block of wood radiused to match the curve in the rail and bead the arches. Using a chisel, small knife, gouge, sandpaper, or other means, blend the corners together on the arched piece.

Once all the edges are beaded, cut the pieces to final length and width, keeping in mind that the door is oversize and will be taken to dimension later. Lay out and cut the 5/16-in. through-mortises, centered along

Sturdy frame for a picture-perfect panel. The door's inlaid panel slides into a frame joined with mortises and wedged through-tenons.

Revealing Hidden Compartments

Remove the bottom drawer and reach through the opening to slide the back upward. When it clears the lip of the lower groove, it tilts away from the bottom and out of its housing.



Hidden treasure. Both hidden compartments are accessed from the back of the box. The shallow space above the false top conceals documents. The deep box in the alcove can hold small valuables.

the thickness of the stock, leaving about 7⁄32 in. on each side. Next, plow a ¼-in.-deep groove the same width as the mortise along the internal edge of the stiles and rails. I use a slot cutter on a router table, clamping on an auxiliary fence and making sure the tip of the cutter is buried in the fence where it would make contact with the stock. I shaped another auxiliary fence for the arched portion of the top rail, setting it up so it was also just ¼ in. deep.

I cut the tenons on the tablesaw and handpared the internal miters using a guide block. Because the groove is deeper than the ⅛-in. bead, do a sample to figure out the quirks. The tenons need a ⅛-in. haunch to fill the groove. Because it is such a small door, I did not bother angling the haunch in, as I would on larger doors. Cut the tenons for wedges and, with the door dry-fit, turn to the panel.

Once the inlay is done, glue up the door. Because of all the miters and the need to fuss a little, use white glue and take advantage of its extra open time. With the door clamped, make sure it is flat, pound in the wedges, release the clamps, and let the door dry.

Size the door to the opening, mortise in the lock and hinges, and hang it in the case. I typically line up the hinges with the rails. To calculate the location of the lock mortise, use machinist's blue/white correction fluid on the end of the bolt. With the door closed, turn the key, forcing the bolt against the case side. Cut the mortise with a small chisel. To finish the case, door, and drawer fronts, I padded on several coats of garnet shellac.

A Unique Cutting Board

SCOTT LEWIS

When I was asked to make a cutting board as a special gift, I wanted to do something new and eye-catching. Tired of squares and straight lines, I envisioned curving accents—not shallow inlay, but strips extending through the full thickness of the board so they would be visible on the top, bottom, and both ends. I drew some flowing S-curved lines, and one soon overlapped another. I liked the way they looked, but I thought, how am I going to make all the curved pieces nest together perfectly?

When I broke the process down, it was actually quite simple. I make the through-inlays as bent laminations: Each accent line is made of thin, flexible strips sandwiched together to look like a solid piece of wood. The critical step is getting the solid parts of the cutting board to fit together. After routing a shallow groove in the blank using a curved template, I bandsaw most of the waste from the groove and use a flush-trimming bit to remove the rest from each half. When I add the inlay strips, the curves match exactly.

Although the three lines of through-inlay in my cutting board differ in thickness and appear to have different shapes, I use a single template to do all the routing required to establish their paths. I trim the inlays flush

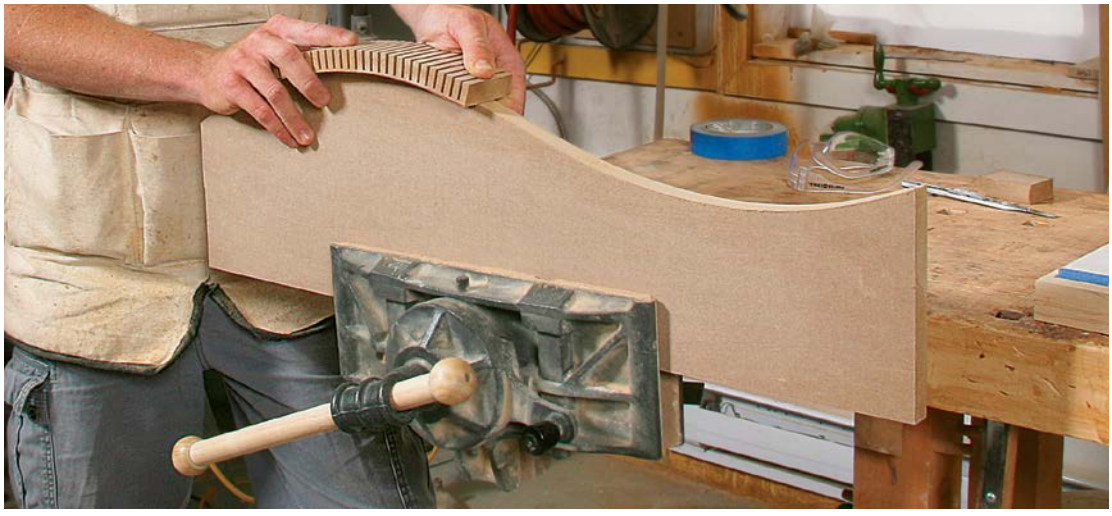
once they are glued in. So far, I've used the technique only on cutting boards, but I can also imagine using it on chair backs, box lids, or cabinet doors.

One template guides the routing

I create the through-inlays one at a time—gluing in the first one, then trimming it to length and flushing it off before beginning work on the second. I use different diameter router bits for each inlay, but just the one router template. By flipping the template and moving it laterally, I get different results for each line of inlay.

Thin strips make sweet curves. Lewis uses sandwiches of ⅛-in.-thick strips to create the S-curved stripes that pass through the entire board.

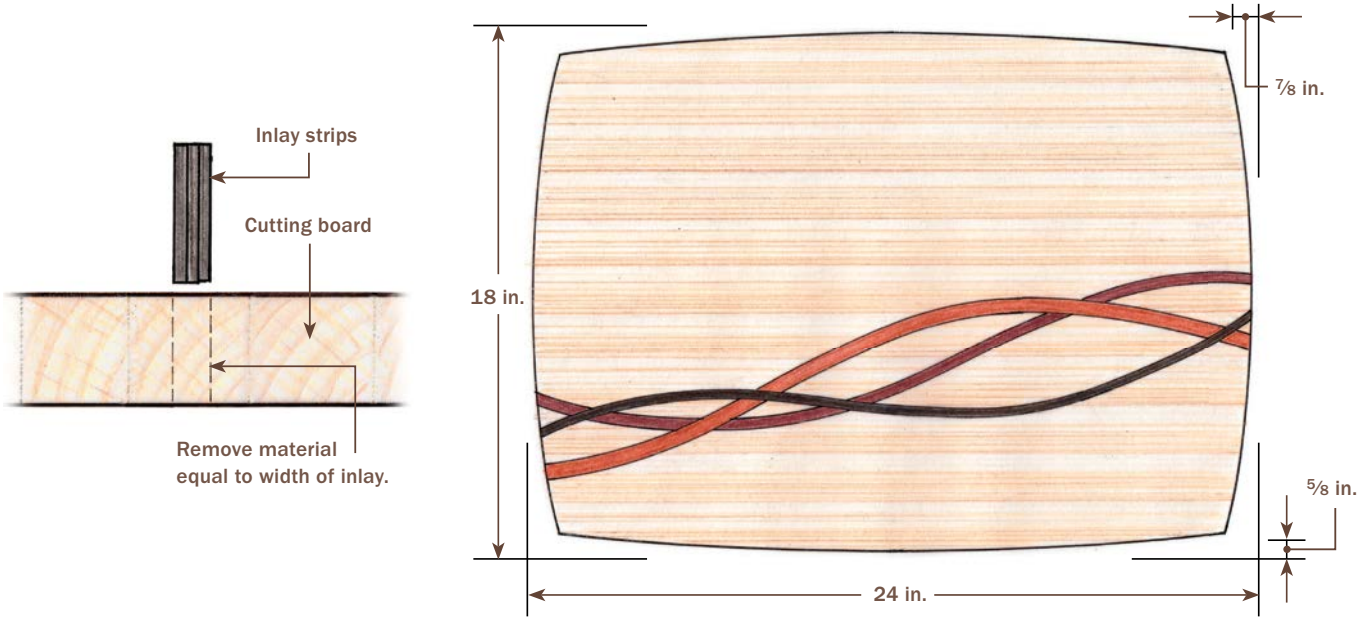
Sketch a pleasing curve. Lewis begins by sketching an S-curve freehand on the cutting-board blank (far left), keeping it roughly parallel with the grain. He transfers the curve to tracing paper (near left), which he tapes to ¾-in. MDF and bandsaws out to make a template.



Make it smooth. Fairing the template's curves is vital because any bumps could be visible in the inlay gluelines. Lewis used the tablesaw to cut slots in a piece of MDF, creating a pliable sanding block that conforms to convex and concave curves.

Make Room for the Inlay

By routing away the same amount of material he is adding, Lewis ensures perfectly mating curves and tight gluelines. It's vital to start with a blank that's dead flat so that everything goes back together properly.



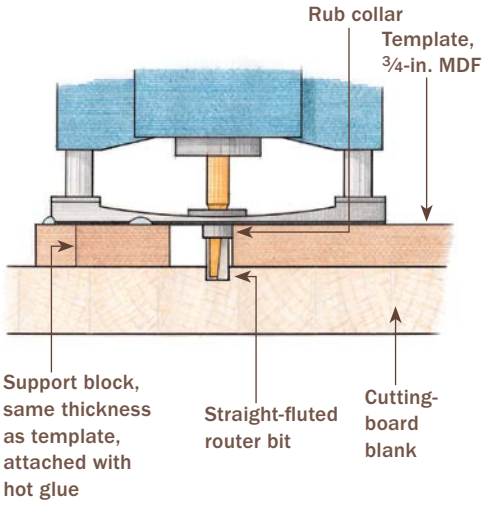
Varying the inlay thicknesses yields a more interesting pattern. You need a different router bit for each thickness you want to include.

To design the curves, I sketch freehand right on the cutting-board blank, keeping in mind that I will have to bend the strips to that shape, so the curves can't get too crazy. And to avoid problems with wood movement, I keep the inlay curve roughly parallel with the grain of the cutting board.

When I have a curve I like, I transfer it to a piece of tracing paper cut to the size of the cutting-board blank. Then I tape the paper to a piece of ¾-in. medium-density fiberboard (MDF) and bandsaw along the line. So that the router will be supported at the beginning and end of the cut, I make this template several inches longer than the cutting board.

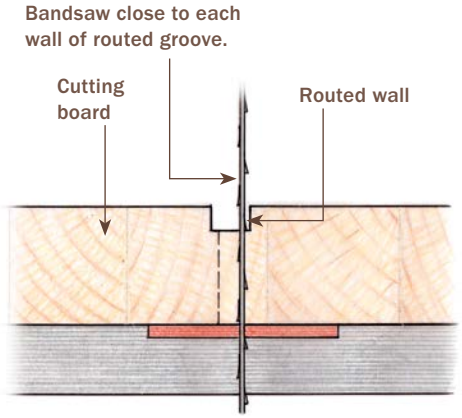
For tight gluelines, the curves of the template must be free of bumps and dips, so I bandsaw carefully and sand with a flexible sanding block. If you mess up a template, you can try again with the offcut.

1. Rout a Groove



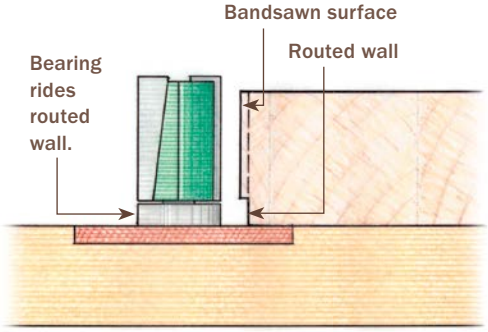
Route. Template-routing a ¼-in.-deep groove creates smooth, accurate reference edges for the next steps. Get to final depth in multiple passes.

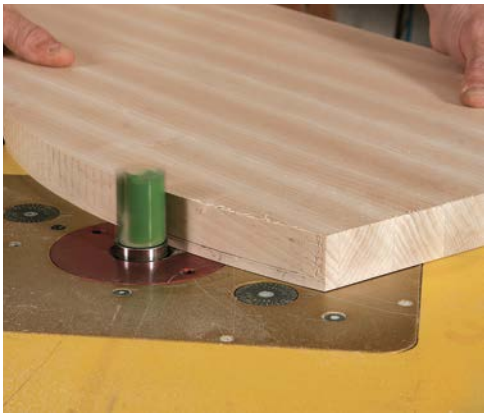
2. Saw out the Center



Saw. Before sawing, Lewis darkens the corners of the groove with a pencil for visibility. Then he carefully bandsaws the waste, staying 1/16 in. away from each wall of the routed groove.

3. Finish with a Flush Cut





Flush cut. Placing the workpiece groove-side down on his router table, Lewis flush-trims the bandsawn surface with a 1-in.-dia. straight bit, guided by a bottom bearing.

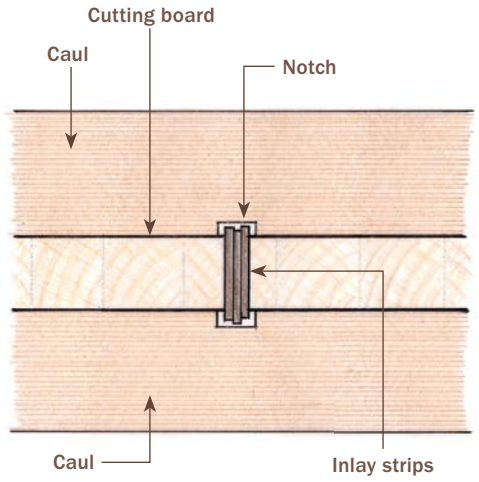
Dial in the thickness. Lewis uses Melamine®-coated MDF as an auxiliary bed (left) to keep the thin strips from getting chewed up in the planer, bending the strips to create downward pressure at the point of the cut. A straight groove cut in a piece of scrap (above) tests the pack of strips for a perfect fit.

This glue-up takes some guile. A quick-grip clamp, with its pump action and long travel, is ideal for making the flat strips conform to the S-curve.

To prevent the router from tipping while using the template, I hot-glue a ¾-in.-thick piece of scrap to the router base. I rout the paths for the through-inlays in a number of shallow passes. When the groove is about ¼ in. deep, I bandsaw first along one wall of the groove and then the other, leaving just a bit of waste to clean up on the router table.

If you push the halves of the cutting board together now, the curves won't match. Add the through-inlay—which is exactly as thick as the routed groove—for a perfect match. I make the individual inlay strips ⅛ in. thick, and they flex easily around the curves. I cut them about ¼ in. wider than the thickness of the cutting board so that during glue-up they extend slightly above and below the board. I also cut the strips over length by about 6 in. This allows me to cut off any planer snipe. Even minimal snipe is noticeable when a number of strips are stacked together.

Glue It Back Together



Hold it flat. Cauls with shallow notches center the inlay strips. Lewis uses a deep-reach clamp to adjust end-to-end alignment of the cutting board's halves.

Verify the alignment. Before putting on the final pipe clamps, Lewis uses a notched piece of MDF to make sure the halves are lined up perfectly.

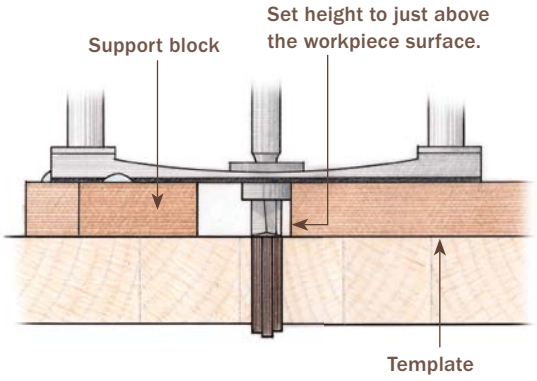
Add variety with pin stripes. For a jazzy alternative, try adding thin commercial veneers between each of the thicker strips.

Interesting assembly

Having sliced your cutting board apart, you may look at the two halves and think, "What have I done?" Not to worry; with the right clamps and clamping cauls, the whole thing will come back together. The glue-up is a bit of a challenge, though, since you have to clamp in three directions.

I glue up the cutting board on a flat bench and use shopmade cauls that have notches to accommodate the inlay. I use a quick-grip-style clamp to bring the halves most of the

A Few Steps to Smooth Strips



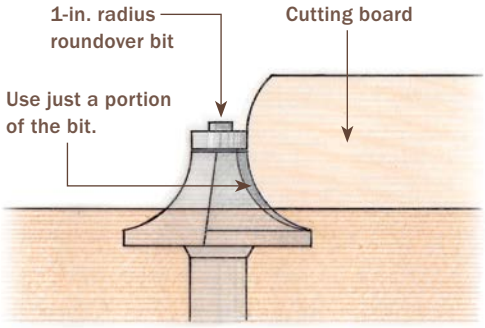
Smooth and repeat. After cutting the end of the inlay flush with a handsaw, Lewis uses a router (above) to get it close to flush with the surface. Then he uses a card scraper (inset) for final smoothing.

Repeat for additional strips. With the first strip glued in and flushed off, Lewis starts the process for the second strip. After repositioning the template on the cutting board, he routs a new groove (above left), bandsaws away the waste, and flush-trims it on the router table (top). He clamps the new curve (above), and when that is all glued up and scraped flush, he repeats the process for the third strip.

way together, squeezing the stack of inlay strips to the curved shape. I then add pipe clamps with light pressure to close the joint. Next, I tighten clamps on the notched cauls that hold everything flat and push the inlay strips into place. As I tighten the pipe clamps, I check that the ends of the halves line up.

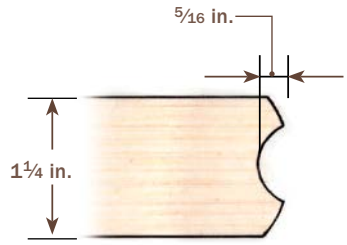
After glue-up, I use a handsaw to cut the inlay to length, then rout it and scrape it flush. Then I start the process over to add the subsequent inlay strips.

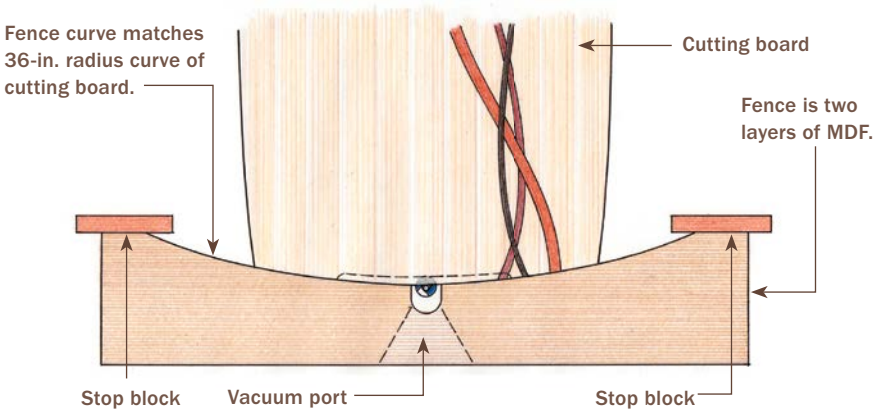
Shape the Profile



Soft edges. After bandsawing and smoothing the cutting board's curved perimeter, Lewis gives the edges a shallow radiused profile (left). He uses the top section of a 1-in. roundover bit, taking light passes (above).

Add Finger Grips





Finger grips in a curved surface. To rout the finger grips on the curved ends of a cutting board, Lewis makes a curved fence for the router table. He uses a ¾-in. edge-fluting bit and takes multiple shallow passes. He controls the length of the finger grip by adding end stops to the fence.

When I've finished the inlays, I bandsaw the sides of the cutting board to gentle curves and sand them smooth. Then I give the edge a radiused profile and cut finger grips into the ends.

I sand all surfaces with P150 grit, and sand the end grain to P220. Before wrapping this gift and mailing it off, I coat it with my favorite food-safe finish—mineral oil, which never goes rancid and is easy for the owner to maintain.

Two-Sided Standing Frame

CHRISTIAN BECKSVOORT

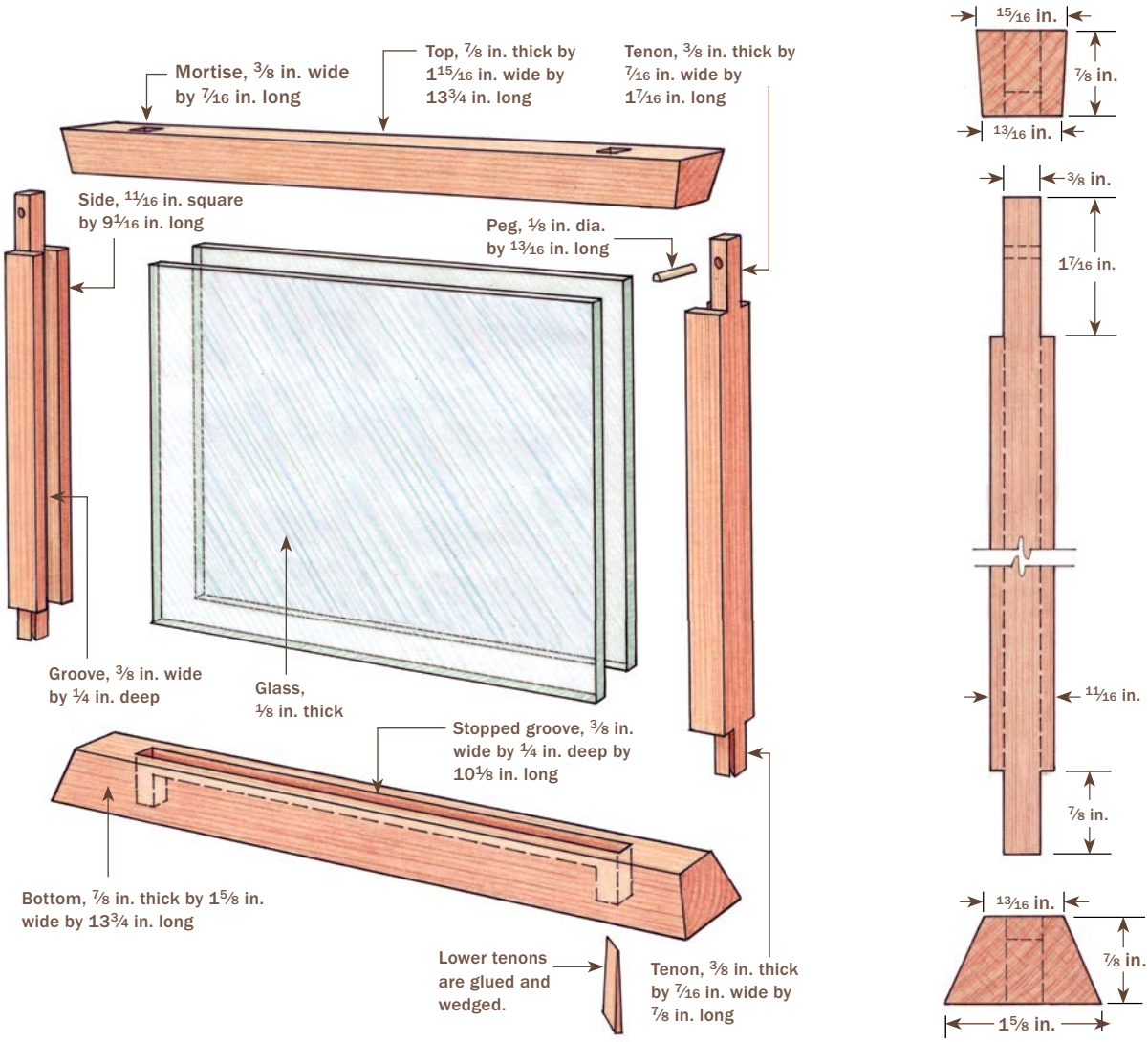
I have a black-and-white woodcut print and a piece of needlepoint that are dear to me. Since wall space is limited in my house, I decided to make a free-standing frame to display them. Both pieces of art fit in the same frame, one on each side facing out, and the frame can be placed on a tabletop, shelf, 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

Simple Anatomy

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



Installing artwork is a breeze. When your frame is complete you'll be able to sandwich the art between two glass pieces and slide the package into grooves in the bottom and sides (left). The mortised and grooved top will fit onto the sides (middle) and dowels will lock it all in place (right).

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 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 table-saw 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 too 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 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 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.

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.

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.

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 on p. 68) 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.

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.

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 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.

Build a Greene-and-Greene Picture Frame

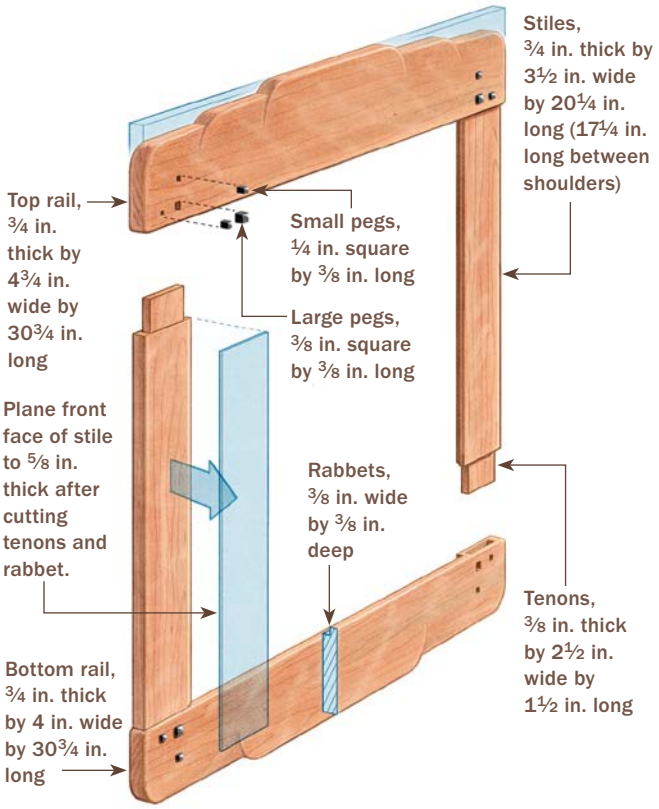
KELLY J. DUNTON

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 Joinery

Beefy tenons make this frame stronger than the mitered joints of a typical frame. Leave the pieces square while cutting the joints. Then add the curves, carving, and pegs.



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.

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.

Rail rabbet is stopped. If it weren't, you would see it on the outside of the frame. But it's easy to do. To start 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.

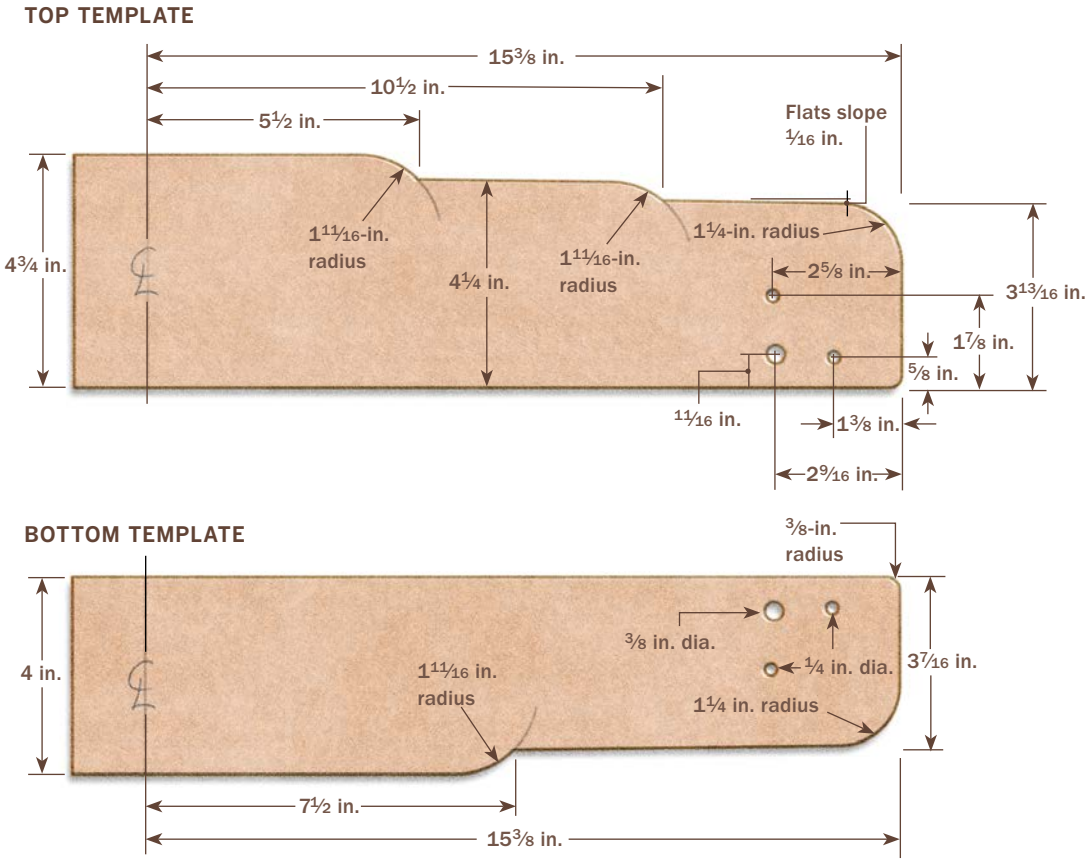
Cut the joinery before the curves—it's easier to work on square pieces. I used a hollow-chisel mortiser to cut the mortises on the rails first. Then I cut the tenons on the stiles at the tablesaw using a dado blade and used a shoulder plane to fine-tune the fit of the tenons. The rabbet runs the entire 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 ⅜-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 ⅛ 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.

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.



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 ½-in.-thick medium-density fiberboard (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.

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-faced 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 the photos on pp. 74–75).

While the templates are on the top faces, use drill bits—Forstner®, if possible—as transfer punches to mark the centers of the

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.

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.

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

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

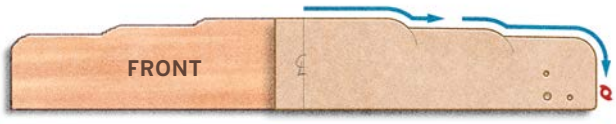
The shallow carving around the cloud lifts extends the line of the curve into the rails, and adds a three-dimensional look to the surface. Start the carving by placing the largest can on one of the inside curves on the frame. Scribe around the can with a marking knife to sever the wood fibers.

Lay out the curves. Mark the profile on both sides of the rails, and bandsaw the curves. Stay about ⅛ in. to the waste side.

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

Four Flips, One Template

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



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 ¼-in. and ⅜-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.

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 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've found that the pillowing looks much better if you start with a pyramid-like profile. 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.

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.

Round all the edges. Round over all edges with a router and a ⅛-in. roundover bit. But avoid the shoulders of the stiles.

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 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.

Relief carving. The same can used to make the templates extends the curves onto the frame and guides the carving. Line up the can on the profile and continue the curved line. The knife line gives the paring cuts 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 "Supplies," below).

Supplies

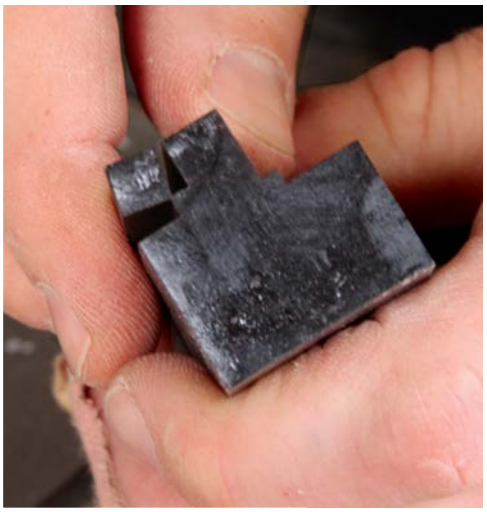
WWW.LEEVALLEY.COM

Hollow-chisel mortising bits, ¼ in. and ⅜ in.

Square hole punches, ¼ in. and ⅜ in.

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. 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 will snap away cleanly by hand afterward.

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.

The final payoff. After assembly the frame was finished with a washcoat of shellac and Minwax antique oil finish.

A Chessboard Made Easy

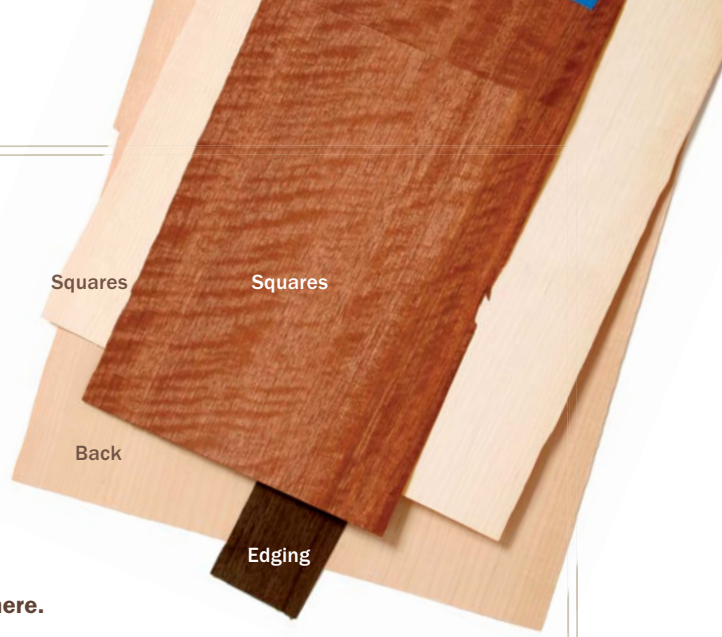
CRAIG THIBODEAU

At some point in your woodworking life, you'll probably make a chessboard. The classic parquet pattern adds fun and function to an ordinary table. And a stand-alone chessboard makes a great gift.

If you haven't worked with veneer, you may be tempted to make your game board from thick squares of solid wood. Don't. You'll have to contend both with wood movement and weak end-grain joints. Veneer is much easier to cut accurately and is easy to apply to a stable medium-density fiberboard (MDF) substrate. Also, veneer is available in hundreds of beautiful species and grain patterns. By the way, the following technique works for other parquetry patterns, too, such as diamonds.

Standard chessboard squares range from 2 in. to 2½ in. sq., but you can size the squares to fit the chess pieces you have on hand.

A short list of supplies



VENEER

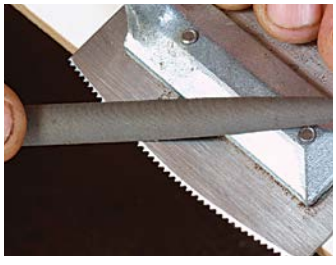
Standard commercial veneers work great for this project. For the 2-in. grid you see on the facing page, you'll need two pieces of contrasting veneer, each about 10½ in. wide by 18½ in. long. If need be, you can cut the strips from a narrower stack of matching veneer. For a more decorative pattern, try alternating the grain direction of one color. Use an even darker wood for the banding at the edges and don't forget to veneer the back to prevent the panel from warping. Any species will do there.

TAPE

For initial assembly, you'll need blue masking tape. It has some stretch to it, so when you pull on it as you apply it, it draws the pieces together tightly. It also peels off easily. Moisture-activated veneer tape goes on next and stays on until the veneer is applied. I prefer the wide, thin variety (34-gram, 50-mm veneer tape; from www.veneersystems.com), which covers more ground and is easier to remove after your panel is done and dry.

VENEER SAW

You can use a razor knife or a sharp veneer saw to do the cutting, but I greatly prefer the veneer saw because it cuts quickly and doesn't tend to follow the grain of the veneer and wander off the cut line. Veneer saws are inexpensive, but they require a quick tuneup (see the photos below) with a fine file. It takes only a few minutes and then you are ready to make perfect cuts.

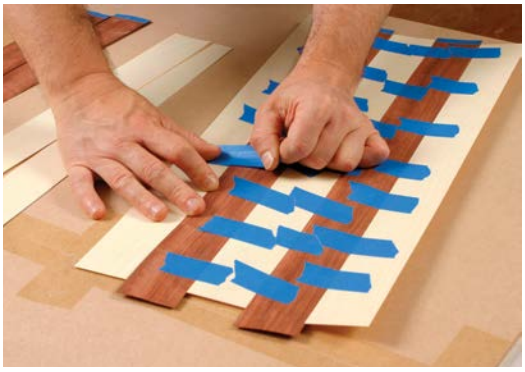


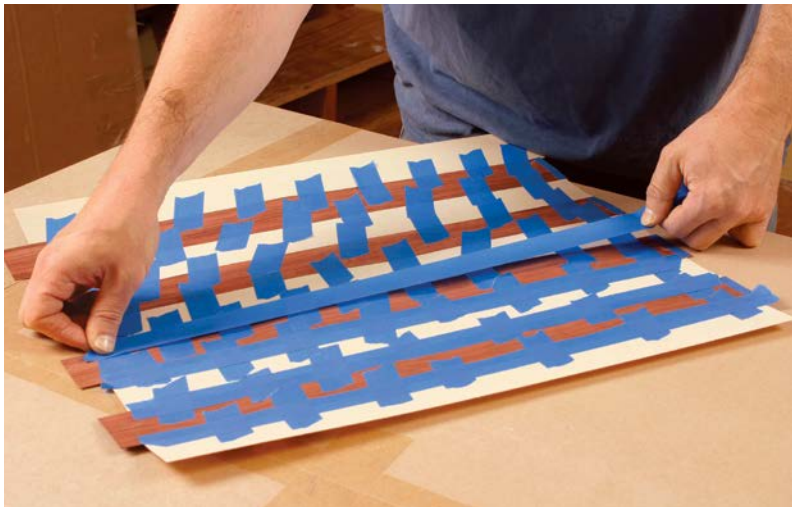
Quick tuneup. First, sharpen the teeth with a fine file (above left), following the angles already established. Then bevel the outside edge (above right) to bring each tooth to a sharp point. Last, knock the burr off the back.

Straightedge doubles as a template. Make a plywood guide exactly as wide as your desired squares, and use it to guide a sharp veneer saw. Glue sandpaper on the bottom to keep the guide from slipping. For each new strip, line up the guide with the edge you just cut, and simply saw along the opposite side.

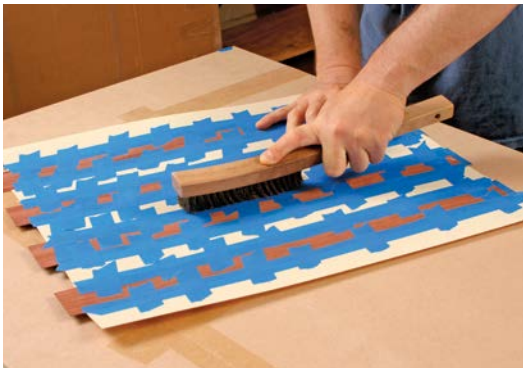
Veneer taping 101

Because of the V-groove that a knife or veneer saw leaves behind, it's important to keep track of your *glue face* and *show face*, as they are called. When cutting the veneer, keep the glue face on top, which guarantees that the lower edges of all of your cuts meet cleanly on the opposite show face. And generally, as you assemble any veneer pattern, you bring the pieces together by using blue masking tape on the glue face, and then thin moisture-activated veneer tape goes on the show face. When the veneer tape is dry, you peel off the masking tape and you are ready to apply the veneer to a substrate.





Tape the strips together. Use blue tape to pull the strips together tightly (above) and then tape each seam (right). Alternate four of one color with five of the other; it doesn't matter which.



Burnish for a better bond. Here's a tip for both blue tape and veneer tape: Burnish them with a brass-bristle brush after applying, and they will hold much better.

Simple jig ensures accuracy

Start by making a straight block of hardwood or plywood roughly ¾ in. thick by 20 in. long. Rip it precisely 2 in. wide, and stick coarse sandpaper to the bottom to help keep it in place. This will be the guide you use to cut the strips of veneer into equal squares, so make sure the sides of the jig are truly straight and parallel.

When cutting with the veneer saw (a single-bevel marking knife or razor also works), make sure the blade stays 90° to the cutting

Crosscut the strips. Use the guide again, setting up the first cut with a framing square.

guide so you will have square edges on the strips. If you decide to use a more delicate veneer for your squares, such as burl or heavily figured woods, it may be necessary to cover the face of the veneer with a layer of veneer tape to prevent chips and breakage along the cut line. Cut a sample strip or two to check.

Using your guide, cut one straight edge on each piece of veneer. Start with a light pass just to create a path for the blade, and then bear down a bit more on the next few strokes until the waste veneer falls away cleanly. Next, align one edge of the guide with the cut edge of the veneer and cut the first 2-in. strip. Repeat this process, using a straightedge as the sizing guide, until you have four dark strips and five light strips or five dark and four light—it doesn't really matter. Ensure that all of the strips have clean edges free of tearout and chips, and replace any damaged strips.

Strips become squares

Now use blue masking tape to create an array of alternating strips, applying the tape on the glue face, where you did your cutting. Start by just taping across the joints every 2 in. or

Blue tape for assembly. Keep the strips in order as you create the chessboard pattern. Work on the show face, which allows you to see the alignment clearly. Just a few pieces of tape are fine here, and then flip to the glue face and put blue tape both across the seams and along them.

Veneer tape locks in the pattern. Peel off the small pieces of blue tape from the show face. Then use veneer tape on the entire surface (above), overlapping the pieces slightly and trimming away the excess. Draw the tape across a wet sponge to dampen it. After the veneer tape has dried, remove the blue tape from the opposite face (left).

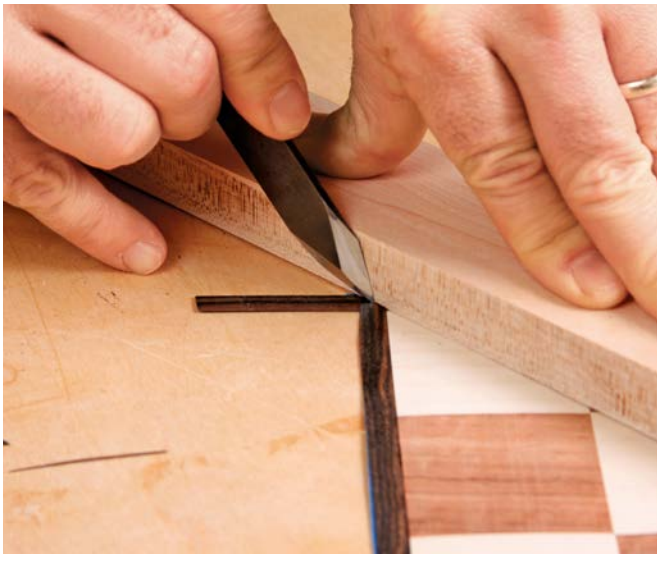
Add mitered banding. Put a strip of blue tape around each edge of the show face, leaving about half of the tape overhanging. Then flip the pattern over.

so, and then run long pieces of tape along the joints.

The next step is to square off one end of the veneer sheet. This is critical, so use an accurate square to line up your guide. Now use the guide to crosscut 2-in.-wide strips from the veneer sheet until you have eight equal strips of alternating squares.

All of the strips now need to be flipped over to the show face so you can see the veneer and align the squares when taping. Just flip one strip at a time end for end so they stay in order and the grain remains aligned. Now slide every other strip down one square to create the chessboard pattern. Use more blue tape to join the strips one at a time, being careful to align the intersections of the squares. Use enough tape to hold the joints together but don't run tape along the entire

Place the banding. Pull it tight to the edges of the pattern as you press it down, and simply overlap the ends.



Cutting guide strikes again. Line up your cutting guide with the corners of the overlap and use a sharp knife to cut through both layers (left). Remove the waste pieces and you should have a perfect miter (right). Do the blue-tape dance again to get veneer tape on the show face and you are ready to lay up the panel.

joint at this time. Peel away the overhanging squares that remain outside the playing surface and you have your chessboard pattern. The blue tape strips on your show face are for alignment only, so your taping is far from over. It goes quickly, though.

Whole lotta taping

To get the veneer tape where it belongs, you need to flip the pattern over again and cover the other side with blue tape, pulling it across the joints first and then putting long strips along the joints.

Now flip it over once more and remove the small amount of blue tape from the show face. Then apply moist veneer tape to this face one long strip at a time, making sure the strips overlap slightly and cover the entire chessboard. When all the wet strips are in place and burnished, place the entire veneer assembly under a piece of MDF or plywood for a few hours. Otherwise the wet tape will distort the veneer and pull the squares apart as it dries.

After the tape has dried, trim off any overhanging pieces with a razor knife and remove all of the remaining blue tape from the glue face.

Tips for a handsome border

A nice way to create a transition between solid-wood edging and chessboard squares is to add a decorative veneer banding, in a color that contrasts with both chessboard colors and the edging. Black is an easy choice, but any contrasting veneer will create a transition.

Before you add any decorative banding, it is likely that the outside edges of the chessboard pattern will need to be straightened slightly. Line up a straightedge with each side of the pattern and trim just enough veneer to clean up any misalignment of the squares.

Now, using your guide, slice four ¼-in.-wide strips of banding veneer. Flip the pattern over so the veneer tape is facing up and lay a strip of blue tape around the perimeter, leaving about half overhanging. Flip the sheet again and begin sticking the banding strips onto the tape, pressing the banding strips up against the chessboard to create tight joints. Allow the banding strips to overlap each other at the corners.

Now you miter the corners simply by aligning the cutting guide at 45° on each corner and cutting through both pieces of banding with a razor knife. Remove the excess pieces, and then press the mitered corner together, pulling it tight with a piece of blue tape across the joint if necessary. Once the corners are finished, do the whole tape dance again. Apply blue tape to the joints between the banding and the chessboard pattern. Flip it over and remove the blue tape from the veneer-tape side. Check for tight miter joints, and veneer tape all along the banding line, and then stick the whole thing under that piece of MDF again.

Now turn it into a real chessboard

Cut your MDF substrate as close as possible to the size of the veneer pattern, but not smaller, and join and cut a backer veneer too. Normal yellow glue works fine, and the panel is small enough that you can use clamps to do the pressing, as opposed to a vacuum bag. Scuff-sand the MDF on both sides to help with adhesion.

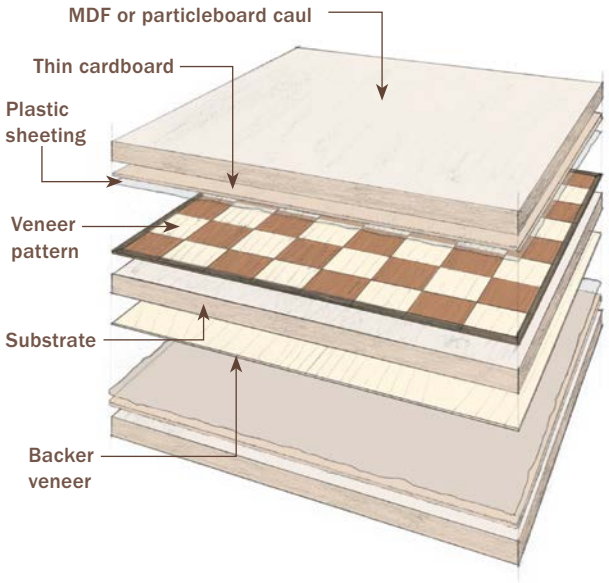
Use MDF or particleboard cauls for the glue-up, a layer of thin cardboard to spread the pressure, and thin plastic sheeting to resist the glue. You'll need plenty of clamps, and either some deep-reach versions or bowed cauls to get pressure in the center of the panel.

Veneer both sides. Get your clamps, cauls, glue, and other materials together, and start with the backside veneer when making the sandwich. Put glue on the substrate only, using a roller or a finely notched spreader to control the amount.

Lock it down quickly. Wrap a few pieces of tape around the bottom and top veneers to keep them from curling or sliding around.

You don't need a vacuum bag. A vacuum bag is easier, but clamps and cauls will work, too. If you come up short on clamps, add extra cauls to distribute the pressure.

Smart Sandwich



Apply an even layer of glue, and then carefully place your veneer (veneer tape side up) on the substrate and press it all over to help secure it. Then quickly tape it in place with several pieces of blue tape wrapped from the backer veneer over the top of the chessboard veneer.

After the panel is dry, remove the veneer tape. Wet the surface with a sponge, allow the tape to soften, then peel and scrape it off.

Clean up the edges with a crosscut sled. Start by scraping and sanding the squeeze-out off one edge (top) and then put that edge against the fence on your crosscut sled (above). You might need to add a shim to align this first cut.

Chessboard or chess table? Add solid-wood edging for a simple chessboard that can be stowed away or incorporate the veneered panel into a table design of your choosing, like Thibodeau's Art Deco–style game table below.

You'll also need to clean up the edges of the panel before gluing on solid-wood edging. I find it easiest to sand one edge flat with a hard block and some 60-grit paper, before placing that flat reference edge against the fence of a crosscut sled on the tablesaw. Trim 1/16 in. off each of the four edges, or whatever it takes to get the miters of the veneer edging to line up perfectly at the corners.

Then fit and glue mitered pieces of solid wood to the edges, just as you would with any veneered or plywood tabletop.

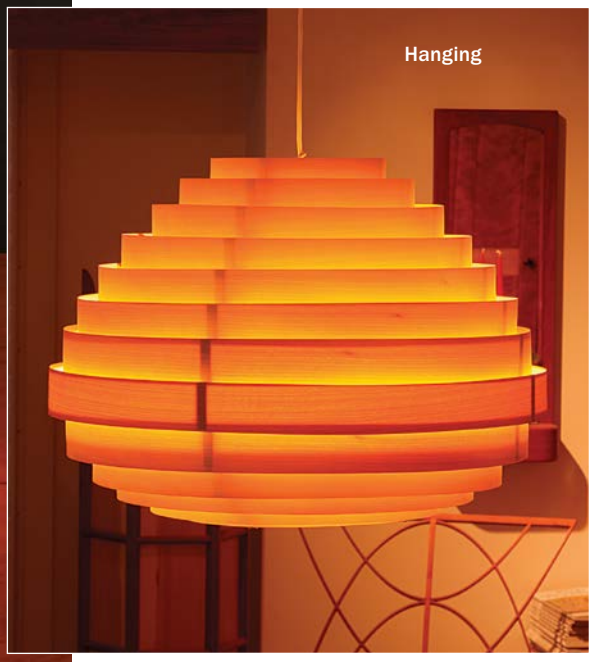
Chessboards are beautiful and functional, and look great in a variety of tables.

Two Unique Lamps

CHRISTIAN BECKSVOORT

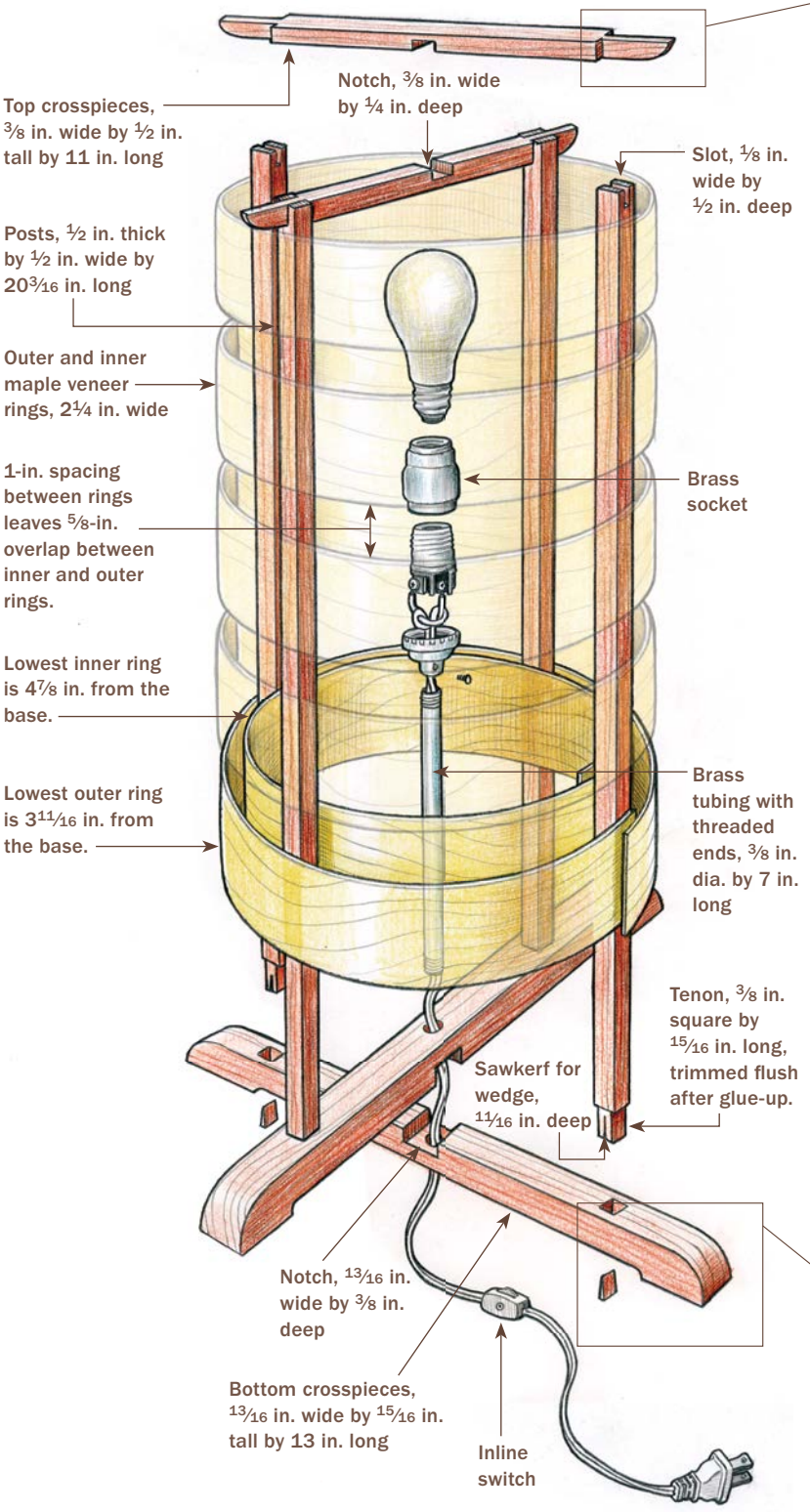
Table

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

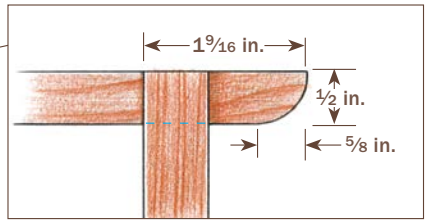


Hanging

A Different Kind of Table Lamp



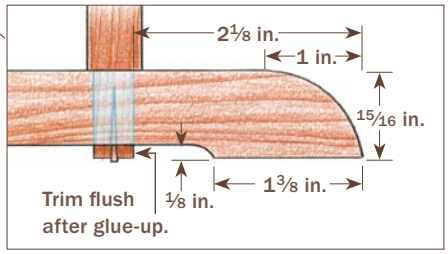
TOP CROSSPIECE TENON DETAIL



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



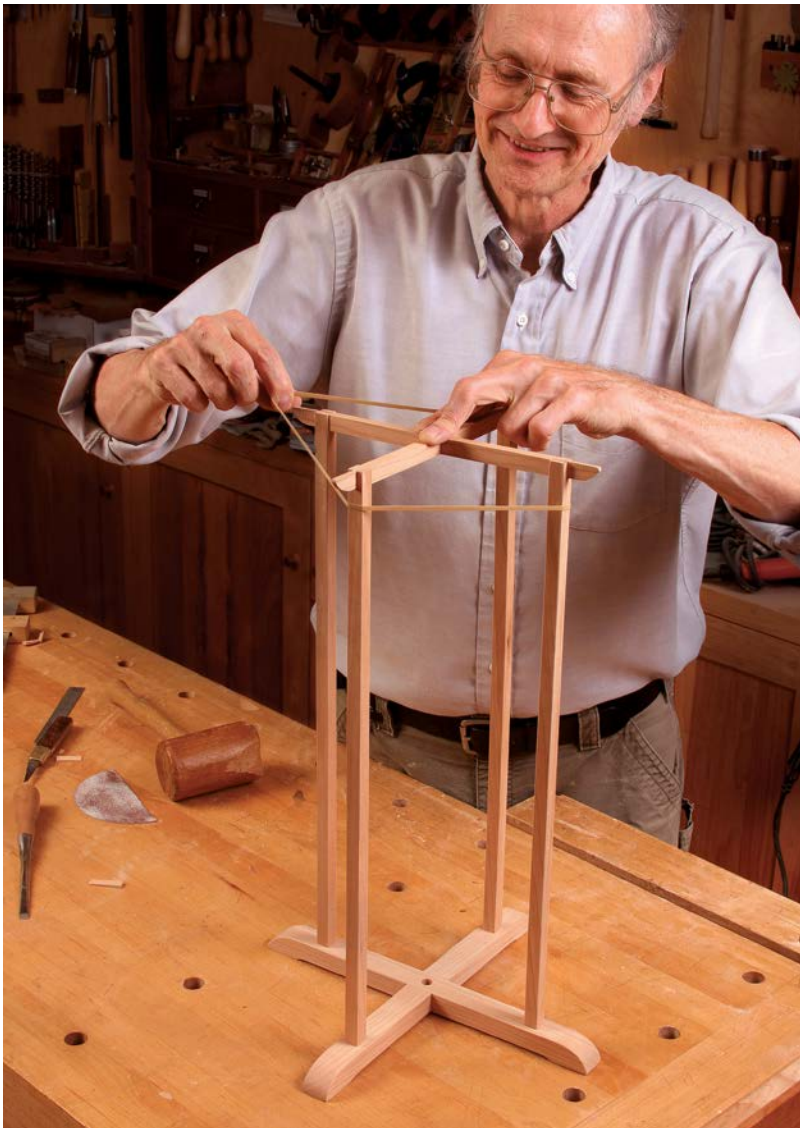
A shallow relief creates the feet. Using a stop block against the router-table fence, Becksvoort pivots into the cut and pivots out at the halfway mark. Then he flips the piece and pivots in again from the other side. This ensures that all the feet are exactly the same size.

Drill and mortise the base. The base gets four mortises to hold the posts, and a center hole for the brass lamp post. 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 (middle). Use a chisel to turn the drill-press holes into square mortises (right).

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 bridle-joint slot to hold its top piece. You can form the bottom 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).



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, which made this project easy because 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 without complicating things too much. That would give you grain continuity along the height of the lamp and open up your wood choices.

Add the rings. The nine veneer rings give this lamp its unique look and warm glow. 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 ⅜ in. for the gluing overlap.

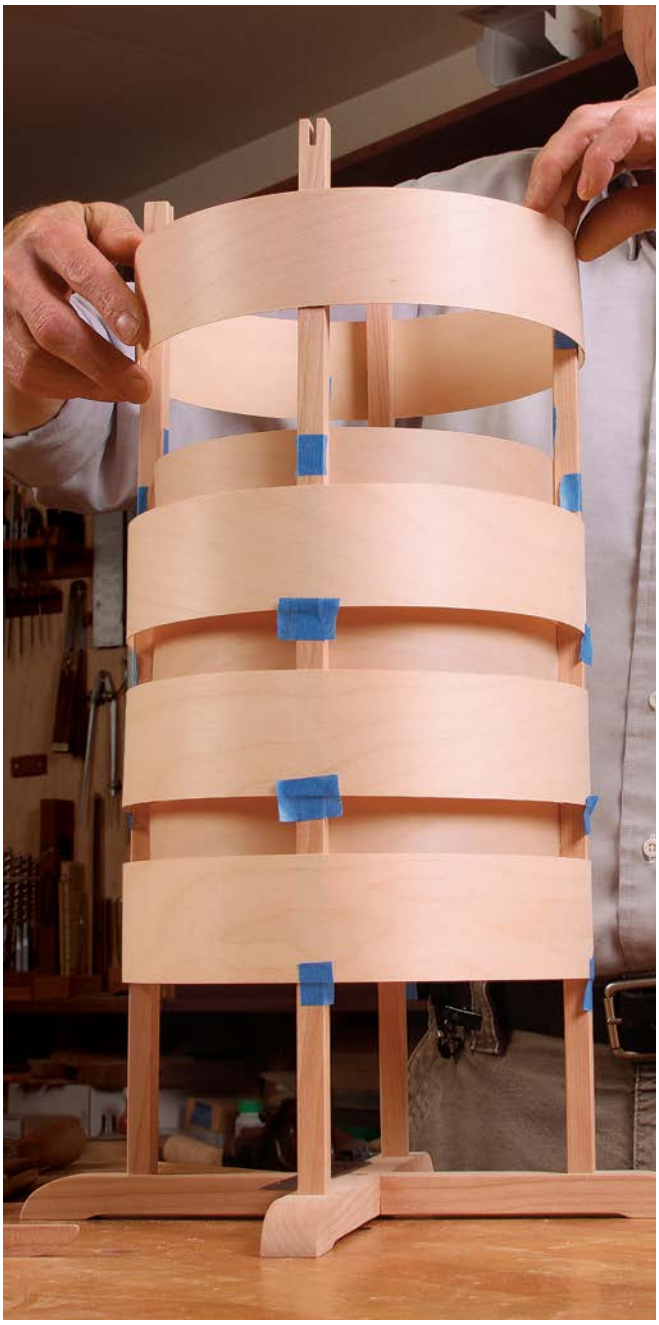
Easy joints for the base and posts

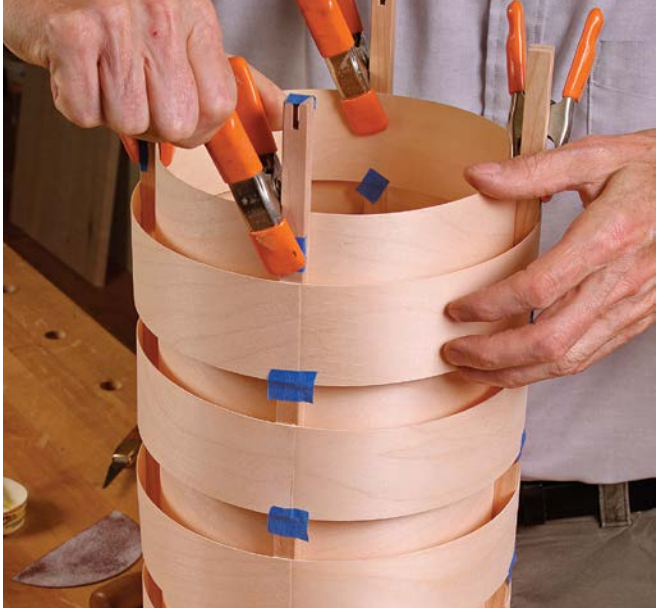
I started with the base, crosslapping the parts at the center. When I had a perfect fit, I drew the curved ends of the pieces, cut them on the bandsaw, and sanded them smooth. Also, I routed a relief on the bottoms that created four feet.

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.

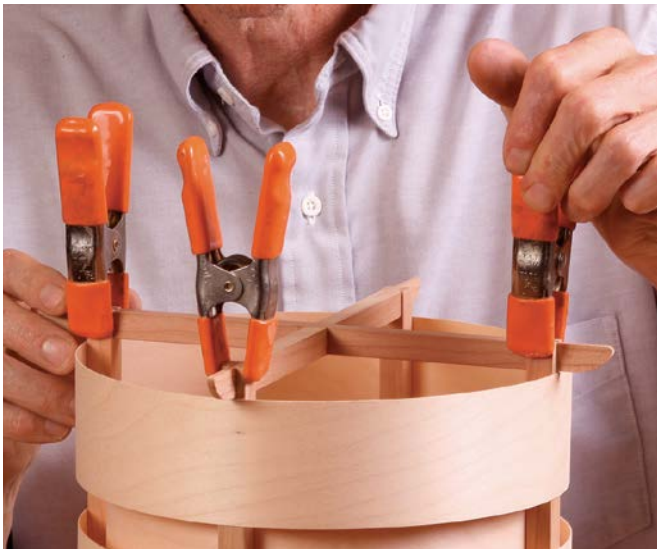
The four posts are easy to make. I tackled the tenons on the bottom ends first, then on the top end, I made a centered slot to form the inside of the bridle joint.

Rings are easy to make. Cut the rings to length with each end square (above). Mark the ⅜-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 (right).





Dry-fit first. Mark the locations with tape (left), make sure the rings fit well, and make sure all the joints end up on the same post (above), 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 on 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.

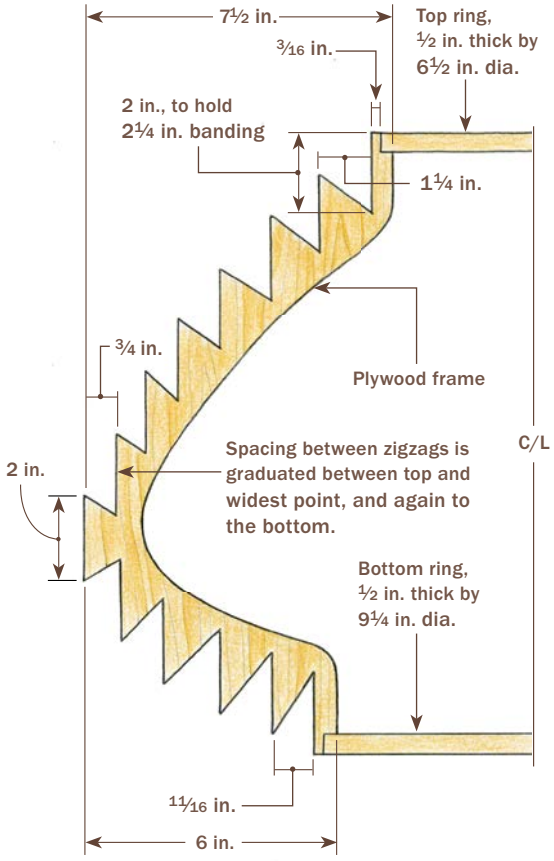
Top pieces get crosslaps and tenons

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 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.

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 www.lampshop.com, with its ring snipped off and its arms inserted into the cherry ring.

HANGING LAMP FRAME



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 preglued stuff does not work because the glue may melt. I made the rings first and then attached them to the frame. A simple formula determines the length of the veneer strips that I glued into the rings (see the top left photo on p. 90). 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 for two reasons. 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. Because a table lamp is seldom seen straight on, 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 ⅜-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.

Supplies

VENEERS/BANDING

www.woodcraft.com
www.homecraftveneer.com
forestplywood.com

LAMP PARTS

Available at most hardware stores and at:
www.mylampparts.com
www.grandbrass.com

ZINSSER® BULLS EYE® SPRAY SHELLAC

Aerosol can, available at any hardware store

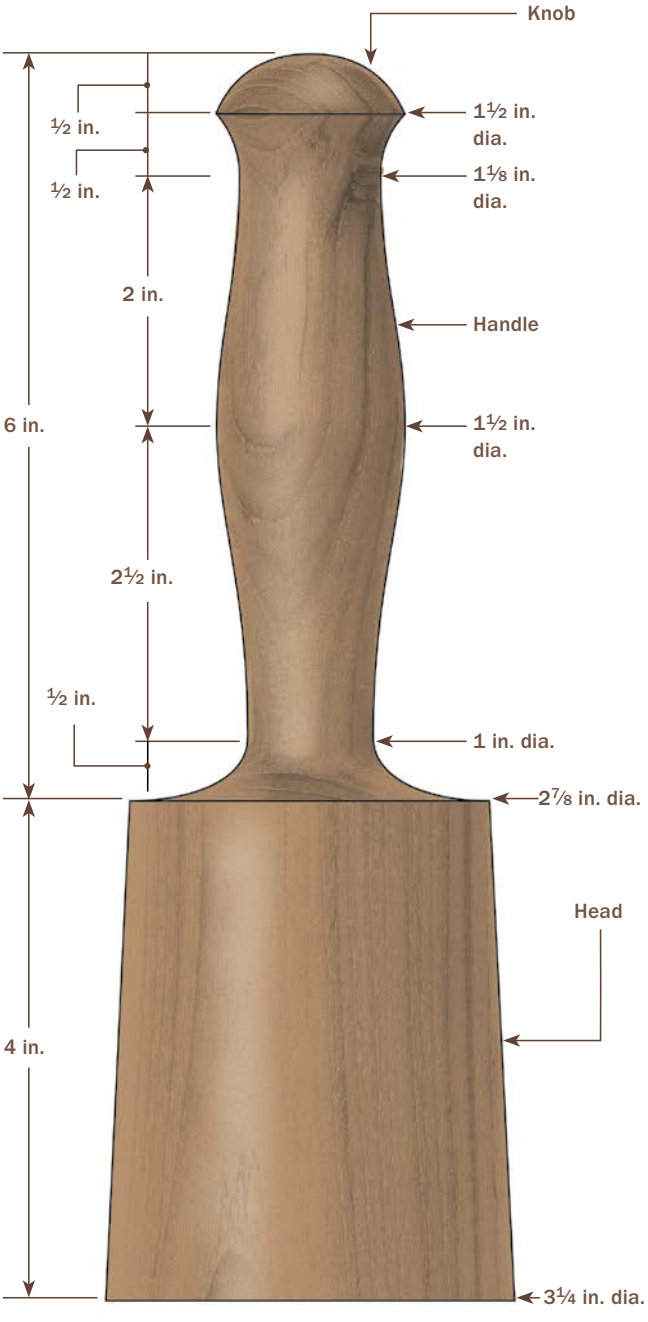
Turn a Carver's Mallet

MICHAEL CULLEN

Every woodshop needs at least two mallets. A traditional square-faced mallet is great for dovetailing and mortising, where heavy striking is required and the chisel moves only slightly between blows. But when it comes to carving and other tasks where a light touch and much movement of the chisel is required, a turned mallet is the one to use. Its tapered, cylindrical head and compact size permit you to approach the chisel handle from any angle while still ensuring perfect contact. And yet it's not a light-duty tool. The solid, one-piece construction packs enough power to drive a large chisel or gouge. And turning your own mallet means you can contour the grip to fit your hand exactly.

Mallet Measurements

These dimensions are guidelines for turning the mallet, but it's not essential to stick to them. The head should be a straight taper at not too steep an angle, but its diameter is not critical. And the handle should be shaped to a length and contour that best fits your grip. Also, your blank should be at least ¾ in. longer than the finished mallet.



Big gouge does the heavy work. Knock off the corners of the blank and bring it to a cylinder with a large roughing gouge. To guide the work, use calipers set to the mallet's largest dimension.

Pick the wood and make a blank

Look for a chunk of dense wood that is relatively easy to turn, such as hard maple, black locust, oak, or eucalyptus—species that will stand up to the rigors of banging against tool handles year after year. I used teak for this mallet. I save cutoffs from other projects for this type of turning, but logs or firewood can also yield great mallet wood. Be sure to choose a piece of wood that is straight-grained because slanting grain could create weakness in the handle.

Mark and measure. Pencil marks define the high point on the knob, the ends of the mallet, and the lower end of the head. Use calipers and a parting tool to define these four diameters.

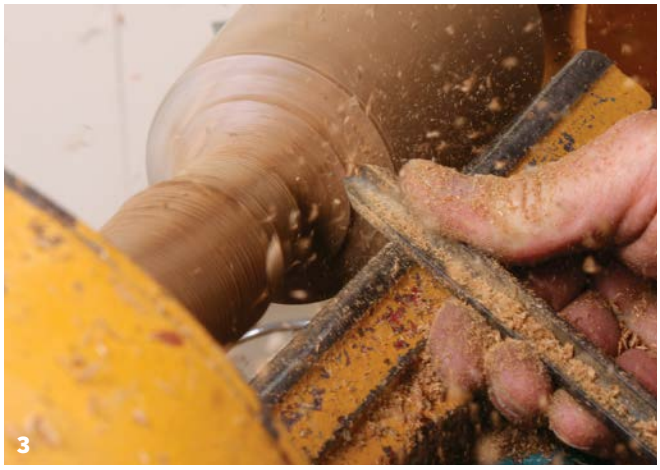
When you've found just the right piece of stock, saw out a blank that is at least ¾ in. longer than the finished mallet will be and at least ¼ in. wider than the finished diameter of the head. Chuck the blank between centers in the lathe and start turning. Even if you're not much of a wood turner, this mallet is straightforward to make.

The head comes first

Turn the square stock to a cylinder using a 1½ -in. or 2-in. roughing gouge. Then, for a finer cut, switch to a 1-in. spindle gouge and turn the entire cylinder down to its largest diameter, 3¼ in. At that point, turn off the lathe and make pencil marks at the four key spots that will guide your transitions: the two ends of the mallet, the base of the head, and the high point of the knob at the end of the handle. With the lathe spinning again, touch the pencil to each mark so the lines wrap around the cylinder.

The next step is to set several pairs of calipers to the sizes you'll need. The calipers are

Head first. Taper the mallet head with a spindle gouge, creating a smooth, straight taper (1). Rough out the knob next. After using a parting tool to relieve the waste ends of the mallet down to roughly 1 in. dia., use the gouge to cut a rough cylinder at the high point of the knob (2).



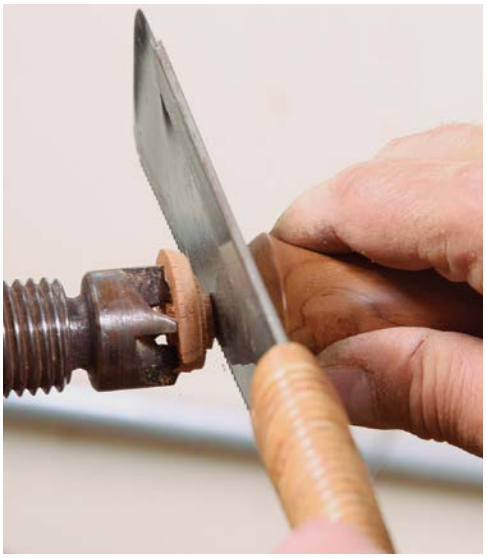
Make quick work of the handle. After turning the handle down to a cylinder equal to its largest finished diameter, use a spindle gouge to create the shoulder at the base of the mallet head.

Nearing the perfect grip. Carefully turn the contours of the handle, stopping the lathe occasionally to see how it fits in your hand. Adjust the shaping accordingly.

Flatten the top. As you define the top of the mallet's head, be sure to make it flat or slightly concave. A rounded head won't be stable standing on the workbench. Use a gouge after the parting tool to create a clean surface.

At last, define the knob. Use a skew chisel to shape the bottom of the knob, coming to within ¼ in. or so of parting it off.

Sand between centers. Sand the mallet with the lathe running, being sure to round the sharp edges at the top and bottom of the head (right). Then turn off the lathe, wipe on a thin coat of shellac (below left), and follow that with a coat of wax.



Cut it loose. A few strokes of the saw will cut the mallet free. Use a chisel and sandpaper to smooth away the sawmarks or nubs.

very handy, but don't let them completely dictate the turning—you don't have to stick to precise diameters; it's more important to get smooth curves and transitions.

Use a parting tool to define the ends of the mallet, turning each end down until the stock is about 1 in. dia. Next, define the taper of the head with a parting tool, cutting in at the transition to the handle. Then use the 1-in. spindle gouge to create the tapered surface of the head. If the surface is a little rough or not quite straight enough, you can smooth it out by taking light passes with a skew chisel or a gouge.

Make the handle fit your grip

Start turning the handle with a ½-in. spindle gouge, roughing in a cylindrical shape that's the size of the knob at the base—the largest diameter of the finished handle. Then begin shaping the handle's contours, working inward from either end with the ½-in. gouge, switching to a ⅜-in. detail gouge if necessary. I use Thompson detail gouges, which are stouter and tougher than regular spindle gouges.

When you turn the steep curve that forms the transition from the head to the handle, be sure to tilt the gouge on its side so that it enters the wood without any flutter or hesitation. Hold the gouge firmly to keep it from slipping out of the cut and marring the mallet head. Use the same technique to define the concave upper side of the knob. Then create the tapering curve that forms the bulb in the middle of the handle. Continue sculpting the handle so that the curves flow into each other to make a pleasing shape. Turn the lathe off periodically and check the fit of the handle against your grip.

Back at the top of the mallet, use a parting tool to create the end surface of the head, and use a gouge to clean up any tearout caused by the parting tool. Because the mallet will be stored on its head, make sure the top end is flat and not domed—otherwise, it will fall off your bench.

The last curve to cut is the bottom face of the knob at the base of the handle, which you can turn with a small detail gouge or a skew chisel. Keep rounding until there's about ¼ in. diameter left at the bottom. Complete the turning by rounding the corners of the head and the transition points so they won't be damaged when you're using the mallet. You can use a gouge for this task, or sandpaper as shown in the top photo on the facing page.

Finishing up

It's simplest to finish the mallet while it is still on the lathe. I use a pad to apply a thin coat of shellac, and after a quick buffing of the surface with steel wool, I finish with a coat of wax.

Free the mallet by cutting through the ends with a handsaw. Then you can smooth any nubs with sandpaper and a chisel, and touch up those spots with shellac and wax.

Get a Handle on Your Chisels

BOB SMALSER

Have some old socket chisels around that need handles? If not, perhaps you should. Even with today's high collector interest, flea markets, estate sales, and auctions still provide excellent values in tools if you can make your own handles. I prefer my own handles anyway, as I custom-fit them to the size of my hands and to my working style.

What's the big deal about old socket chisels in the first place? They generally are premium tools, made when chisels were drop forged instead of investment cast. Except for price (a handle-less old chisel often can be had for less than $5), the differences between an old Thomas Witherby or James Swan and a modern chisel are subtle, but many of my generation still consider them to be the best compromise between edge retention and ease of sharpening in a factory-made chisel. They also are relatively plentiful—there were a couple dozen premium chisel manufacturers in the decades before World War II, not just the two or three best known. I like to see those heritage tools in the hands of users instead of collecting dust.

To make a good handle, any dense hardwood will do. Use what you have locally so you can make matching handles later. The original factories used common woods like hickory, ash, and oak pretty interchangeably. I suppose the hardest, toughest, and heaviest woods with interlocked grain are best—woods like dogwood and hop

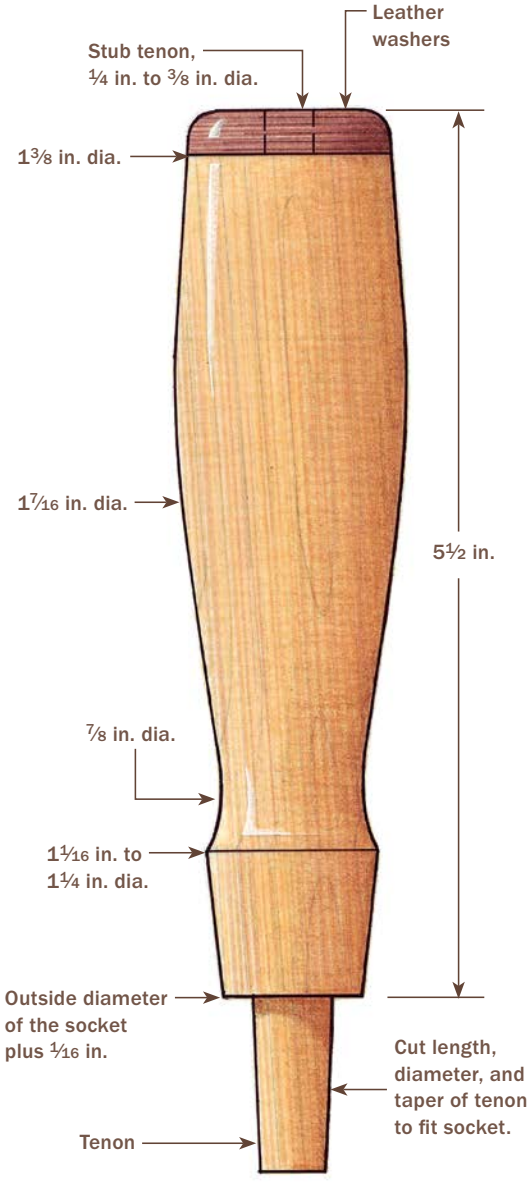
Start by turning a stub tenon. Smalser uses a parting tool to form the tenon and then glues leather washers over it to create a durable striking surface.

Establish the tenon shoulder. Use the parting tool to mark the start of the tenon that fits in the chisel socket, then shape the adjacent tapered section with a small gouge.

Cut the handle to final shape. Use the small gouge followed by a skew chisel for cleanup. This design relies on subtle curves for comfort.

Handle Dimensions

After turning more than a hundred handles for himself and tradesmen friends, Smalser finds these dimensions most comfortable for a man with large hands.



hornbeam—but I haven't found one species to outlast another in normal use. A teenager with a framing hammer can destroy any one of them as easily as another.

Here in the hardwood-scarce Northwest, I use Pacific madrone, simply because it's the densest of the three hardwood species growing in my woods.

I use a lathe, but you can make handles without one. Anything done on a lathe can be done as well, just not as fast, using a drawknife, a spokeshave, rasps, and files.

Use an inside-outside caliper. Transfer the inside diameter of the socket mouth to the tenon shoulder, checking progress as you cut the top of the tenon to size with a parting tool.

Finish the taper. Gauge the socket's depth and its diameter at the deep end. Use these measurements and the parting tool to cut the small end of the tenon to size. Finish the taper by pulling a small skew from the tenon shoulder to the pointed end. Leave the tenon slightly oversize for hand-fitting later.

Begin sanding with 120-grit. Work through the grits up to 320-grit.

Raise the grain. Wipe the handle with a damp towel between each grit. The water swells and loosens the wood fibers in the scratches, so less work is required to sand them off.

Apply the finish. Smalser prefers a thin wiping varnish formulated for gunstocks (Tru-Oil® or Lin-Speed), rubbed out with paste wax and #0000 steel wool after curing.

An age-old fitting trick. After securing the blade in a vise, insert the tenon firmly and twist it a full revolution. A dirty socket will leave dark patches on the high spots; file these away using a fine rasp. Repeat until you have full wood-to-metal contact for a perfect fit.

Fixing a tenon that's too small

A tenon that's too skinny won't fit securely. Simply cut a piece of cloth to fit the tenon's length and circumference, wrap it around the tenon, and glue it in place as a shim. Once the glue dries, drive the handle into the socket.

Drive the socket tenon home with a mallet. Leave a gap between the socket and the tenon shoulder. This helps prevent splitting. You also can seat the tenon and shoulder in epoxy to prevent the handle from coming loose when the handle shrinks in the dry season.

Wood Planes Made Easy

DAVID FINCK

Make a wood plane and it will reward you with flat, gleaming wood surfaces and an unmatched planing experience. Make it the way I describe here, and you'll be surprised how easy it is. Wood planes offer great value, too. They far exceed the quality and performance of less-expensive metal planes, and you can build several of them for the price of one high-end plane. Their thick blades make freehand honing easy and the high-quality steel holds a great edge. Last, they are shaped to fit your hands, so the comfort factor alone is a good reason to explore them.

Often called a Krenov plane, this plane style is closely associated with cabinetmaker and author James Krenov, who adapted the design of commercially made European wooden planes. Gluing on cheeks eliminates the need to hollow a solid block.

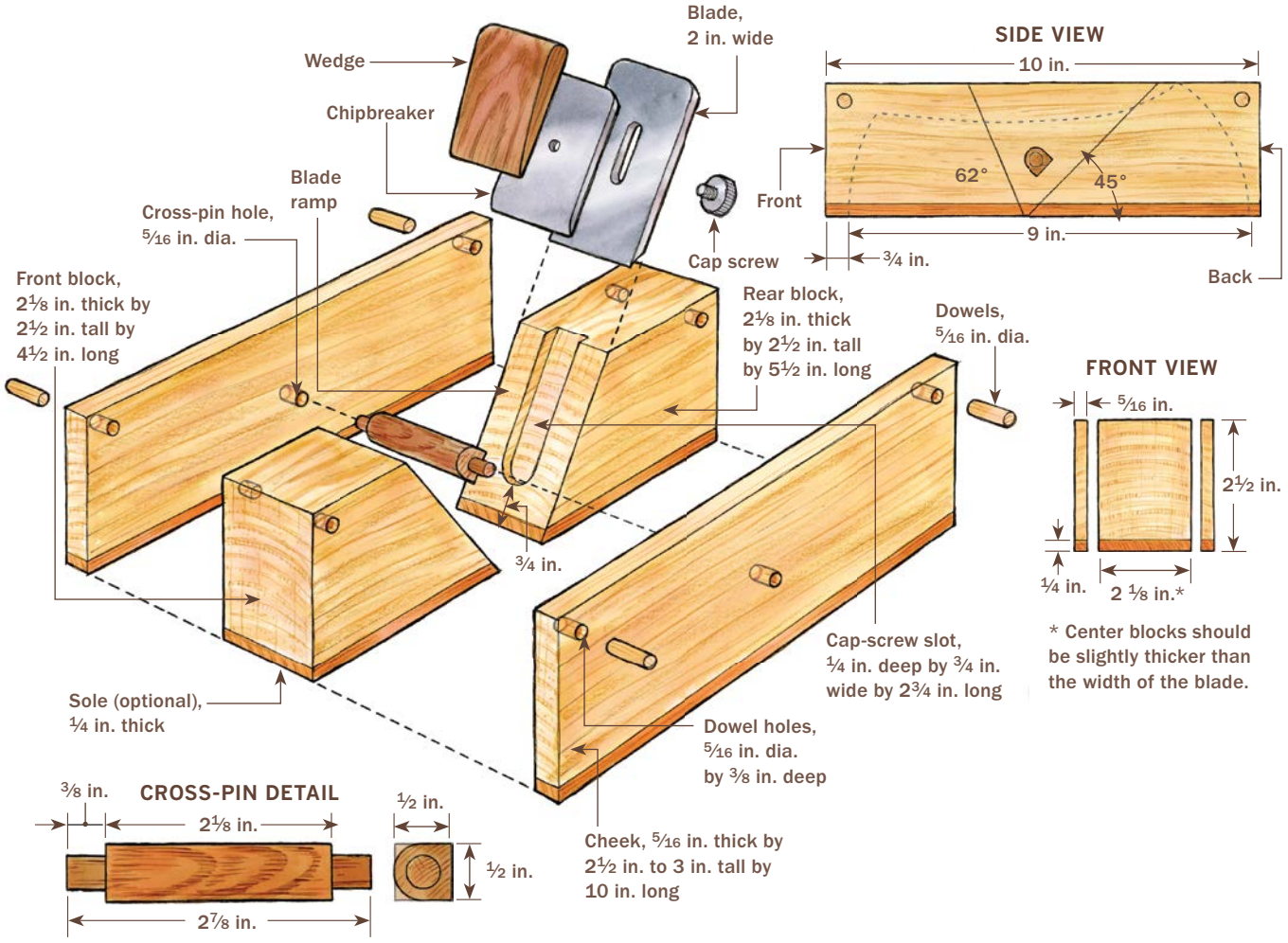
Prepare the plane blank

Straight-grained stock will yield a stable body. Choose well-dried wood of good density and durability. Among domestics, oak, ash, hard maple, Osage orange, mulberry, and applewood are good choices.

To make a smoothing plane, square up a thick block (this can be glued up from thinner pieces) 3⅛ in. wide by 10 in. long by

One method, many planes. Once you know the basics, you can make an arsenal of planes—for everything from chamfering small parts to jointing long edges. A small hammer is used to adjust the planes.

Anatomy of a Wooden Plane



2½ in. to 3 in. tall, with its two sides parallel and square to the bottom. The top can be left roughsawn as it will be trimmed away when shaping the plane. Examine the side of the blank. If the grain slopes noticeably, choose the front of the plane so that the grain direction slopes downward from front to back. This helps the plane slide smoothly and prevents chipout on the bottom.

A plane will hold up fine without a separate sole (and the next step can be eliminated), but planes tend to wear most in the area in front of the throat opening, so a small square insert may be required after a lot of use to compensate for wear. If you will use the plane daily, apply a sole of especially hard-wearing wood, such as lignum vitae, jatoba, or ironbark, to the plane blank. Glue the sole (¼ in. thick and ⅛ in. wider and longer than the blank) to the bottom of the plane blank, using a caul under the clamps to distribute pressure. Use a block plane to trim the overhanging sole flush to the sides of the plane blank.

Cut the cheeks and center block

Cut the blank into three pieces: two cheeks and a center block. After cutting the pieces

Built from one block. After gluing on the sole and trimming everything square and flush, cut away the 3/8-in.-thick cheeks. This should leave the center block about 3/16 in. thicker than the blade width.

Bandsaw the front and back blocks freehand. You can use a chopsaw or a tablesaw to make this cut more cleanly, but the bandsaw is safest and the cuts will need to be smoothed regardless. Set aside the triangular waste piece for later use.

Plane the ramp and check for square. Light passes with a block plane clean up the ramp surface (left). An accurate square and a light source help make sure the blade ramp is square to a side (above). Here, it's still a bit off.

Rout the cap-screw slot. This stopped slot is centered in the ramp and is 1/8 in. wider than the cap screw. Lay out its stopping point (above). On the router table, use triangular scrap as a stop (right).

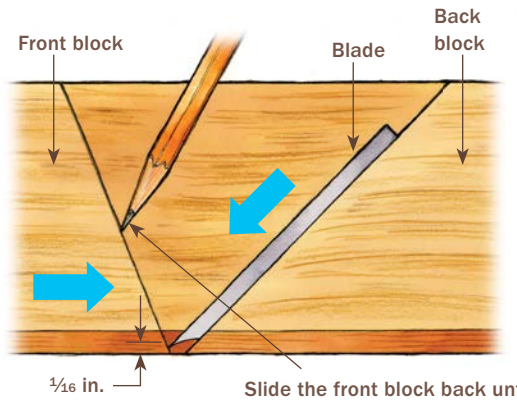
Mark the position of the ramps. Place the back block flush with the back and bottom edge of a cheek and mark its location. Set the blade in place and jockey the front block so that the blade contacts it 1/16 in. above the sole. Trace its location on the cheek.

Dowel the cheeks in place. Drill a 5/16-in. hole in each upper corner, going through the cheek and about 3/8 in. into the blocks. Tap in 5/16-in. dowels, then trim them off.

slightly thicker, mill the cheeks and the center block to finished thickness. The center block is slightly thicker than the 2-in. blade width to allow for lateral adjustments.

On the thick center block, lay out and cut a 45° angle (a good all-purpose cutting angle) for the blade ramp and a 62° angle (provides adequate clearance between it and the cross-pin for fingers to remove jammed shavings) for the front block.

Align the Pieces Precisely



Truing the back block is critical

The blade ramp must be trued to perfection: dead flat across the width and length and squared to one side with no trace of wind or twist. Any imperfections will allow the blade to pivot out of adjustment in use. Start with the front block for practice, because the only thing of importance here is to keep the ramp of the block square to a side. An experienced block-plane user will knock this off in 60 seconds. A novice may spend an hour, but taking the time here ensures the success of your plane.

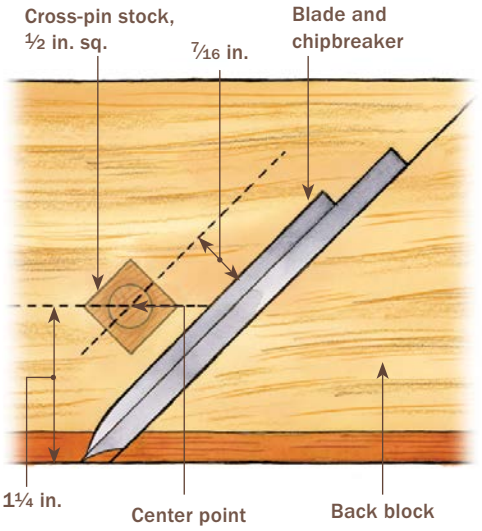
Move on to the blade ramp. The blade ramp must be slotted to provide clearance for the cap screw. The cap screw should not bottom out in the slot before the blade extends beyond the sole.

Assembly is simple but precise. Space the front block and blade ramp so that after glue-up, the blade does not slide through the opening, but contacts the front block 1/16 in. from the bottom. Then true the bottom and file the front block for a minimal throat opening. Clamp everything and insert dowels to lock in the alignment.

Locate the position of the cross pin. Place the blade on the ramp and the chipbreaker on the blade. The cross pin's center point meets at the point 1¼ in. above the sole and 7⁄16 in. from the chipbreaker.

Drill cross-pin holes. For best results, use a brad-point bit and a backer board beneath the cheek. Drill the first hole through the inside face of one cheek while the other cheek is removed (above left). After drilling the first hole, assemble the plane and position it with the drilled cheek up. Use the first hole as a guide for drilling the second (above right).

Position the Cross Pin

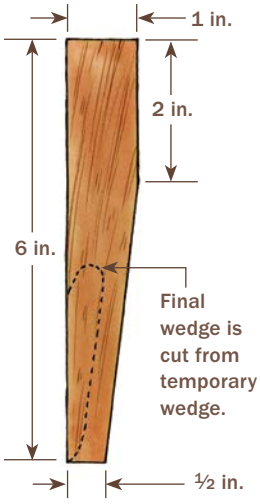


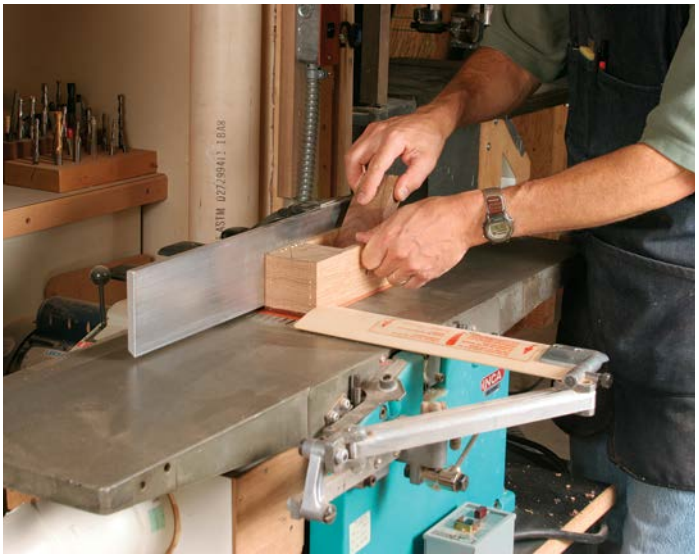
The cross pin sits between the cheeks and contacts the wedge, capturing the plane-iron assembly against the 45° ramp. Mill straight-grained hardwood ½ in. sq. by 12 in. long for cross-pin stock. Unclamp the plane and remove one cheek. Pivot the blocks out of the way and draw a horizontal line on the other cheek 1¼ in. from the bottom (the height of the center of the cross pin). Pivot the blade ramp into location. Place the blade on the ramp and the chipbreaker on the blade. Mark a line 7⁄16 in. from the chipbreaker (the thickness of the wedge plus half the cross pin). Those marks meet at the center point of the cross pin, where you drill the hole for the tenons.

Make the cross pin. Finck uses a tablesaw and sled to form square tenons (far left). Then he rounds the tenons with files (near left) and shapes the cross pin. Dry-clamp the plane to make sure the cross pin will rotate freely; if not, work on the fit.

Glue the plane together. Keep the glue ¼ in. away from the angled surfaces to minimize squeeze-out in the plane opening (above). Do not glue the cross pin. Clamp an alignment stick to the bottom and use cauls to distribute the pressure on the cheeks (right). After the clamps are set, remove the alignment stick so you can clean up any squeeze-out on the bottom and in the opening.

Temporary Wedge





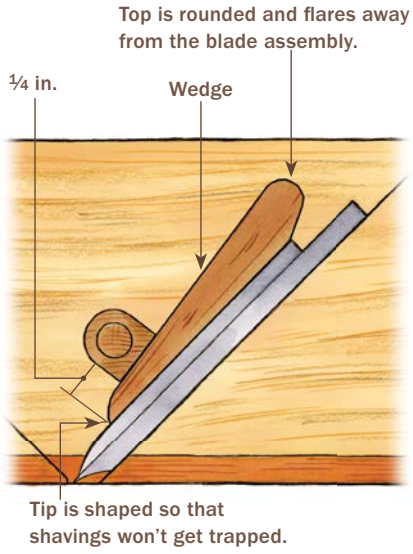
Install a temporary wedge and flatten the sole. Mill stock the same width as the plane iron. Bandsaw the wedge and smooth it with a few plane strokes. Tap the wedge lightly in place until the plane takes on a ringing tone, like a solid block of wood. Once the wedge is set, a light pass or two on the jointer will clean up the bottom of the plane.

The cross pin has rounded tenons on each side and is inserted without glue. The tenons should turn easily but not wobble. Use a file to lightly round the edges of the cross pin that contact the wedge, and give the other two edges a more pronounced rounding.

Glue up the plane and true the bottom

Before the final glue-up, dry-fit the plane with the cross pin installed, check all the seams, and erase any pencil marks. Trim the ends of the cross-pin tenons and indexing dowels flush to the cheeks. After the plane has been glued up, a temporary wedge keeps the plane body tensioned (without the blade in the plane) so you can true the plane bottom with a jointer. Straight-grained, easy-working wood like walnut or cherry is a good choice for wedges. Set the wedge and clean up the bottom of the plane. Then try the blade in the plane (bevel side down). It should bump against the front block. Take passes on the jointer until the blade

The Final Wedge



Cut the final wedge. Bandsaw the permanent wedge from the temporary one. The new wedge shares the flat bottom of the old one and should fit between the cross pin (extending about ¼ in. beyond) and the blade–chipbreaker assembly.

is within 1/32 in. of the bottom, but doesn't pass through the opening. Lightly sand away machine marks on a flat reference surface.

After a few small adjustments to the throat opening (see the photos on the facing page), convert the temporary wedge to a permanent one. Light finger pressure should snug up the wedge without skewing it to one side or the other. It should fit perfectly, without any bumps.

Cut the wedge a bit shorter than the end of the blade. Shape it so that the upper end can withstand hammer taps and flares away from the blade assembly. The tip is sharp, but the rounded top allows shavings to roll over it smoothly. Be sure that the end of the cap screw does not touch the wedge. If it does, either shorten the screw or cut a relief on the back of the wedge.

Take the shaping personally

Shaping the plane is as personal as making furniture. I favor shapes that allow flexibility, for I sometimes pull the plane, sometimes push it, sometimes rock it from side to side, and sometimes hold it one handed. Therefore, I like gentle curves that invite the hand without locking it into one grip.

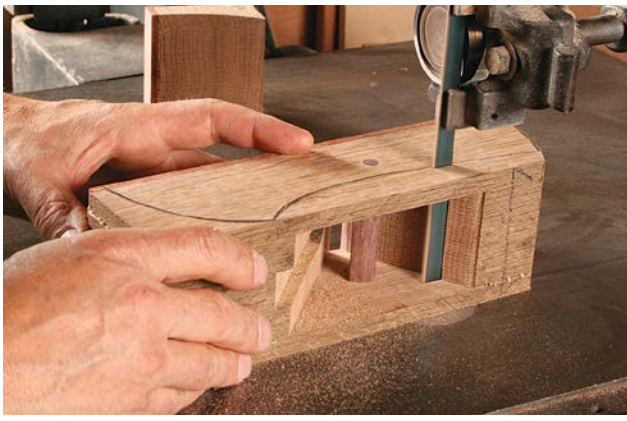
Don't give in to the temptation to shape the plane all at once. Shape in stages, using the plane in between to get a sense of where to shape more.

Keep the leading lower edge of the plane crisp to help push stray shavings off the board. If it's too rounded, stray shavings will go under the plane and jam the opening. Lightly bevel the underside of the cheeks to within about 1/16 in. of the throat opening to reduce friction and burnished stripes on the planed surface.

First shavings

Use a small adjusting hammer to set and tap the blade and wedge into place, then set the blade depth and check for parallelism. The shavings should look lacy and feel cottony-soft. Hone the blade more heavily at the corners to yield a wide shaving that thins to nothing at the edges. This will create a surface with no gouges or digs.

Adjust the throat opening until the blade protrudes. Properly filing the throat opening is critical to the success of the plane. Use a sharp mill bastard or smoothing file (above left). The process is a matter of sighting the blade against the opening, filing, sighting again, and so on, until the blade slips evenly through the opening. The optimal opening is slightly thicker than a fine shaving (above right).



Bandsaw the shape. Sketch the outline of the plane on a cheek and bandsaw it. It isn't necessary to shape the plane all at once. Shaping should be done in stages, after using the plane to get a sense of how it fits your hands.

Shaping with hand tools. You may leave the plane roughsawn for a grip-textured surface or refine the shape and surfaces with spokeshaves, chisels, card scraper, files, rasps, and sandpaper. Finish is not necessary.

Set the wedge. Start with the blade bottomed out, then pull it up 1/16 in. and set the wedge with finger pressure (above). Sighting from the back, tap the blade until it barely breaks the surface (right). Then tap the wedge to set it.

Tap the blade laterally. With your thumb, feel the outer margins of the blade to see if they protrude equally. Adjust by tapping the blade laterally. If the blade is too far out, retract it by rapping the back of the plane. Secure the wedge with another light tap.

Supplies

This Krenov-style plane is built to fit a 2-in.-wide plane iron. Plane-iron assemblies include a chip-breaker and a cap screw and come in a range of widths: 1 in., 1¼ in., 1½ in., 1¾ in., and 2 in.

PLANE-IRON ASSEMBLIES

David Finck
www.davidfinck.com

Hock Tools
www.hocktools.com

Tool Chest with Drawers

MICHAEL PEKOVICH

I teach woodworking on a regular basis, and I invariably would stuff hand tools into a canvas tote to take along with me. While convenient, the tote didn't offer much protection in transit or easy access once I was at school. So I finally got around to making a traveling tool box that not only holds my tools more securely but also lets me get at them when I need them.

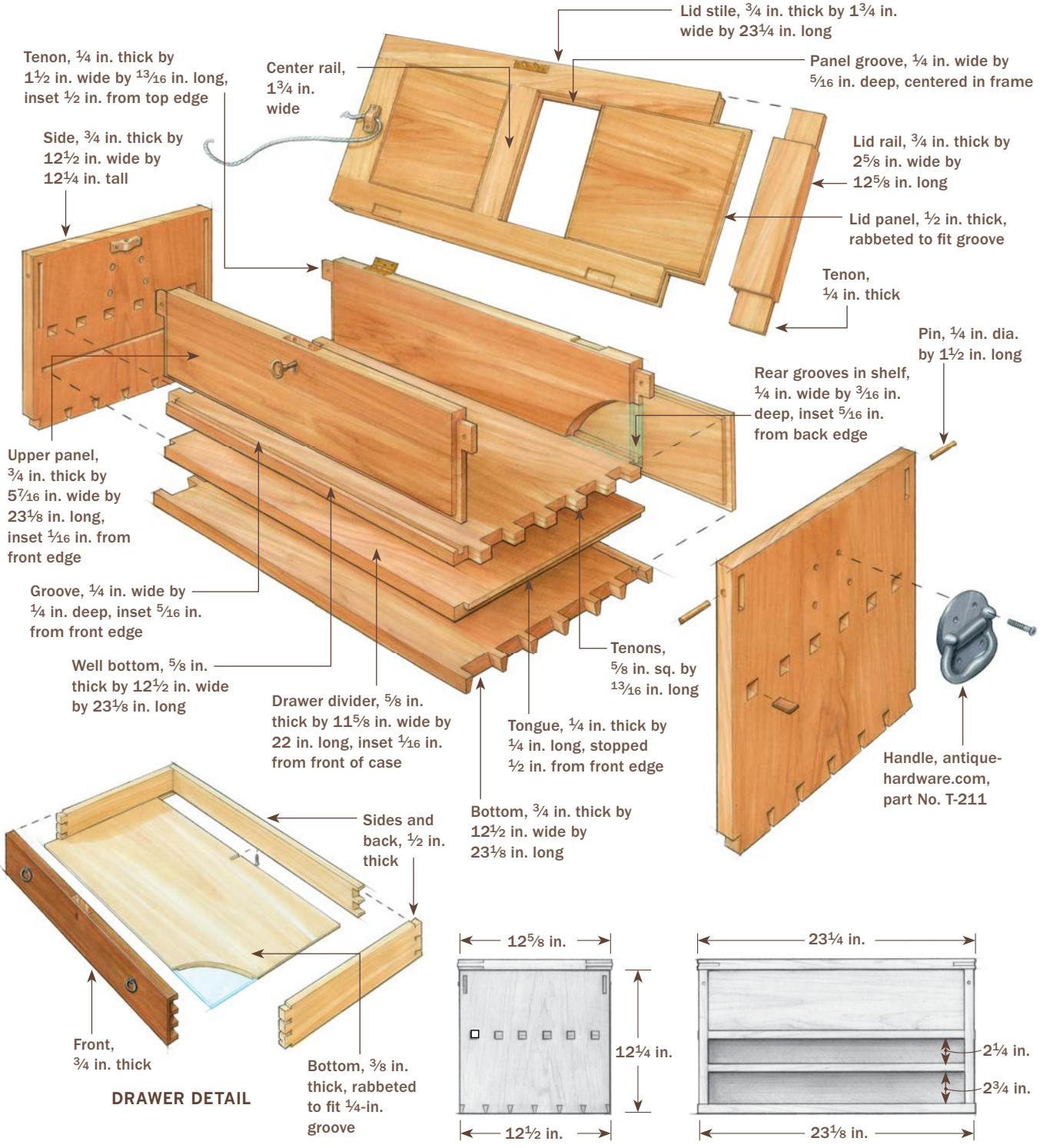
You don't need to be an itinerant woodworker to make good use of this chest. While a wall-hung tool cabinet might offer more storage, it also requires dedicated wall space. If you haven't set up a permanent shop yet and need to stow your tools on occasion, a tool chest makes sense. This small case will house your essential hand-tool collection, keep it close at hand on a benchtop or countertop, and tuck away just as easily. Another reason I like it is that it has forced me to think about which hand tools I really need.

I studied quite a few classic tool chests as I designed this one. I went with a well deep enough to store handplanes and backsaws up top, and drawers below that allow easy access to chisels and layout tools.

To keep the weight down, I made the case from butternut. It's as light as pine but a lot prettier. Another thing I love about butternut is how it works with hand tools. It dents easily, so be sure to keep your work surface clean and chip free. It also has a tendency to

Anatomy

This small chest combines a deep well for planes and saws with a pair of drawers below. The dovetailed bottom and tenoned shelf make the box sturdy, allowing the front, back, and drawer divider to be tongue-and-groove panels.



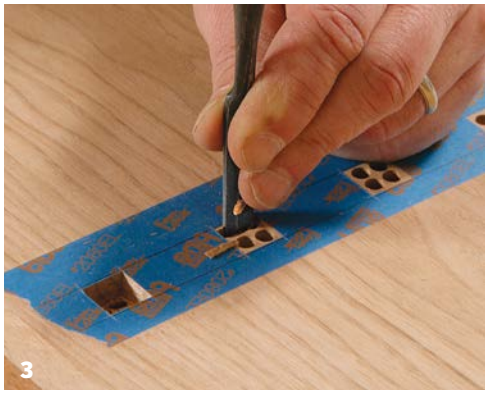
Tails first, of course. After scribing the baselines with a marking gauge, lay out the tails with a bevel gauge set to a 1:8 slope (above left). Saw to the baseline with a backsaw (above right). Don't worry about following your pencil line precisely; you'll scribe the pins to fit later. Just keep your sawcuts square and try not to go past the baseline.

Remove the waste. Use a coping saw to remove most of the material (above). This makes chopping faster and keeps your chisels sharper longer. Then chop to the baseline, taking thin cuts (right). Angle the chisel slightly and work in from each face to create an undercut shoulder. This ensures that the joint will come together tightly.

Scribe the pins for a perfect fit. Clamp each pin board in a vise, level with the top of a scrap board. Raising the tail board lets you focus your pressure in its center, which will ensure accuracy by keeping it motionless. Another key here is to use a marking knife, not a pencil. Carry the lines onto the faces, and then saw, chop, and pare the pins to fit.

be a little fuzzy, but a sharp handplane leaves a glass-smooth surface and brings out the luster in the wood.

The case joinery looks impressive but is pretty simple. The sides attach to the bottom with hand-cut through-dovetails, and the well bottom is attached with through-tenons, also hand-cut. I like to leave this type of joinery a little proud to add interest. The rest of the case joinery is mostly routed grooves and rabbeted panels. I built the frame-and-panel lid with tenons and bridle joints that I cut quickly and easily at the tablesaw, though you could do them with hand tools, too.



Layout tip for old eyes. Wood grain can make scribed lines tough to see, so Pekovich puts painter's tape on each face before marking the mortises. Use a marking gauge to scribe both the mortises on the sides (1) and the tenons on the shelf. Then use a square and marking knife to scribe the top and bottom edge of the mortises (2). Peeling away the tape provides a clear border for drilling out the waste and chopping the mortises square (3). Work inward from both faces.

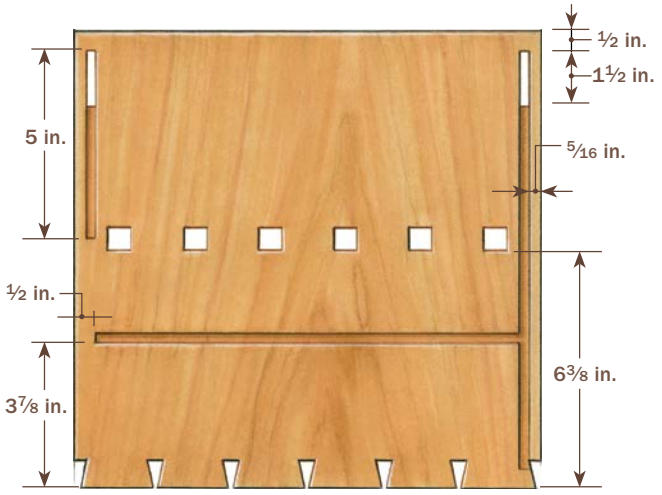
Chamfer and kerf the tenons. Saw the tenons like the dovetail pins. Before glue-up, use a block plane to lightly chamfer the ends and then cut slots for wedges using a backsaw (above). Working from each end, saw an outside tenon and then use it as a guide for the adjacent ones (right).

Tips for hand-cut dovetails

Begin by dovetailing the bottom to the sides. The tails are flush with the bottom of the case, but the pins extend past the sides a bit. This requires two marking-gauge settings for the baselines. Set the gauge to the thickness of the stock and mark the case sides. Increase the gauge distance by 1/16 in. to scribe the case bottom.

This is a good time to scribe the shoulders of the other case parts as well. It's a great trick I picked up from period furniture maker extraordinaire Steve Latta. When you have a lot of parts with the same shoulder-to-shoulder dimension, cut them all to the same length even if the final lengths of the parts will differ. That way you can scribe all the parts with the same gauge setting. Later

Side Joinery Detail



Little through-tenons first. Start these on the outside face. Use a router with an edge guide and a ¼-in. spiral straight bit to rout most of the way through (above left). The groove will finish the job from the other side. Square up the mortises with a chisel (above right).

Rout the grooves on the inside face. Set the bit slightly deeper than the tongues on the panels to allow for glue squeeze-out. Cut the grooves along the edges of the sides before resetting the fence to cut the narrow dado for the drawer divider. You'll need to groove the well bottom, too.

Easy tongue-and-tenon combo. Use a dado set to rabbet both faces of the panels to create a centered tenon. Then trim the tenons on the bandsaw as shown to leave a perfect through-tenon.

you can cut them to final length, knowing the case will turn out square. So go ahead and scribe the shoulders on the well bottom, drawer divider, and front and back panels.

Now back to dovetailing. Set a bevel gauge to a 1:8 slope and lay out evenly spaced tails with a half-pin at each end. Use a backsaw to cut the tails. Don't worry about nailing your line. The exact shape of the tails doesn't really matter because you'll be scribing the

Surface and seal. The soft butternut planes easily and yields a shimmering luster (top). Apply a washcoat of shellac to all the parts, especially the end grain of the tenons and dovetails, but stay clear of the glue areas (bottom).

pins directly from them. Think of these cuts as a warmup for the pin cuts. Those are the ones that count.

Use a coping saw to remove the waste between tails and clean up the corners with a chisel (see the photos on p. 114). Now you are ready to tackle the pins. Scribe them directly from the tail board. Mark the waste areas with a pencil to make sure you cut on the right side of the line.

I try to cut right along the scribe line because it reduces the paring I have to do. I'm not trying to save time; instead, I'm trying to avoid errors, because I seem to create most of the gaps in my dovetails while paring. With all of the mating surfaces, sometimes it's hard to figure out exactly where the joint is hanging up.

One big glue-up. Unfortunately the case glue-up can't be broken into subassemblies. So do a dry run to reduce some of the stress and avoid any surprises once the glue is on (top). For the actual glue-up, use plenty of clamps to bring the case together. Then put glue in the slots in the shelf tenons and drive wedges in place (bottom).

After coping and chopping out most of the waste between the pins, it's important to check how straight you made your cuts. It's common to veer away from the line as you cut. This results in wedge-shaped pins that are wider at the bottom. They can make fitting a pain and can lead to cracked parts if

Bridle slot meets panel groove. If you run the workpieces in both directions to center the panel grooves, you can do the same thing on the tenoning jig to cut bridle joints that line up with the grooves. Align the blade with the inside edge of the groove, then just flip the workpiece for a perfect cut on the other side too.

Tenons last. Align the blade with the outside of the panel groove to cut the tenon cheeks (left). To cut the shoulders, trim away most of the waste first on the bandsaw to avoid a trapped offcut, and then use your miter gauge and rip fence for the final cut (above).

you try to force the joint home. So the first task is to trim the pin walls straight. Now you can go about paring for a perfect fit.

Tips for tenons too

The through-tenons on the well bottom are easy to handle with hand tools. When marking along the grain in butternut, it can be really hard to see the line. Instead of investing in a new pair of reading glasses, lay a strip of painter's tape across each face of the case sides before scribing the mortises. Once the mortises are marked out with a knife, peel away the squares for easy reading.

To cut the mortises, start by drilling out most of the waste at the drill press. Then chop back to the scribe lines, working from each face. Undercut the inner surfaces a little as you chop. Cut the tenons just like the dovetail pins, sawing as close to the line as you dare. Then cope out the waste and pare to the line as necessary.

Clamp from three directions. A bridle joint needs a lot of help to pull it together. Start by clamping across the rails; then add clamps across the stiles (left). Check to make sure that the joints are pulling closed in each direction as you tighten the clamps. Finally, clamp vertically at each corner to ensure a good glue bond (above).

A hybrid joint

With the major case joinery complete, you can rout the grooves and through-tenons for the panels. Start by routing a short groove for the through-tenons on the outside faces of the sides. Once you groove the inside face, the two cuts will combine to create a through-mortise to accommodate the tenons at the top of the upper panels. This is an interesting joint I call a dog-eared tenon (actually, I just made that up). The tenon is glued and pinned to the sides, while the rest of the panel is allowed to expand and contract with the seasons. Note that the grooves in the well bottom are shallower to avoid weakening it.

Get organized for the glue-up

Before assembly, use a backsaw to cut slots in the through-tenons. Then chamfer the ends of the tenons and dovetails, and plane or sand the parts. Butternut is too soft to scrape effectively so I'd avoid that. Apply a washcoat of shellac to the parts before glue-up, staying clear of glue surfaces. When dealing with protruding dovetails and tenons, it's important to seal the end grain before gluing or you'll end up with a blotchy finish there.

On a side note, one feature on this chest that you may want to skip is the half-mortise locks for the drawers and lid. I added them to keep the drawers closed during transit and to keep the tools secure once I'm at my destination. If you do add them, be sure to cut the mortises for the lock bolts in the underside of the well bottom and drawer divider before gluing up the case. Trust me, it's much easier that way.

Once the case is clamped up, tap in the wedges. Finally, drill through the tenons at the top of the case and drive in pins for even more strength and sturdiness.

A power assist for the lid

I could have done the lid joinery by hand, too, but my tablesaw was sitting right there itching to tackle it for me, with a fast, accurate way to cut the bridle joints and panel grooves. I used a ⅛-in.-thick blade with a flat-top grind to cut this joinery. The bridle

No-math solution for dividers. Start by milling divider stock to match the width of a ¼-in. dado stack. Then set your tools where you want them and mark dado locations wherever you need a divider (1). Cut dadoes for the dividers in pairs (2). Install the dividers, making cutouts to allow easy access to your tools (3).

joint is exposed, so you want the slots to have dead-flat bottoms. Start by cutting the panel grooves, which are centered in the frame parts. Make one pass and then flip the workpiece for a second pass, resulting in a ¼-in.-wide groove that's perfectly centered. Now break out your tenoning jig. Start by cutting the slots in the stiles. Align the blade with one side of the groove and make a cut. Because you took care to center the groove, you can now flip the piece to cut the second side and it should be aligned with the opposite wall.

Cut the tenon cheeks in the same way, this time simply aligning the blade with the outside edge of the groove. To avoid trapping the offcut when cutting the shoulders, trim away most of the waste on the bandsaw, then cut the shoulder on the tablesaw. Cut a stub tenon on the center stile to fit the panel groove. Finally, use your dado set to rabbet the panels, leaving a ⅛-in. gap between the panel and the frame.

The lid is attached with butt hinges, and a simple rope stay keeps it from opening too far. I used 4-mm hemp cord threaded through wood blocks screwed to the lid and case side. Instead of knotting the rope, add glue and pound a wedge into the rope hole. Pare the rope and wedge flush with the block once the glue is dry.

The drawers are the standard dovetailed variety. I chose brown oak for the drawer front to add contrast and provide better purchase for the half-mortise lock screws. The ⅜-in.-thick pine drawer bottoms are glued along the front edge and screwed to the drawer back to help prevent sagging.

When mounting the cast-iron trunk handles, I replaced the supplied screws with through-bolts. I drilled a counterbore on the inside face of the sides so that the nuts would be recessed.

Divide and conquer

To keep tools from rattling around, I installed simple pine dividers in one of the drawers and the plane well. To secure the saws and scrapers, slot a pine block on the bandsaw. The kerf allows just the right wiggle room for sawblades and scrapers. The drawer with the dividers houses a set of chisels, a spokeshave, and layout gear.

The bottom drawer doesn't have fixed dividers. Instead, I've left room for removable boxes and trays. This lets me organize small items and keep them handy. I made a large tray for all my sharpening gear that I can take to my sharpening station. There's a small box for carving tools and another that contains hardware for the projects I'm working on as well as the drill bits and screws necessary for installation. Finally, I have a small tray for odds and ends like tweezers, a pocket flashlight, and such.

I finished the chest by wiping on a few thin coats of shellac. This provides some protection, but doesn't leave the surface too glossy.

Simple storage for saws. Pekovich cut kerfs in pine blocks to secure his handsaws, scrapers, and combo square. The blocks are glued to a medium-density fiberboard (MDF) base and installed as a single unit.

Comfortable Seat for Two

JUDITH AMES

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, with their subtle but noticeable Asian influence. And being 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 first developed when 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 of the bench.

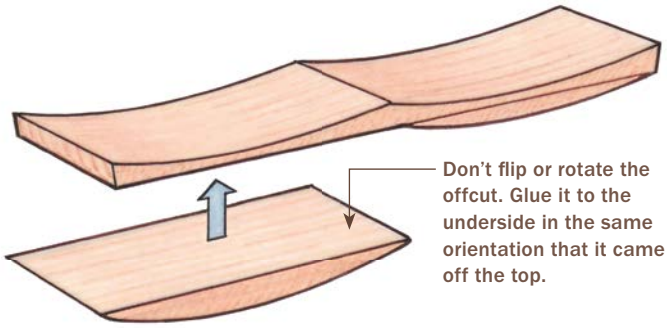
I also am pleased that the simple elegance of the bench is the result of a refreshingly simple technique. The seat is made from two planks of wood. All it takes is two cuts at the bandsaw to rough out the scoops. I then move the offcuts to the underside and glue them in the same orientation. After the two halves are glued together, I shape the legs at the bandsaw and join them to the seat with mortise-and-tenon joints.

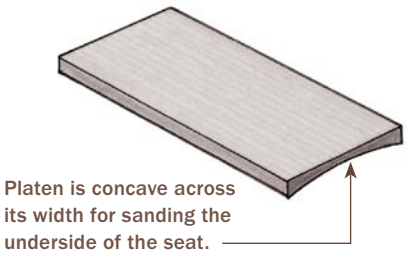
In all, I find this a satisfying piece to make. Not only do my clients find the design pleasing but they find comfort in it, too. And it pleases my frugal Yankee soul that I'm helping to conserve a precious resource by getting the most out of the wood I use to make the bench.

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.

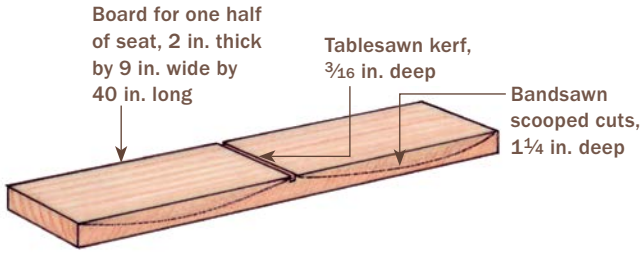
Tablesaw kerf simplifies resawing. When the bandsaw blade enters the kerf, the offcut comes free. Without it, you'd either cut into—and ruin—the second offcut or stop the blade and back out of the cut.

Glue Offcuts to the Bottom





Bandsaw the Seat Profile

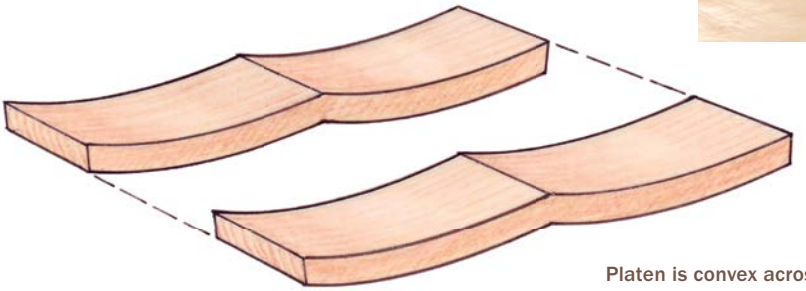


Sand the offcuts before glue-up. They come together at too steep an angle to sand afterward. Ames sands across the grain with a shopmade, curved platen inserted in a belt sander.

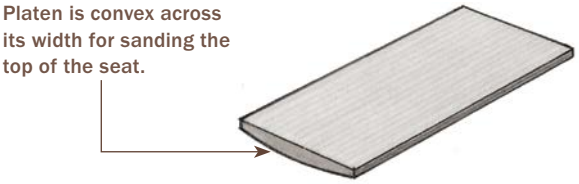
Got clamps? You'll need them now. Ames spaces them 3 in. apart and uses shaped cauls to get pressure into the valley where the offcuts meet.

Glue Two Halves Together

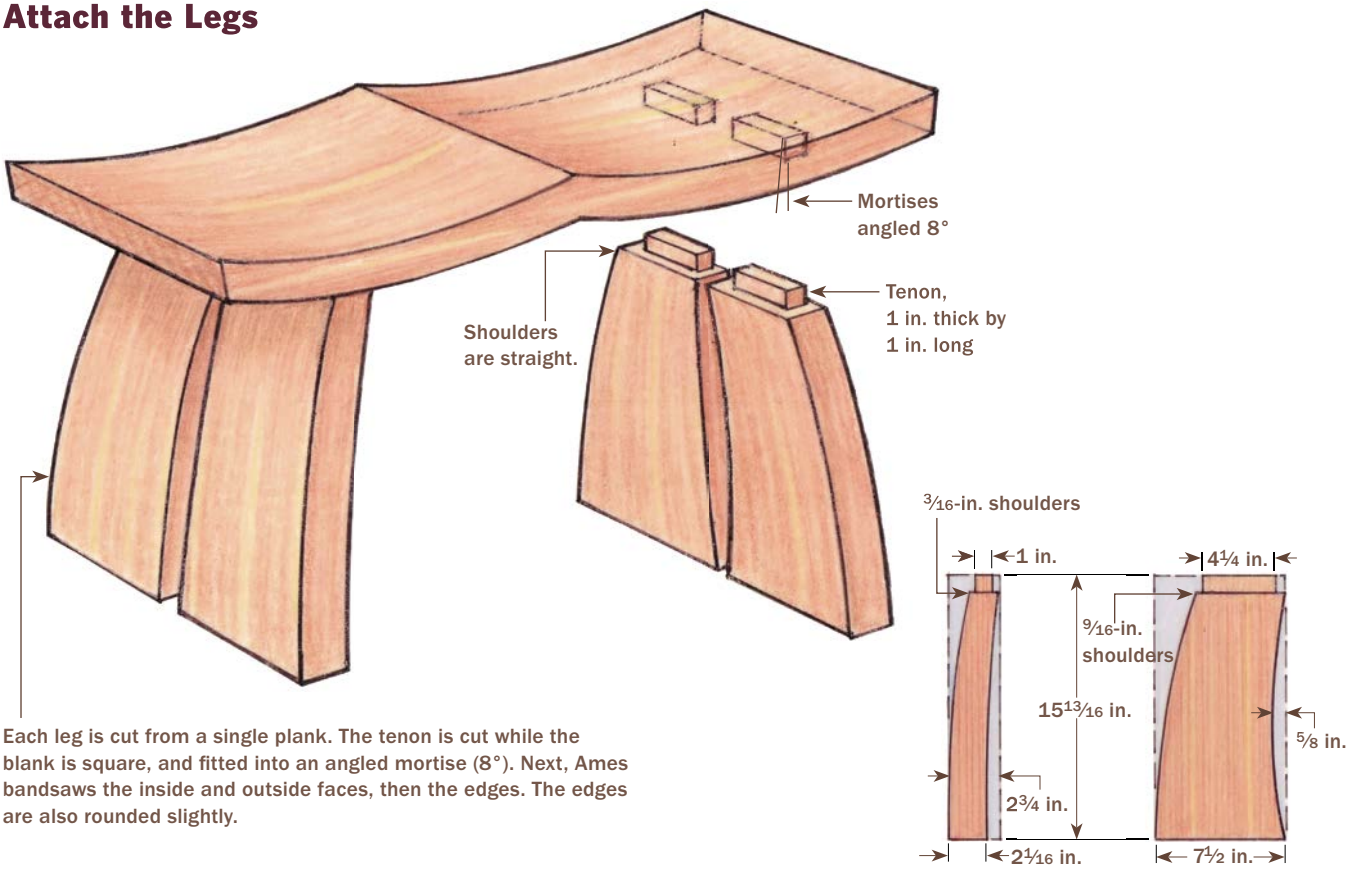
The full width of the seat is made by gluing two boards together. For the best grain and color match, both halves should come from a single longer board.



And smooth the seat. When gluing, Ames aligns the two halves simply by sight and feel. Afterward, she again sands across the grain. The platen for the top side needs only a slight curve. After sanding, Ames uses a card scraper.



Attach the Legs



Each leg is cut from a single plank. The tenon is cut while the blank is square, and fitted into an angled mortise (8°). Next, Ames bandsaws the inside and outside faces, then the edges. The edges are also rounded slightly.

A Classic Step Stool

TOMMY MACDONALD

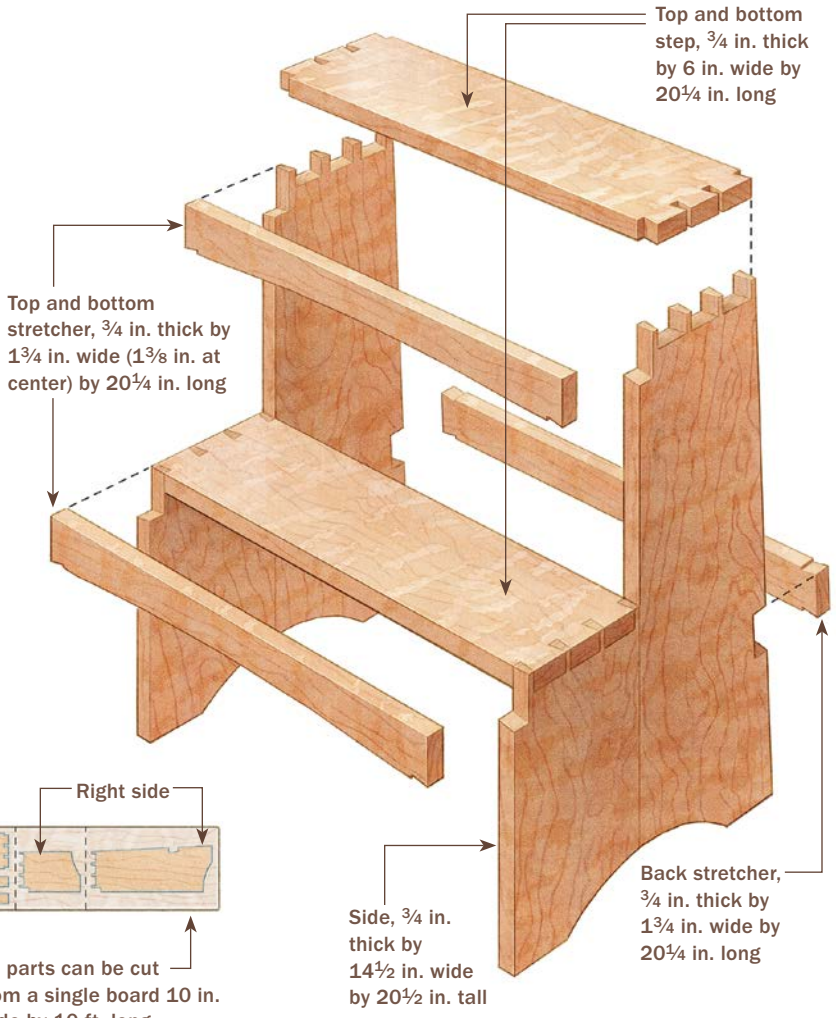
The design of a Shaker two-step stool isn't complicated. There are two steps, two sides, and three stretchers, all joined by dovetails. The crisp, unadorned lines are elegant. My version—influenced by the work of Ira Richer, a former classmate at North Bennet Street School—preserves the simplicity and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

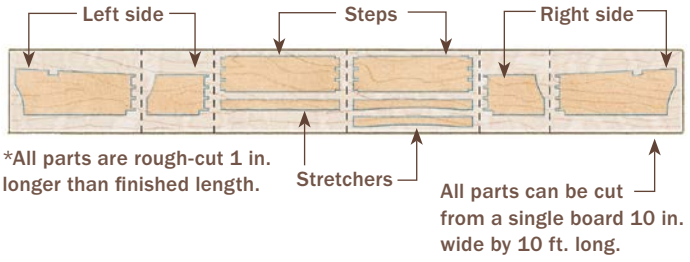
If you're an experienced hand-tool user, this stool is a great opportunity to put your skills on display. There are no hidden parts, so all of your work is visible. It lets you show just how far you've come.

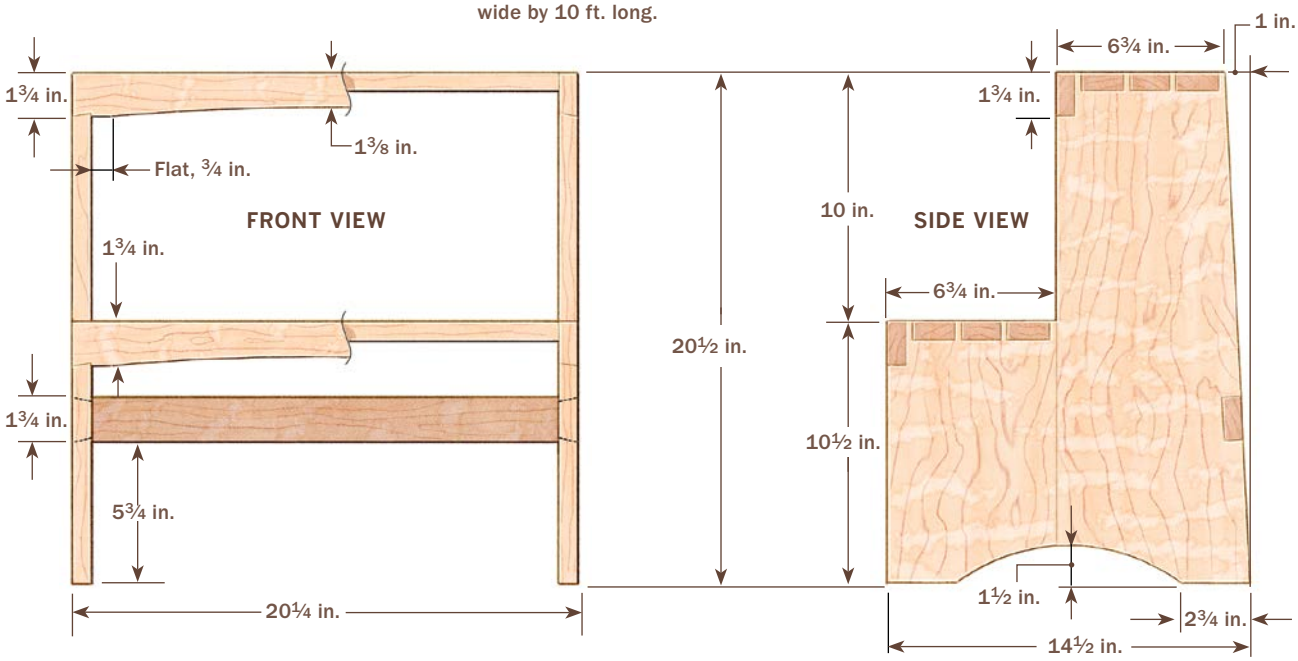
Beginners, though, shouldn't be scared off. I'll show you how a pair of dividers and a small guide block can bring beautiful hand-cut dovetails within your reach. And because the stool is a small project, you can take your time and practice on scrap before cutting into good stock.

Shaker Step Stool

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.

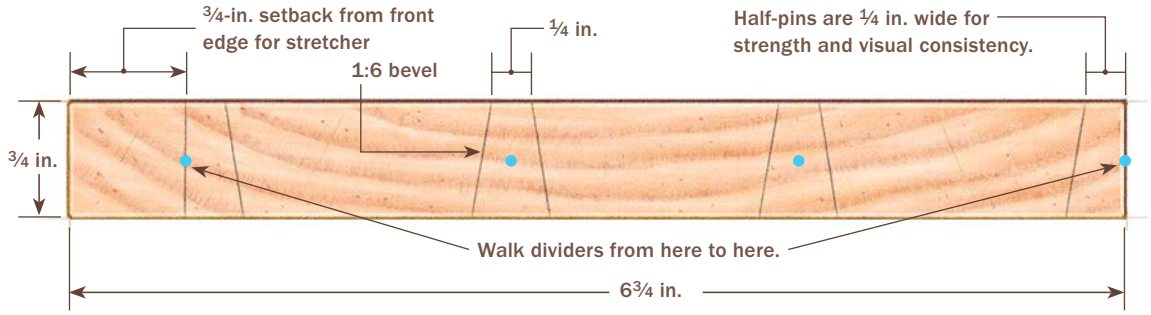






Accurate Layout

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.

Find the pin centerlines. After marking the notch for the front stretcher, and the half-pins, open a pair of dividers about 1⅞ 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.

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 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

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.

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. Use a backsaw to define the pins. Cut to the outside of the layout lines, leaving about 1/16 in. to be pared away.

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.

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.

the tools needed to mill rough 4/4 lumber, use boards premilled to ¾ 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 the drawing on p. 126). 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.

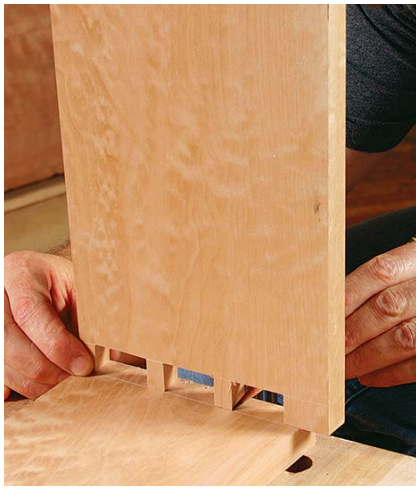
Taper before you lay out

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.

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.

Tails next. After the pins are cut in the sides, transfer them carefully to the tail board (the step). 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.

It begins at the top, 1 in. from the back edge. I cut it with a handsaw and then clean 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

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.

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

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 (top), 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 (bottom).

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 another two to pull it down into its socket.

keeps it square to the shoulder. If your pins aren't square, 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.

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.

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.

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 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.

A Portable Book Rack

GREGORY PAOLINI

Years ago, while researching American Arts and Crafts designs, I took an immediate liking to Gustav Stickley's No. 74 book rack. It's shorter than most bookcases, with slats that form a V-shaped trough to hold books spine up. Its D-shaped handholds make it easy to move.

I've made a dozen racks based on that design, from small desktop versions to extra-tall ones that hold compact discs and DVDs. I've also modified Stickley's design. Simple through-tenons replace the wedged tenons. I added a second V-shaped trough in the middle to make the rack more functional, and I tapered the end panels, reflecting the look of the Roycroft designs that I favor. Despite the changes, the book rack retains its Arts and Crafts character. This version, made from quartersawn white oak, is sized to sit between a couple of Morris chairs.

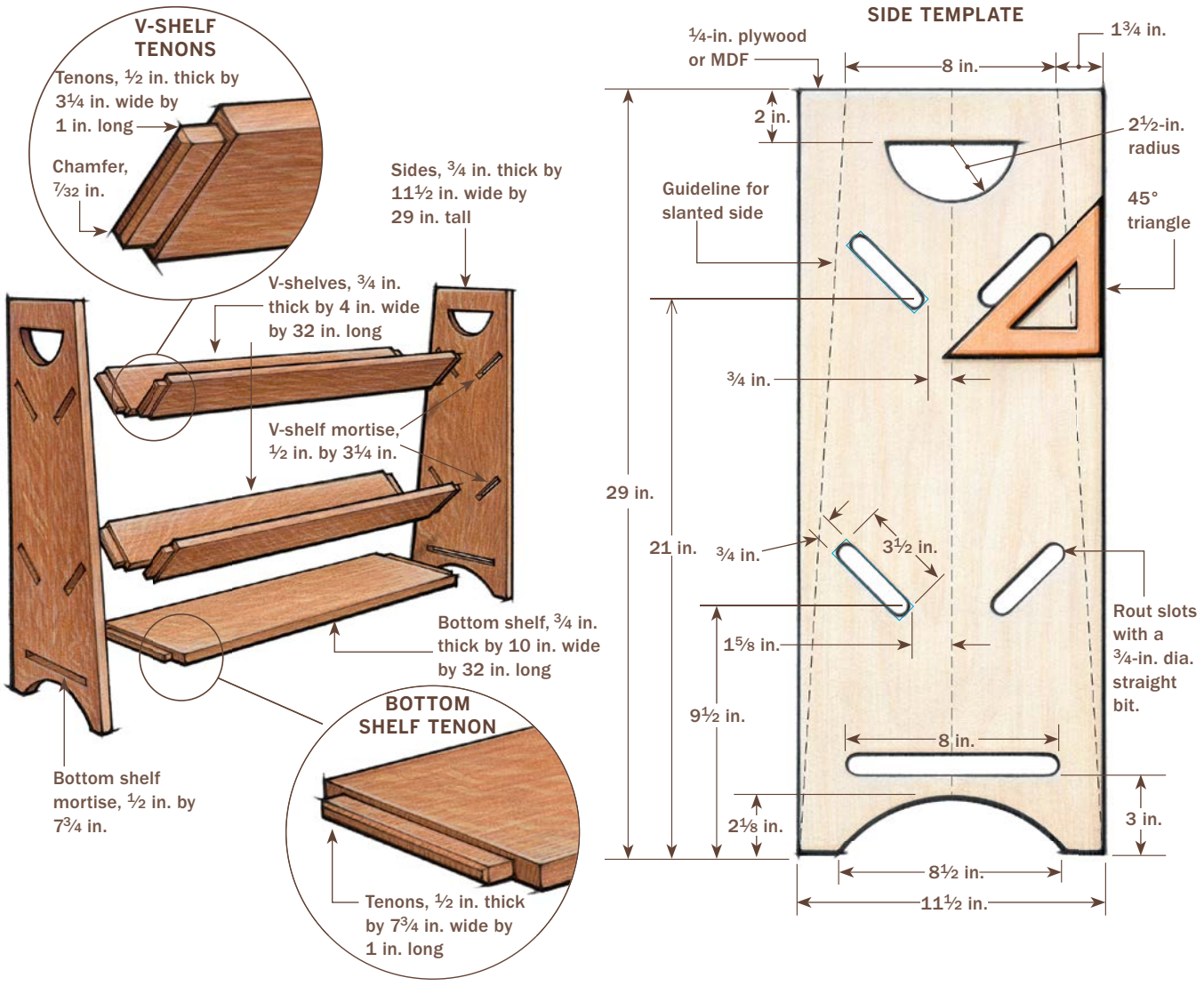
Make the end panels and router template

Because the end panels are the focal point, you want boards with maximum figure. Use single wide boards if you have them, or edge-glue narrower boards.

While the panels are drying, make a router template from ¼-in. medium-density fiberboard (MDF) or plywood, which you'll use to cut slots for the shelf mortises.

The template (see p. 134) simplifies construction in several ways. It locates the shelf

A Stickley-Inspired Book Rack



mortises, of course. And because I clamp the template to the inside face of one end piece and the outside face of the other, it ensures that the mortises will line up. When laying out the slots in the template, all you have to do is draw the dimensions for the ¾-in.-thick shelves and cut a slot that wide. When using those slots to cut the through-mortises, use a bit and guide bushing. The offset between bit and bushing equals the width of the tenon shoulders. I get a mortise the right width, in the right location.

To avoid tearout when routing through-mortises, I work from one face toward the middle, without popping out the other side. So I rout the bulk of the mortises with the guide bushing, then use a flush-trimming bit from the other side to finish them cleanly.

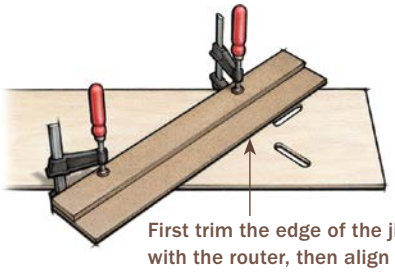
Make the template 11½ in. wide by 29 in. long. Draw the panel side tapers, handle, and lower arch. Then draw rectangles representing the full size of the ends of the narrow V-shelves and the wide bottom shelf. With the template drawn, draw layout lines ¼ in.

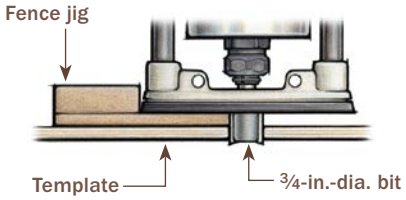
Making the Template

The ¾-in.-wide slots in the template will guide a router bushing for making the ½-in.-wide mortises in the workpieces.

Lay out the slots. Align the template and the triangle against a straightedge clamped to the bench to draw the shelf outlines.

Make the cutouts. Use a straight bit and a fence jig to cut the ¾-in. slots for the shelf mortises. Use a jigsaw for the other cutouts.





from each end of the V-shelf rectangles. For the bottom shelf, draw layout lines 1 in. from the ends. These define the starting and stopping points for the shelf mortises. To cut the mortise slots, clamp a shopmade fence jig flush with the long side of each shelf outline and plunge cut from one line to the next with a router and a ¾-in. bit. Cut out the handle and bottom arch with a jigsaw, then smooth the curves and clean up the sawmarks with sandpaper.

Mill the oak and cut the mortises

Next, I mill all the oak shelves to size and cut the glued-up end panels to length. However, I won't taper the panels until I've finished making all the cutouts with the router.

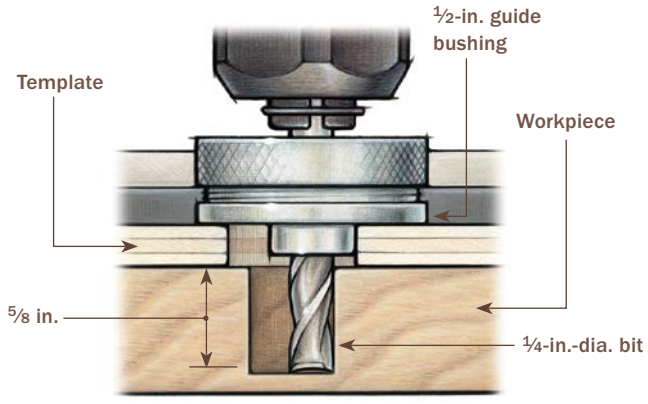
I make the mortises and cutouts on one panel at a time. Rather than clamping them together and cutting everything at once, I set up the template so that the panels are oriented as copies, not mirror images. In other words, the template goes on the outside face of the left-hand panel but on the inside face of the right-hand panel.

Register the template to the side and bottom of the end panel. You can use a long scrap of wood as a fence to help align the template with the side. Clamp the assembly to the bench and mark a small dot on the bottom of the right foot. You'll use that mark to reference how you laid out the panel.

Set up the router and bushing. The ¾-in.-wide slots in the template will produce a ½-in.-wide mortise in the oak, using a ¼-in. spiral bit and a ½-in. bushing. You could also use a ⅜-in. bit and a ⅝-in. bushing. However, the smaller bit leaves a tiny ridge dead-center in the groove, which comes in handy later on.

Rout the outlines for the D-shaped handle, the lower arch, and the shelf mortises in several passes. Don't cut all the way through. When the cuts are about ⅝ in. deep, stop and remove the template. Use a jigsaw to remove most of the waste from the handle and the lower arch.

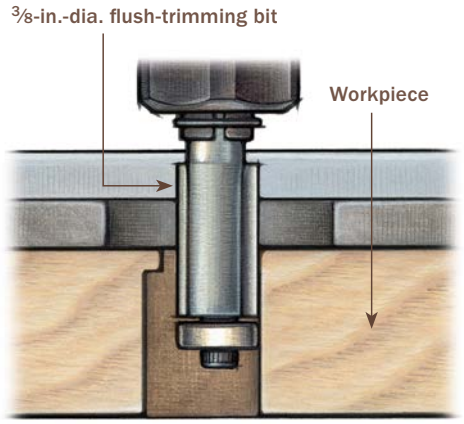
Rout to Partial Depth



Use a guide bushing for initial cuts. Clamp the template to the workpiece. Begin cutting the shelf mortises with a plunge router equipped with a ¼-in.-dia. spiral upcut bit and a ½-in. guide bushing. Use the same setup to make the curved cutouts. Make these cuts only about ⅝ in. deep; don't cut through the work at this stage.

Starter holes for the next step. Drill a hole to allow the flush-trimming bit to enter the mortise. Start with a small pilot hole to locate the center. To prevent blowout, follow with a larger bit from the other side.

Finish the Cut



Flip the work and finish with a flush-trimming bit. Finish the mortises and other cutouts with a 3/8-in. flush-trimming bit, working from the opposite face. To clean up the D-shaped handle and the cutout at the foot, cut away most of the waste with a jigsaw, then use the same bit to smooth the edge.

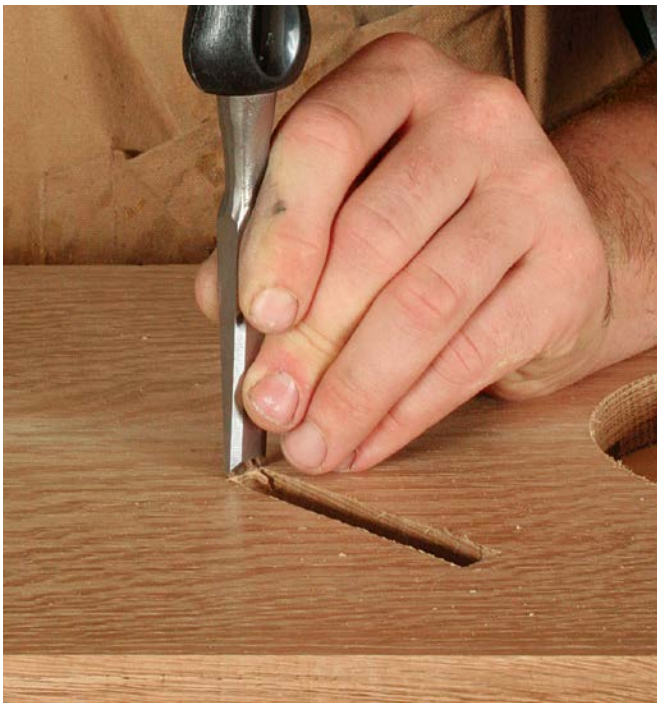
Drill a hole through each shelf mortise. This is where you can use that ridge left by the ¼-in. bit. I like to use it to center a 1/16-in.-dia. pilot hole. Then I flip the panel over and enlarge the pilot hole with a 13/32-in. bit. This gives me a starting place for the router bit I use next.

Flip the panel over, and finish all the cuts with a 3/8-in. flush-trimming bit. I chuck the bit in a laminate trimmer. It's easy to control and lets me clearly see what I'm doing.

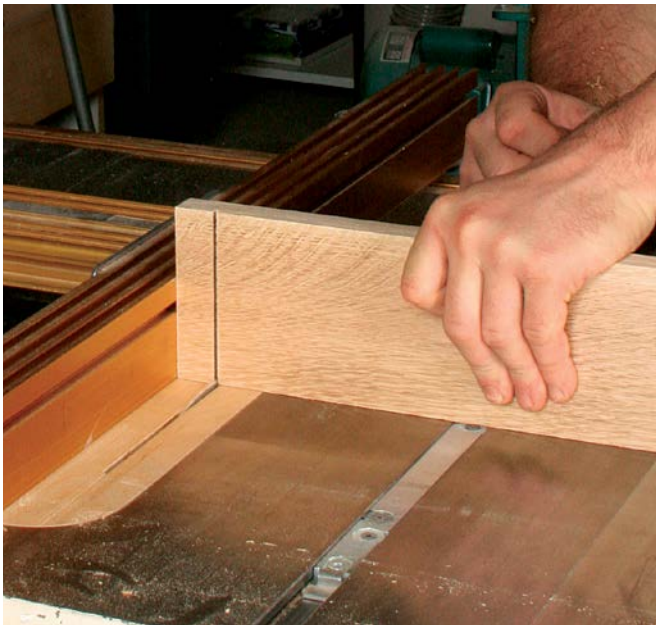
These extra steps guarantee that you won't have any tearout. Square up the mortises with a chisel, working from each face toward the middle to avoid tearout. Finish the panels by tapering the sides on the bandsaw, cutting just to the waste side of the line. I clean up the cuts with a router, using my shopmade edge guide and a straight bit.

Cut the tenons on the tablesaw

The through-tenons on the shelves project ¼ in. from the side panels. They have narrow shoulders on their wide faces, and deep



Square up the corners. Cut away the waste in the corners with a chisel. Chop about halfway down, then flip the work and finish by paring from the opposite face toward the center.



Define the shoulders. Use a combination blade to make the initial cuts for the tenon shoulders. Make these cuts about 1/32 in. deeper than the tenon, to define the shoulders cleanly.

shoulders on the sides. The shoulders hide some imperfections and make glue-up much easier. I cut the tenons on the tablesaw, defining the shoulders with a combination blade to minimize tearout, then switching to a stacked dado set to finish.

You should purposely make the shoulder cuts a hair too deep, which prevents a ridge at the inside corner that you'd have to clean out later.

Trade the combination blade for a stacked dado set to finish the tenons. Cut the wide cheeks first. Set the blade low and raise it gradually through a series of cuts to sneak up on the proper tenon thickness. Test the fit after each cut. Once that first tenon fits the mortise just right, cut the rest. Follow the same procedure to cut all the short cheeks.

Next, chamfer the ends of the tenons. Mark a line 7/32 in. from the ends, then plane to that line at roughly a 45° angle. Plane the long edges first, then plane the short edges.

Finally, soften the remaining sharp edges of the shelves and side panels with a ¼-in. roundover bit in the router.

Fit and finish

Dry-fit the piece. The tenons should slip into their mortises with hand pressure. If you need a mallet, the joints are too tight and you'll need to pare down the tenons with a shoulder plane or a coarse file.

Smooth the pieces with a random-orbit sander, finishing with P180-grit. Then hand-sand all the pieces with P180-grit paper, working with the grain, to minimize any sanding swirls.

I like to do some of the finishing before assembly, when the pieces are easy to handle. To keep finish off the tenons, I wrap them with ½-in. masking tape.

Finish with a dado set. Use a stacked dado set to cut away the waste on each tenon. Check the first tenon often against its mortise to creep up on the right blade height.

The result. You should have tenons with even shoulders, smooth cheeks, and a nice fit.

Chamfer the tenon ends. Use a block plane to chamfer the portion of each tenon that will be proud of the side pieces, working to a layout line. To minimize tearout, plane the wide cheeks first, then the narrow ends.

To simulate the look of ammonia-fumed oak, I follow Jeff Jewitt's technique for using dye and pigment stain ("Safe and Simple Arts and Crafts Finish," *Fine Woodworking* #157). For a simpler finish, I like Minwax early American 230 stain followed by clear shellac or varnish, which looks remarkably like one of Stickley's original finishes.

After the stain has dried, glue up the piece. If you get any squeeze-out, let it dry, then peel it off.

In keeping with the Arts and Crafts tradition, I use shellac as a topcoat. I typically brush on six or seven coats of Zinsser SealCoat™ thinned to a 1-lb. cut. After the shellac has cured, I rub out the piece with mineral oil and 0000 steel wool, giving the piece the satin sheen typical of this style of furniture. The finish should provide plenty of protection for a few generations of readers.

Fine-tune the fit. The tenons should fit into the mortises with hand pressure (left). At the end, you may need to remove a small amount of excess with a coarse file (above) or a shoulder plane.

Dye, then stain. A brownish dye, followed by a darker oil stain, produces a finish that's very close to fumed oak. Mask the tenons to keep finish off the glue surfaces (above). When applying the finish, work carefully to keep the stain out of the mortises (right).

Glue, then shellac. To reduce squeeze-out, put most of the glue on the tenons and only a dab in the mortises. When the glue has cured, apply several coats of thinned shellac. As a final step, rub out the finish.

Arts and Crafts Wall Shelf

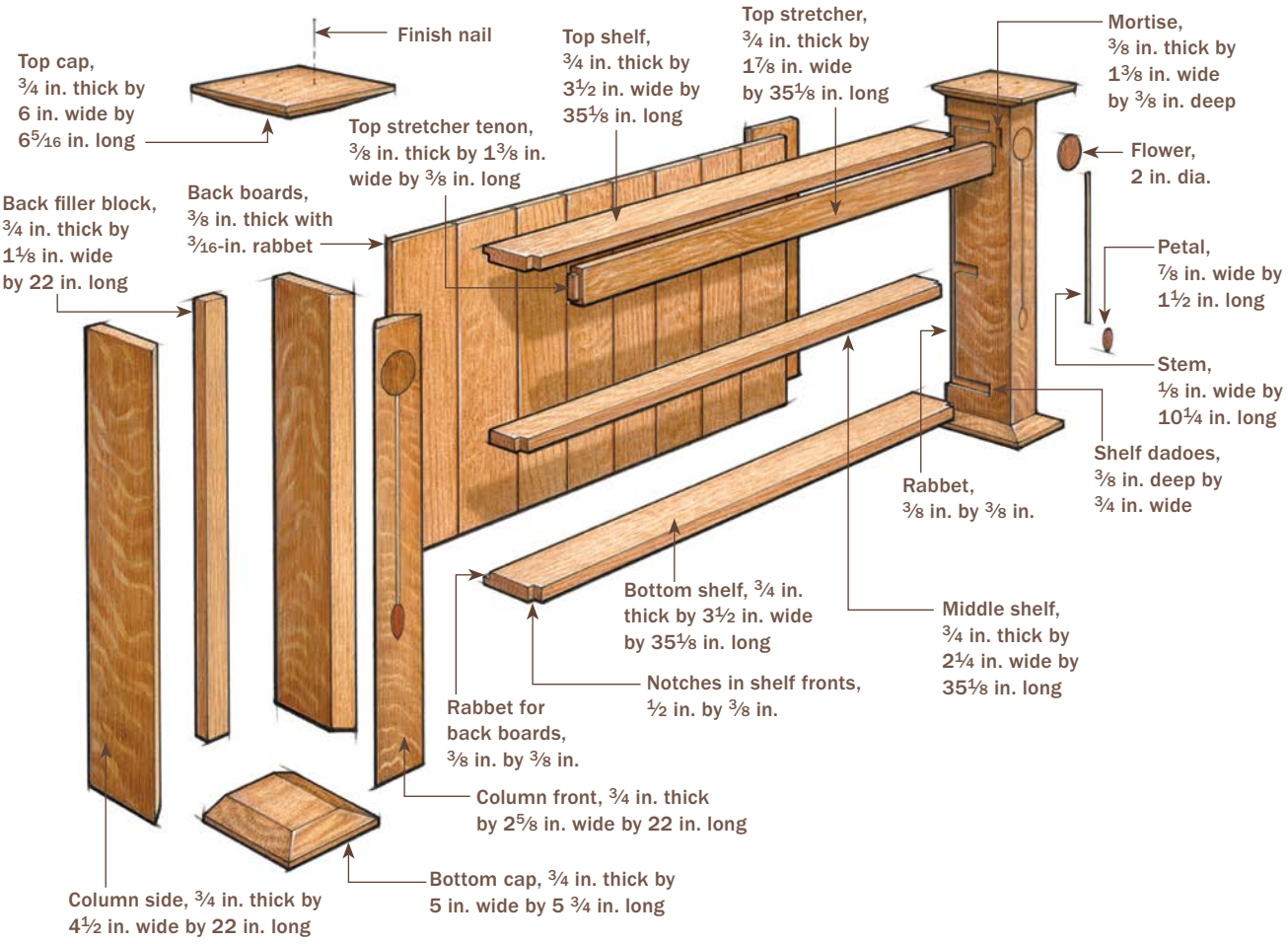
NANCY HILLER

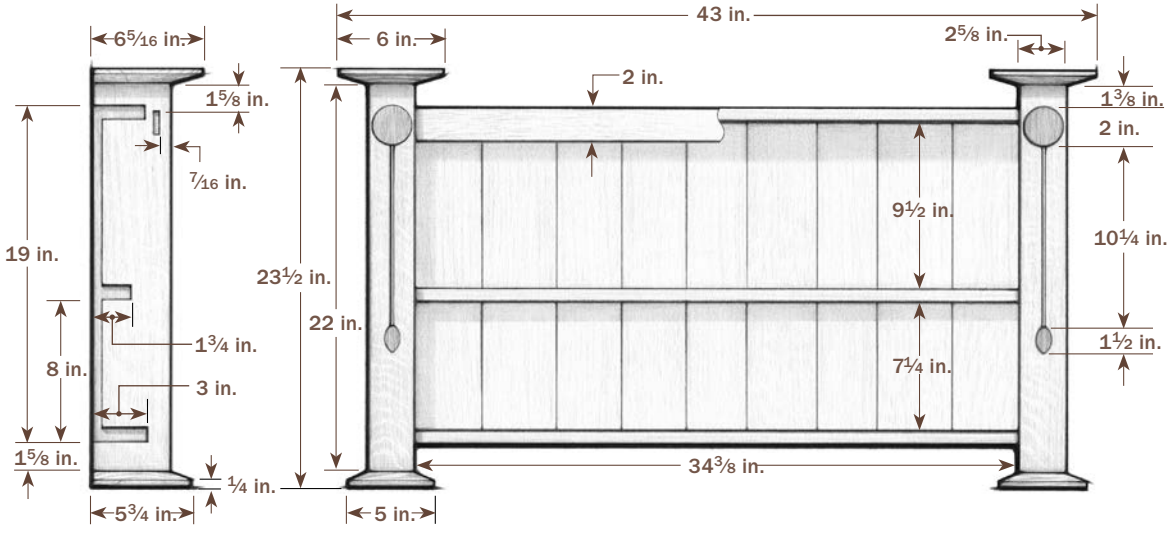
While looking through a book on home design several years ago, I noticed a small cabinet hanging above a claw-foot bathtub. With its inlaid columns and beveled caps, the shelf was wonderfully British in style and was quite distinct from American interpretations of Arts and Crafts design. Although the original cabinet 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 using a number of valuable techniques such as mitered joints for the columns, decorative inlay, and a finish for quartersawn oak that makes new work look old. Although quartersawn oak is the traditional choice for English Arts and Crafts furniture, this piece would look equally good if it were made of cherry or nonfigured maple.

Anatomy of a Wall Shelf

The foundation of this simple but stylish wall shelf is the columns, which are dadoed for the shelves, mortised for the stretcher, and rabbeted for the back boards. The British-flavored end caps are also anchored to the columns.





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.

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

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 visible on each face, with a fourth board inserted as a back filler.

Even if you are not using oak, 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 tablesaw, 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

Insert the filler piece in the back. Once the back is in place, use bar clamps to apply pressure.

Rout shelf dadoes 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 dadoes by hand (above).

Rout a rabbet for the back boards. A rabbeting bit works well, with the guide bearing running against the side of the column. Stop the rabbet in the shelf dadoes.

of the columns to work out any kinks in the process. Now you are 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 (www.garrettwade.com or www.collinstool.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.

I match the putty to the piece only after the third step of the finishing process. 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 dadoes, rabbets, and stretcher tenons

The shelves will be housed in stopped dadoes routed into the columns. Mark the columns and rout the dadoes while the two columns are clamped together. When marking the

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).

dadoes, there are two things you must remember: Because the center shelf is set back more than the other shelves, its dado begins farther back than the dadoes for the top and bottom shelves; and all of the dadoes are stopped short of the shelf fronts to accommodate the notch in the front of the shelf.

Cut the dadoes in one or two passes using a ¾-in. straight bit, guiding the router with a straightedge clamped to the work. With a chisel, square up the front ends of the dadoes.

While milling stock for the shelves (after you have finished cutting the dadoes), be attentive when you get close to ¾ 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 back boards 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 back boards. When cutting the rabbets in the columns,

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.

A simple inlay technique

Prepare the inlays by resawing stock (on the tablesaw or bandsaw) to a 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-faced 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 1/4-in. straight bit set at just less than 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 1/8-in. straight bit (also set at slightly under 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.

Score the outline. Press lightly at first to avoid getting caught in the grain, then more deeply a second and third time.

Remove most of the recess. Rout close to the inlay border, leaving a bit of waste to clean up by hand.

Pare to the line. Carving gouges make it easy to clean up and shape the recess accurately.

Rout for the stem. After routing the groove, rip stock to fit tightly into it.

Glue in the flower and leaf. Use a caul to apply even pressure. Newspaper prevents the caul from sticking to the inlay.

Insert the stem and finish up. Glue and clamp the stem in place (6). Once the glue is dry, scrape and sand the inlay flush (7).

Arts and Crafts finish

Whenever clients want cabinets to look original to a late-19th- or early-20th-century-style home, I use this finish. I have borrowed techniques from two well-known finishers to create a period look. While the five steps to this Arts and Crafts finish may seem daunting, the execution is actually quite painless.

DYE AND STAIN INCREASE COLOR AND CONTRAST

Before applying any finish, sand all parts to P180-grit, then use water to raise the grain and gently sand again with P180-grit. Jeff Jewitt introduced me to using dyes under oil-based stains to bring out the contrast between the basic grain and the rayfleck patterns of quartersawn oak.

First, dye the oak with a water-based dye solution (I use honey amber from TransTint®, dissolved in water at the ratio of 1 oz. to 1 qt.), applying it quickly and liberally with a foam brush, wiping off the excess with a lint-free cloth. During this step and the next (depending on the woods used), it may be necessary to block out and/or stain any inlays your piece might have, to maintain contrast. In this case, I carefully placed a sealer coat of clear shellac over the inlay after it had been glued in place and sanded, but before applying the amber dye. To knock back any raised grain, lightly sand with P320-grit paper.

Next, use an oil-based stain (in this case, Minwax's early American) to bring out the wood's full figure. Apply the stain generously using a foam brush and leave it on for 5 minutes to 10 minutes. Wipe off any excess stain using a clean, lint-free cloth and allow the piece to dry overnight. Make sure to check periodically for stain weeping out of the oak's open pores, removing any you find.

SEAL IN THE PREVIOUS STEPS WITH SHELLAC

A professional floor finisher once advised me that I could get an old look on pine floors by adding amber shellac. So once the stain has dried, I brush on a thin coat of Zinsser's premixed amber shellac to achieve a look similar to the shellac-based varnish that was used in many older houses.

The shellac also seals the piece before the aging steps. When the shellac has dried, scuff-sand with P320-grit paper and wipe off the dust with a tack cloth. Now you can judge the final tone of the finish and fill any holes with matching wood putty. Scuff-sand again.

SIMULATE SIGNS OF AGING

Teri Masaschi's suggestion to use gel stain for shading enables me to mimic signs of age without heavy-handed distressing.

Using a rag, apply gel stain in a compatible color (for this application, I used dark walnut from Old Masters®) to areas where dirt would typically have built up, such as joints, crevices, and around hardware. Let the gel stain set for 10 minutes or so, then with a lint-free cloth, gently rub and feather out the shading to create a natural-looking patina. Allow the gel stain to dry overnight.

Two coats of oil-based polyurethane finish the piece. You can follow it with a generous application of paste wax, applied with 0000 steel wool and buffed out with a soft, lint-free cloth.

stop them in the upper and lower shelf dadoes. 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.

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 does not have a stretcher, will be set back about ¾ 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 back boards. 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 tablesaw. Test-fit the shelves in their dadoes.

Create the decorative inlay and assemble the case

I do my inlay 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 (see "A simple inlay technique," on p. 146).

At this point, the piece should be ready to dry-fit. First, sand all of the parts 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 back boards, rabbeting alternate edges on the tablesaw. Sand the back board faces and use a block plane to work a small bevel on the front edge of each board. Apply finish to the back boards. Once all the other parts also have been finished, attach the back boards 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.

Shaker Side Table

CHRISTIAN BECKSVOORT

The first time I saw a photo of this small table, I was thrilled, but also taken aback. It looked to me like something designed in Denmark in 1960, not in a Shaker village in the early 1800s. The Shakers designed a variety of beautiful round stands, and I've written about other versions—and built more than 100 of them—but this one in my opinion is the ultimate. With its slightly concave tapering post, thin top, and light, half-crescent legs, the piece sums up the power and simplicity of Shaker design.

It also happens to be the rarest of round stands; only one original in this form is known to exist. I've since built several reproductions, in a variety of woods and refined the parts until they are as near to the original as possible.

Start with the top

My first move when I make this stand is to glue up a blank for the 16⅛-in.-dia. cherry top and put it aside. A single-board top (like the original) is ideal, but because that kind of plank is rarely available, I usually cut two pieces from a 9-in. or 10-in. board and edge-glue them. I look for a flatsawn or rift-sawn board and disguise the glueline by putting two rift-sawn to quartersawn edges together.

Turn the post

Start the post by selecting stock with grain as straight as possible and turn a 2-in. cylinder. Using a story stick, make pencil marks on it at each of the dimensions. On the top end, turn a tenon 1 in. dia. by ¾ in. long. Just below the tenon is a flared bulb. Its curve is not an arc but rather a section of a parabola. Turn the diameter below the bulb first, using a parting tool. Then use a small gouge and a spear-point scraper to turn the bulb itself.

The long part of the post is not a straight taper but a concave flared curve, and reproducing that subtle shape requires precise turning. I use a parting tool fitted with a gate jig to make a series of cuts that will control the shape of the curve. If you prefer, you can use calipers instead of the gate jig. The last section of the post—where the legs will dovetail in—must be perfectly cylindrical and the small shoulder should be crisp. Make a series of depth cuts with a parting tool, clean them up with a spear-point scraper, and follow with sandpaper on a block.

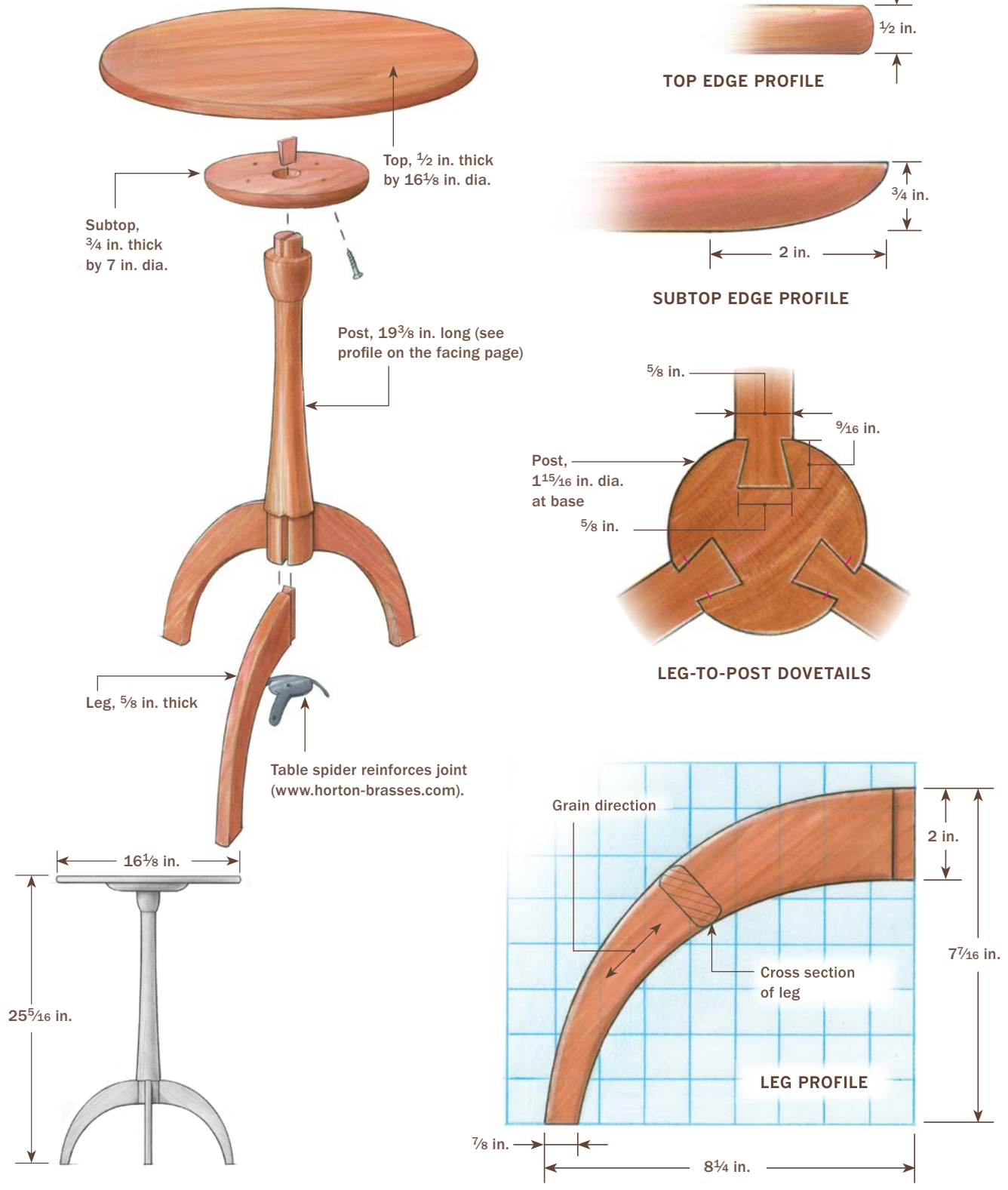
With the bottom cylinder complete, move on to the main section of the post, cleaning out the waste between the parting-tool cuts with a sharp gouge and then fairing the curve with a thumbnail gouge. When the turning is finished, leave the lathe running and sand the whole post to at least 400 grit, followed by a rubdown with 0000 steel wool.

Shape and dovetail the legs

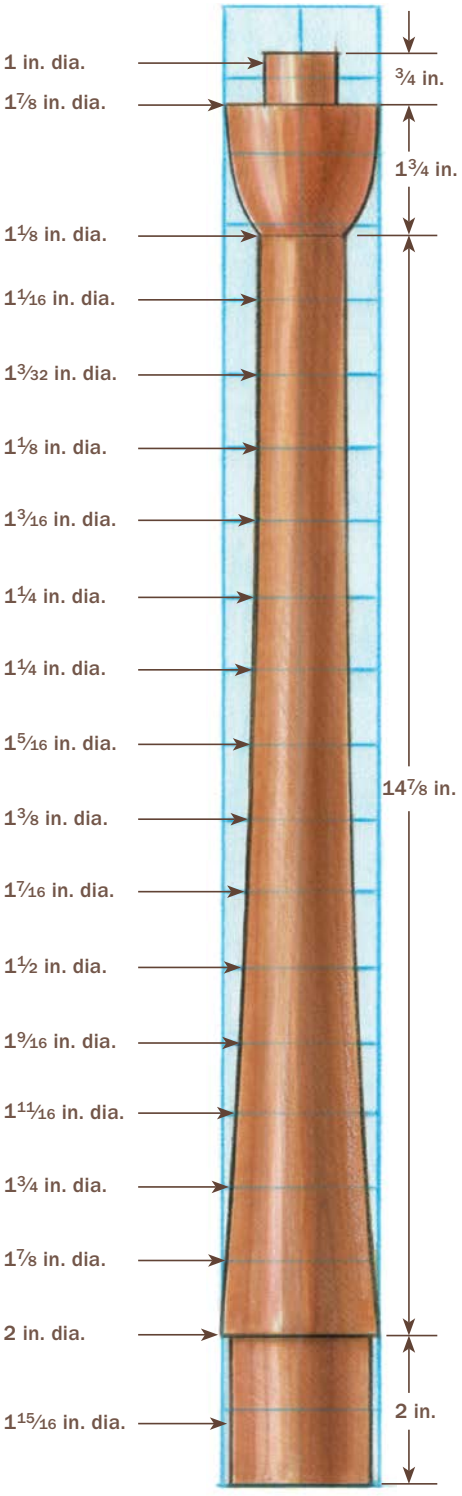
Make a pattern for the legs and trace it three times onto ⅝-in.-thick stock, orienting the pattern so the wood's grain runs more or


cowboy junkies

A Delicate Round Stand



Post Profile



Where to find the rarest round stand

The lone original example of this table, made at the Mt. Lebanon, N.Y., Shaker village in 1820, is in the collection of the American Museum in Bath, England. John Kassay measured and drew the table for his classic book, *The Book of Shaker Furniture* (University of Massachusetts Press, 1980), which is still in print.

Marked and measured. After turning the cylinder, use a pencil to transfer diameter marks from a story stick (1). Then turn the tenon (2) and the bulb at the top of the post (3).

Dial in the diameters. Use a gate jig (1) or a pair of calipers to control the depth of cut. Establish the critical diameters of the post with a parting tool (2). Then remove the waste between the grooves with a heavy, shallow gouge (3), before fine-tuning the surface with a fingernail gouge.

Sandpaper cleanup. Smooth the taper and the bulb with sandpaper, going through the grits from 150 to 400, and finishing with steel wool (top). For the cylinder at the base, back up the paper with a sanding block to be sure the surface stays flat (bottom).

Turn the subtop while you're at the lathe. After bandsawing out a disk, turn it perfectly round. Then shape the curved profile on the bottom edge with a roundnose scraper.

less straight between the two farthest points of the leg. Cut out the legs on the bandsaw and sand the curves fair. Then, at the router table, use a roundover bit to cut a shallow arced profile into the curved edges of the legs. Next, create the dovetail keys on the legs at the router table, using a 14° dovetail bit. Then finish-sand the legs to 400 grit and rub them with 0000 steel wool.

Mark and cut the dovetail sockets

To properly locate the dovetail sockets, clamp the post upside down in the vise and divide the bottom into three 120° sections. You can do this with a protractor or a compass, but I do it with paper. Wrap a strip of paper around the end of the post, marking and cutting it to the exact circumference. Flatten the paper on the bench and divide its length into exact thirds. Then wrap the paper around the post again and transfer the marks to the end grain.

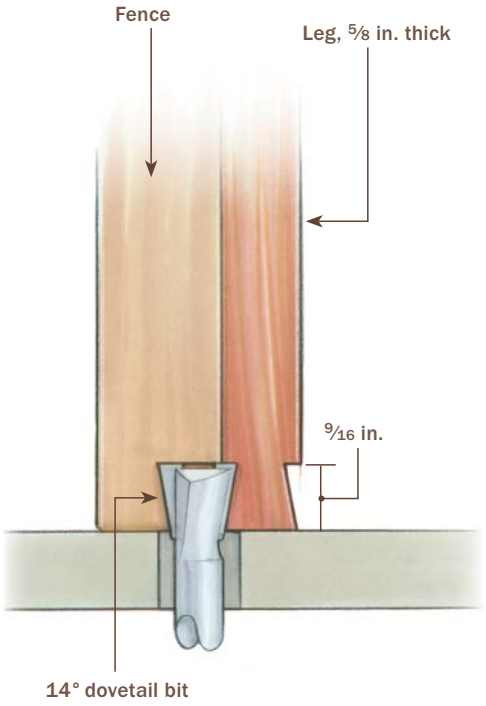
Now position one of the leg dovetails on the post's end grain so that it sits flat and the tips of the shoulders just touch the rim of the post. Put it just to one side of one of the third marks. Then scribe around the dovetail with a knife. Repeat the process for all three legs, and be sure to number the legs and their mating sockets. If the knife marks are faint, I highlight them with a chisel. Use a small square and a pencil to bring the lines down the face of the post to the shoulder.

To cut the sockets, position the leg in the vise at about a 30° angle. Using a rip dovetail saw, cut on the inside of the pencil lines, following the knife marks. Because you have to stop shy of the shoulder, this angled cut will create a bit less than half of the cheek of each

Leg layout. Trace the shape using a cardboard template, orienting the grain so it runs straight from tip to tip (see "Leg Profile" on p. 152).

Strapped in for sanding. After cutting the legs, tape them in a stack and smooth the ends and the outside curve at the disk sander (left). Sand right through the tape. Retape the stack, then fair the inside curve with a drum sander (above).

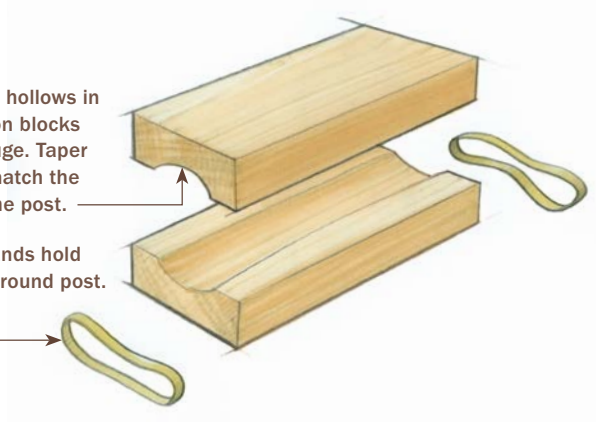
Dovetail the Legs to the Post



Standing dovetail. Cut the sliding dovetail keys at the router table, using a dovetail bit and a tall fence.

Socket layout. With the post inverted in the vise, scribe around the dovetail key. Pine cushion blocks hold the post steady.

Cushion Blocks Hold the Post



Extend the layout lines. Use a small square and a pencil to carry the scribed lines down to the shoulder.

Saw the socket. With a rip dovetail saw, cut a kerf just inside the pencil lines and as deep as you can without hitting the shoulder.

dovetail. The rest of the work is done with a chisel, using the sawn plane as a guide.

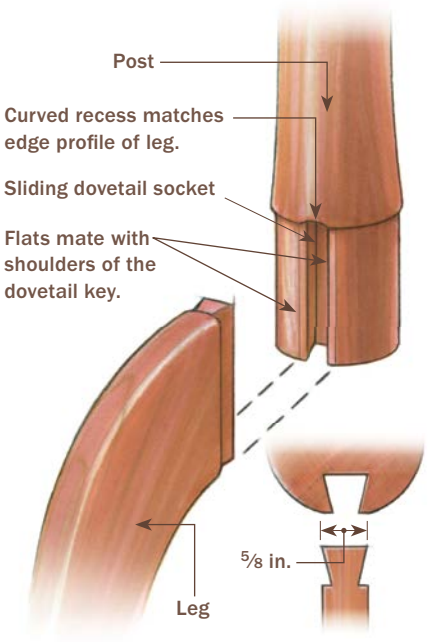
Carefully define the end of the socket by chopping downward right at the shoulder line, then begin chiseling out the bulk of the waste between the sawcuts. Once most of the waste is removed, place the chisel into the knife cuts and pare down the slot. If the grain runs perfectly straight, this works fine. Unfortunately, it often runs to the left or right, in which case one side pares very well, while the other side tears into the post. When that happens, instead of paring along the grain from the end of the socket, pare across the grain from the outside of the post.

Fit and glue up the dovetails

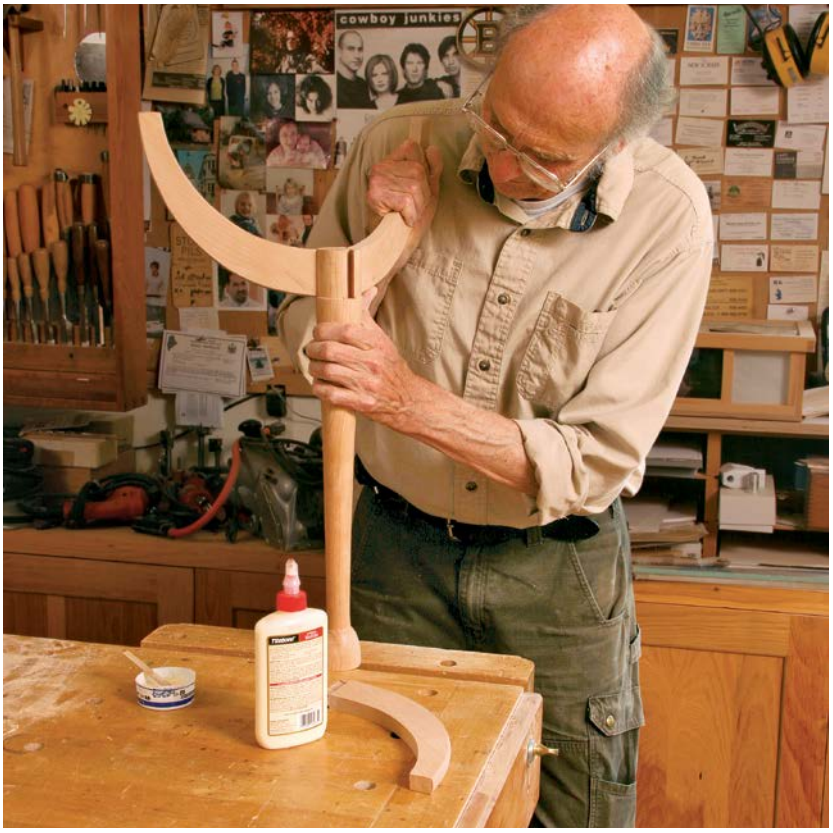
Once the socket is well-defined, begin fitting. Mark the three leading edges of the dovetail key with a pencil and push the leg in as far as it will go with moderate hand pressure. The graphite transfers to the edges of the socket and shows where the dovetail is binding.

It's chisel work from here. Establish the shoulder of the socket with several mallet hits (top), then remove long chips of waste, working from the end with the chisel horizontal. Extend the cheeks beyond the sawkerfs with vertical and horizontal chops (bottom).

Attach the Legs



Flat tops. Cut flats on each side of the socket to seat the shoulders of the dovetail keys (left). Use a shallow gouge to cut a crescent-shape recess to accept the rounded edge of the leg (right).



Mark and fit. To fit the joint, rub the leading edge of the dovetail key with a pencil, insert the key, and pare darkened wood from the socket (left). When all the joints fit, apply glue and pull them home with hand pressure (above).

Joint cleanup. After the glue cures, smooth the bottom of the post with a drum sander.

Bottom needs support. Screwing in a metal brace, or spider, reinforces the sliding dovetails. Becksvoort bought his spider and modified it, cutting several inches off each of its legs.

Pare this away from the socket, and repeat the process 5, 10, even 15 times until the leg slides all the way to the end. It should seat with no wobble. Too loose a fit means a weak joint. But you shouldn't have to pound a leg in, either; if it's too tight it could split the leg. When all three legs are fitted, glue them in. If they fit right, there's no need to clamp them.

Subtop and true top

Bandsaw out the subtop, mount it on a faceplate, and shape its edge profile on the lathe. After turning, drill a 1-in. hole in the center of the subtop to mate with the tenon at the top of the post. The original table has a small metal plate, or spider, at the bottom of the post to reinforce the joints. You can cut your own spider out of ⅛-in. sheet metal, or order one from Horton Brasses.

Finally, bandsaw the top to a 16-in.-dia. circle and fair it on the disk sander. Then create the edge profile with a balloon sander. Alternatively, it could be done with a rasp, file, spokeshave, or router. Finish-sand the top to 400 grit and attach it with four wood screws up through the subtop.

I use a straight linseed-oil finish of three or four coats. Because it has no UV filters, linseed oil allows the cherry to darken faster than any other finish.

Crosswise wedge. To avoid splitting the subtop, orient the wedge perpendicular to the grain. After the glue cures, saw off the wedge and chisel the tenon flush. Then attach the top with screws through the subtop.

The completed table is a delicate version of the iconic round stand.

Blanket Chest by Hand

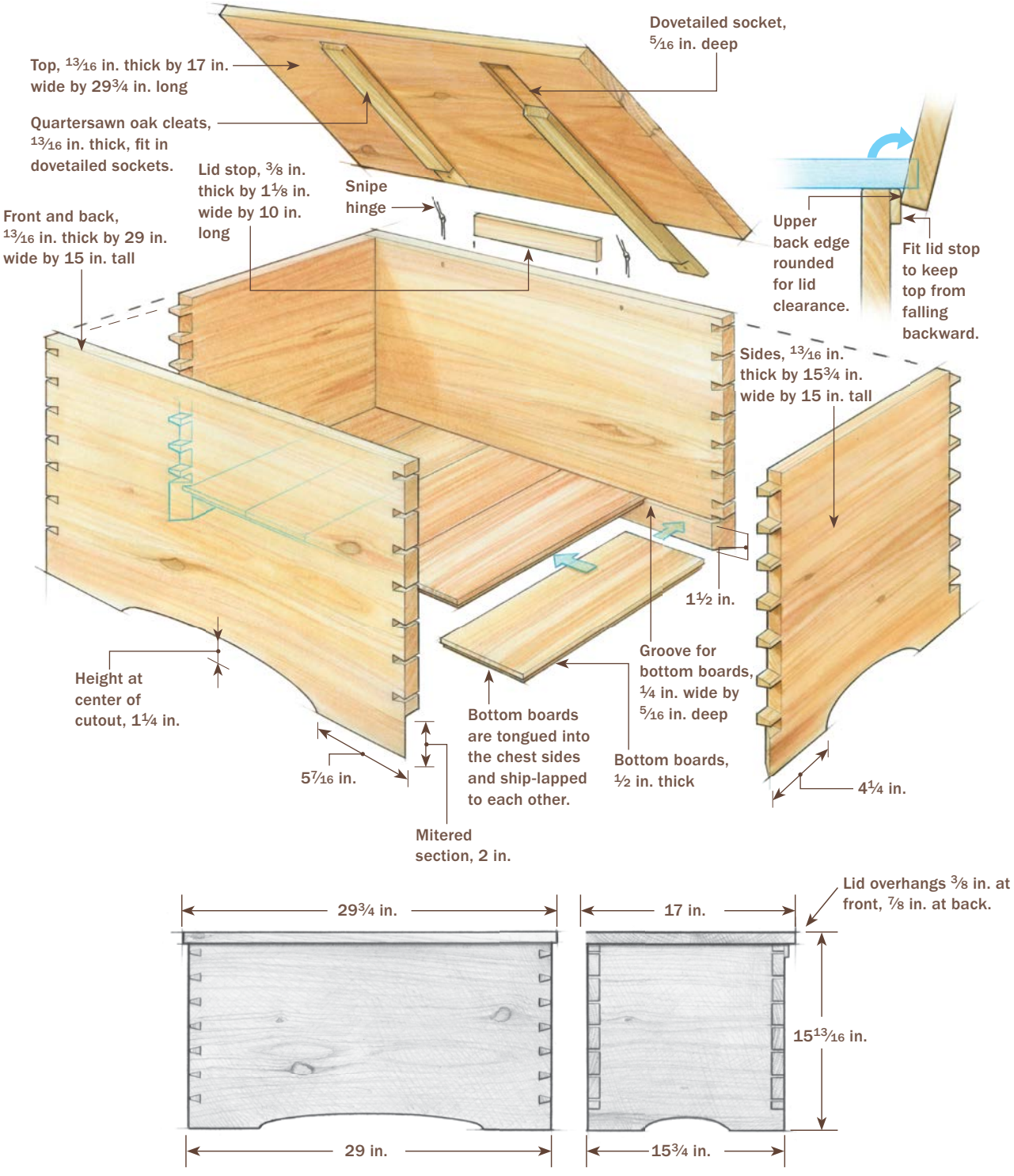
ANDREW HUNTER

Trends in furniture come and go, but Early American country furniture endures. Country pieces, with their simplicity and practicality, can find a home in any setting, from an 18th-century farmhouse to a New York City loft. The clean, unpretentious designs, born of necessity, have an honesty that gives them lasting beauty. But for a woodworker, the real beauty of country furniture is in the making. Everything from fine dovetails to clinched nails is appropriate as joinery, and eastern white pine—the wood of choice for so much Colonial furniture, and my choice for this chest—is a dream to work.

Country designs are ideal for building solely with hand tools, and the classic six-board chest is a great project for developing your skills. It is small enough not to over-

Dovetailed Pine Blanket Chest

Leaving the dovetails 1/16 in. proud of the face adds an interesting detail and hides future wood movement.



Start with the groove. After milling and cutting the boards to size, begin the chest by cutting the groove for the bottom boards. A grooving plane makes short work of the task (top). Then create the cutouts at the bottom of the chest, sawing close to your layout lines with a bowsaw or coping saw and smoothing the surfaces with spokeshaves and chisels or files (above).

whelm yet chock-full of enjoyable joinery. One can work without the pressure to be perfect. Imperfections and stray tool marks in a country piece only add to the feeling of authenticity. Although I'll demonstrate using only hand tools, you can choose your battles, depending on the skills you have or wish to develop.

Preparing the boards

My father and I sawed up a large white pine tree 10 years ago, and I've made a number of country pieces with those beautiful planks. But even though pine is my preference, any locally abundant, easily worked wood fills the bill for this project. And while I had the luxury of using full-width boards for my chest, you can always glue up narrower boards if wide boards are not available, matching two boards to look like

Dovetails by hand. These protruding dovetails also have a short miter at the bottom, giving the chest a clean base section. To start Hunter lays out the dovetail pins with a mechanical pencil and a sliding bevel (above), then scores along the baseline, in the waste areas only, with a marking gauge (right).

Mark the miters. When you lay out the 45° miters on all four boards, begin at the baseline. The miter's tip should end 1/16 in. shy of the end of the board. The dovetails need the extra length because they're proud.

Rip the pins. Hunter saws just shy of his layout line, then pares right to it, leaving the line for reference.

one or simply using random boards for an uncalculated country look.

I milled all the stock for my chest with hand tools. Of course, you could mill your wood with a jointer and planer instead and begin the hand-tool work after that. Once you have straight, flat boards, rip and crosscut the four main boards and the lid to their final dimensions. But leave the bottom boards and the lid cleats wide and long for now.

Construction work begins at the bottom

Start the joinery by laying out and cutting the grooves for the bottom boards and the cutouts that form the feet. Locate the grooves in the mitered section of the corner joints, so they can be through-grooves, which are much easier to cut. Plow these grooves before you make the cutouts so you still have the bottom edge of the sides to use as a reference surface. I used a grooving plane with a fence for this job. Alternately, you could use a panel saw with a guide block and a chisel.

Next come the arched openings. To lay them out, I made templates cut from cereal-box cardboard. I first drew a number of curves freehand, and when I had one I liked,

Chop and pare. Chop away the waste between the pins with heavy blows, leaving 1/16 in. or so along the baseline (top). Follow with paring cuts, starting with the tip of the chisel in the score line. Work from each face of the workpiece toward the middle to avoid blowout (bottom).

Two-step layout. With the pin board simply standing along the baseline on the tail board, Hunter makes a short pencil mark inside each pin cheek (left). Then he removes the pin board and extends the marks with a sliding bevel (right).

Saw, chop, and pare. Saw close to your lines and then chop out the waste, staying away from the baseline. Last, pare to all of your layout lines.

Cut all of the miters now. Cut the mitered faces first with a ripsaw. Then saw in from the side to cut the waste free. Use paring cuts with a chisel to clean up the miters, and fit one to the next.

I made a template from it. To be sure the two ends of the cutout were mirror images, I made the template for just half the opening and used it to lay out both sides. I cut out the curves with a bowsaw and followed it up with spokeshaves and chisels to smooth the cut and fair the curves. You could use a coping saw or even make multiple relief cuts with a handsaw and chisel away the waste. The best tool is the one you have—making do goes along with the country theme.

Story pole simplifies joinery layout

Accurate layout is the most important part of the project, and I try to focus all my attention while I'm doing it. After that I can relax a little and just enjoy working wood—all I have to worry about is not going over the lines.

Start by laying out the baselines for the dovetails on all four boards in pencil with a sliding square. Because the dovetails will be proud, set the square to the thickness of the

Final touches before assembly. With all the joinery cut, Hunter creates a glassy finished surface with light passes of a Japanese smoothing plane (left) and chamfers all exposed edges (right).

Tiny chamfers are a big help. Chamfered edges give the proud dovetails a distinctive look and also make assembly go more smoothly.

stock plus 1/16 in. Leaving the dovetails proud is not just an aesthetic choice. Over time, as the wood moves, joints that are cut flush don't stay exactly that way, and protruding joinery will accommodate any such changes. With the baselines marked, locate the pins and the mitered foot with a story pole. Using a story pole will ensure that all four corners of the chest are laid out identically.

I drew the pin cheeks using a bevel gauge set to about 14°. Then I used a marking gauge to score the baseline of the pins. The tail layout waits because you'll trace the tails from the pins. Take care when laying out the mitered foot because the dovetails are proud, they'll extend 1/16 in. past the point of the miter.

Create the dovetail pins

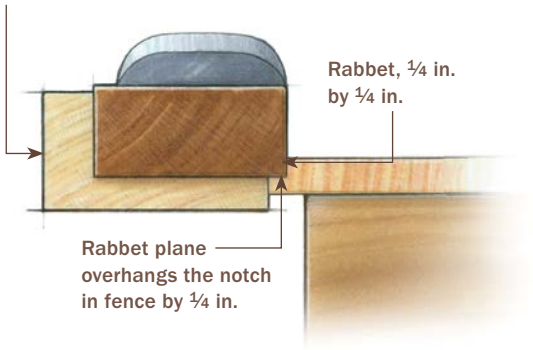
I used a Japanese ripsaw to cut the cheeks of the dovetail pins, but of course a Western saw will get the job done, too. I cut the dovetails while sitting on a stool with the board lying on my bench. This puts the workpiece at eye level for great control of the cut.

With the cheeks sawn, begin chopping away the waste between the pins, chiseling about 1/16 in. from the scored baseline. Be sure the workpiece is well supported beneath because any give will steal force from the chisel blow. Working in soft wood, such as pine, there's a greater tendency for end-grain tearout. To minimize it, use low blade angles on sharp chisels and give firm blows, working from both sides toward the middle. To protect my bench, I support the board at both ends on scraps of 1/4-in. plywood.

After chopping close to the baseline, pare away the rest of the waste, inserting the

Shopmade Rabbet Fence

Scrap of solid wood notched to fit a rabbet plane is held in place during the cut.



Rabbet the bottom boards. To cut the tongues and shiplaps on the bottom boards, Hunter fits his rabbet plane with a simple shopmade fence. To prevent tearout on cross-grain cuts, he scores the workpiece with a marking gauge.

chisel point into the scored line. Then pare the cheeks, working up to the pencil line but leaving it as a reference.

Pins generate the tails

To trace the pins, lay the tail board on the bench with its outside face down. Then stand the pin board along the tail board's shoulder line. If the pin board has any cup, use a caul and clamps to keep it straight while you are tracing. The joinery will keep the boards flat after assembly.

With the pin board in place, make a short pencil mark to register the location of each pin. Then remove the pin board and use the bevel gauge to complete the lines. Use a square and the bevel gauge again to transfer the layout to the second face. When you've finished the layout on all four joints, saw the tail cheeks. Then use a narrow chisel to chop close to the baselines. Because the space between the tails is so narrow, I used a narrow chisel, tapped into the end grain, to split the waste so I could remove it as I chopped. After paring to the baselines, pare the cheeks as well.

The last part of the joint to be cut is the mitered section at the foot. First, with the workpiece clamped so the feet are pointing up, make the angled crosscut. Then clear the waste with an angled ripcut. Clean up the sawcuts by paring with a chisel.

Getting ready for glue-up

Before test-fitting the corner joints, put a slight chamfer on the ends of the pins. Go slow with the test-fitting, using light blows and a scrap block to protect the project. If the going is tough, separate the parts by hammering down on the tail board, check for excessive denting, and pare where necessary. When you've made the bottom boards, dry-fit the case to see that they are a good fit.

Once all the parts are fitted, disassemble the chest and use a smoothing plane set very fine to put a finished surface on all the parts. Then plane a small chamfer on the exposed edges. Handplaning the surfaces was my final finish—I didn't apply any coating. The sheen of the wood is from the keenness of the plane blade and the lustrous surface will attain a rich patina over time. Dents, scratches, and stains will attest to its years of usefulness.

Knock home the ends. After applying hide glue to the cheeks of the pins, Hunter hammers home the joint (above). Then he installs the bottom boards. Scraps of ¼-in. plywood under the case accommodate the through-dovetails (right).

Bringing the box together

Assemble the chest with a bit of glue on the pins only, and try to keep any squeeze-out to the inside where it can be cleaned with a chisel after it dries. I used hide glue, which gives me more time for assembly and also means that in the future parts can be reglued because new hide glue will bond with old.

I did the glue-up with the back of the chest lying facedown on the bench. I fit the two ends to it and then fit the bottom boards. I didn't use any glue on the bottom boards, although you could put a dab at the center of each one, as long as you ensure there's a gap between them to allow for seasonal movement.

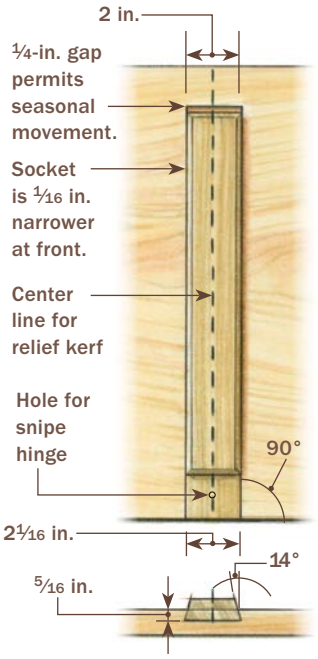
Put a lid on it and add appropriate hinges

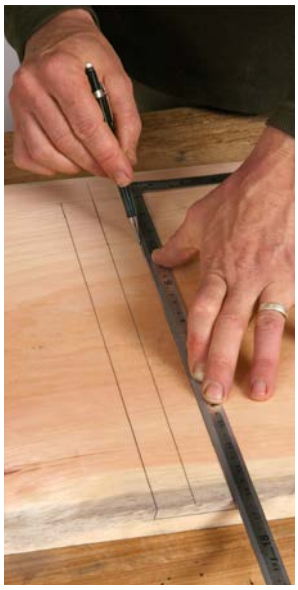
Two quartersawn hardwood cleats in dovetailed sockets keep the chest's lid flat yet allow for seasonal movement. To excavate the sockets, I started with a saw and finished with chisels. I used a Japanese panel saw, which has a convex head, enabling me to start a cut in the middle of the board.

After sawing, clean out the waste with a long chisel or a router plane. Then plane the

Proud and square. Seat the joints with a scrap block placed just inside the pins (left). Then measure the diagonals to check for square (below). If necessary, pull the chest into square by lightly clamping from corner to corner.

Cleat Socket Layout





Cleats keep the lid flat. The cleats fit in a dovetailed socket. The socket, tapered slightly along its length, is 1/16 in. wider at the back of the lid than at the front.

Automatic angle. A block of scrap cut to a 14° angle guides the saw to cut the dovetail socket. Hunter draws a line on the sawblade with an erasable marker to gauge the depth of cut.

Rough removal. Working toward himself with the bevel down, Hunter chisels out all the waste, first on one side of the central relief cut, then on the other.

Out comes the long chisel. Hunter flattens the bottom of the cleat socket with a long, wide paring chisel. He checks his progress with a straightedge.

cleat to its layout lines and test the fit in the socket. The cleat should stop ¼ in. before the closed end of the socket to allow the lid to move with the seasons. Hammer the cleat home and mark it to length. Also mark where the back edge of the cleat will need to be relieved to allow the lid to sit flat. Remove the cleat one last time and make the two cuts. The cleat, which gets no glue, is fixed at the back end by the snipe hinge.

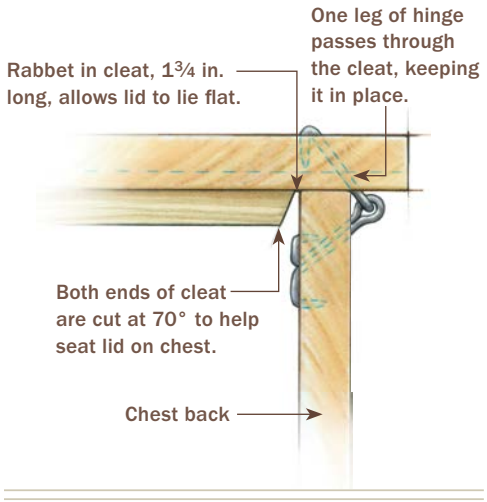
Cotter-pin or "snipe" hinges, common in Colonial furniture, are a simple way to attach the lid, and they function quite nicely, with the added benefit of securing the cleats. You can make them from ⅛-in. steel rod or simply use cotter pins from the hardware store. To install the hinges, drill holes where the back and top meet, centered on the cleats. Loop the cotter pins together and slide them through their holes. With pliers, fold the tips outward 90°. Then hammer each leg over, supporting the blows from below.

Create the cleat. An angled guide block produces the cleat angle. Hunter bevels a scrap block at 14° and uses it like a shooting board to angle the sides of the cleat. He makes the cleats from quartersawn red oak for maximum strength and stability.

Drive it home. Adjust the fit of the cleat until you can drive it in with moderate hammer blows. Wax helps. Leave a ¼-in. gap at the front end of the socket to allow for seasonal movement of the lid.

Trim the cleat. When you are satisfied with the cleat's fit, mark it at the back edge of the lid and cut it to length (above). Then remove it and cut a notch (left) so the last section lies flush with the lid.

Install the Hinges



Drill for the hinges. Snipe hinges—two linked cotter pins—suit this chest. With the lid weighted, drill an angled hole up through the cleat and lid. Then remove the lid and drill the other hole through the back of the chest.

Clinch the deal. With the pins linked, push one through the back, the other through the lid. With the lid closed, use pliers to crimp the ends of the lid pin (above) and clinch it with a hammer (left). Then open the lid and crimp and clinch the mating pin.

Contributors

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Credits

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The articles in this book appeared in the following issues of *Fine Woodworking*:

pp. 4–10: A Box Worth Repeating by Laura Mays, issue 240. Photos by Steve Scott. Drawings by John Tetreault.

pp. 11–16: 2 Fast Ways to Build a Box by Bill Nyberg, issue 210. Photos by Mark Schofield. Drawings by John Tetreault.

pp. 17–24: A Better Way to Build Boxes by Doug Stowe, issue 201. Photos by Tom Begnal. Drawings by Christopher Mills.

pp. 25–32: An Elegant Jewelry Box by Strother Purdy, issue 150. Photos by William Duckworth except for photos p. 25 by Erika Marks. Drawings by Bob La Pointe.

pp. 33–41: Elegant Veneered Boxes by Seth Janofsky, issue 192. Photos by David Heim except for photo p. 33 and top right photo p. 34 by John Tetreault and photos p. 41 by Seth Janofsky. Drawings by Christopher Mills.

pp. 42–53: Pennsylvania Spicebox by Steve Latta, issue 196. Photos by Steve Scott. Drawings by Bob La Pointe.

pp. 54–61: A Unique Cutting Board by Scott Lewis, issue 233. Photos by Jonathan Binzen except for photo p. 54 by Kelly J. Dunton, bottom right photo p. 59 by Scott Lewis, and bottom right photo p. 61 by Asa Christiana. Drawings by Vince Babak.

pp. 62–68: Standing Frame Has Two Faces by Christian Becksvoort, issue 212. Photos by Anissa Kapsales. Drawings by Vince Babak. Needlepoint by Margo Timmons. Woodcut by Mary Azarian

pp. 69–77: Build a Greene-and-Greene Picture Frame by Kelly J. Dunton, issue 224. Photos by Ken St. Onge except for photo p. 69 and photos of the bits and ebony blank p. 76 and p. 77 by John Tetreault. Drawings by John Hartman.

pp. 78–85: A Chessboard Made Easy by Craig Thibodeau, issue 219. Photos by Fine Woodworking staff except for the right photo p. 84 by Craig Thibodeau. Drawing by Kelly J. Dunton.

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