Perfect Mortise-and-Tenon Joints

A plunge router, a tablesaw, and a couple of jigs make the process almost foolproof

BY JEFF MILLER

The mortise-and-tenon joint is one of the strongest woodworking joints. For maximum strength, a mortise-and-tenon joint needs good contact between long-grain surfaces; those are the surfaces on the sides of the mortise and the cheeks of the tenon. That means the long-grain surfaces must be flat, smooth, and parallel. And, just as important, the fit between those surfaces must be snug.

My techniques for cutting mortise-and-tenons have served me well for years. The mortises are cut with a plunge router, a straight bit, an edge guide, and a shop-made jig. Tenons are cut on the tablesaw with a tenoning jig. The machine work generally produces a fit that's right on. If it isn't, the final fitting is done with a few hand tools. All of the techniques are simple and efficient, and they result in perfect-fitting joints.

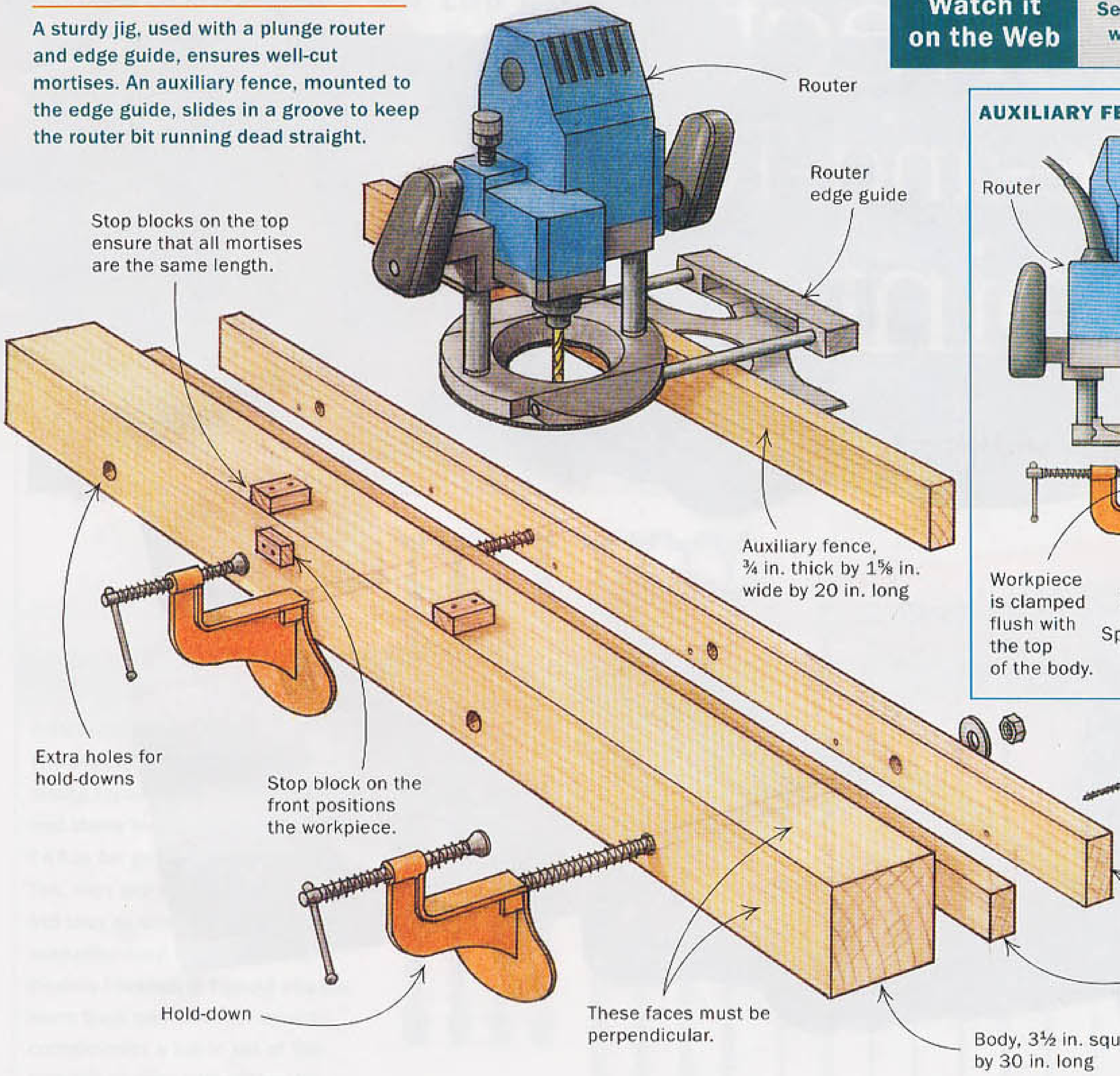
How snug is snug?

A snug fit allows for a very thin layer of glue (0.002 in. to 0.004 in.) between the contact surfaces once the joint has been assembled. If the fit is too tight, as the tenon is slipped into the mortise, almost all of the glue ends up squeezed to the bottom of the mortise, resulting in a glue-starved joint—one that has little strength. Too loose

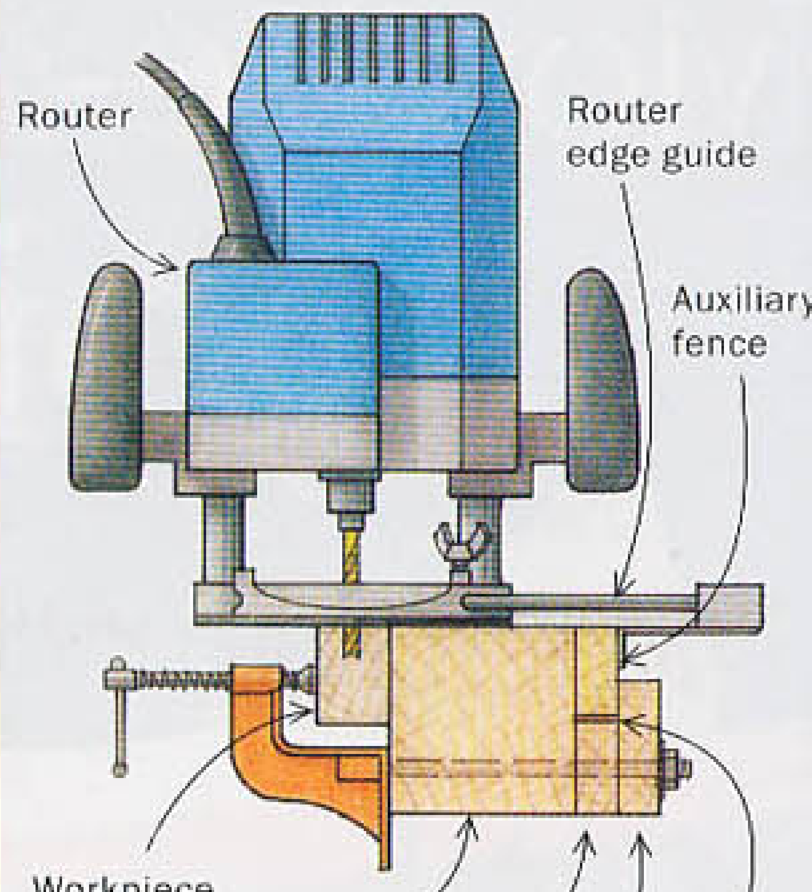
Photo, this page: Kelly J. Dunton

A SIMPLE MORTISING JIG

A sturdy jig, used with a plunge router and edge guide, ensures well-cut mortises. An auxiliary fence, mounted to the edge guide, slides in a groove to keep the router bit running dead straight.



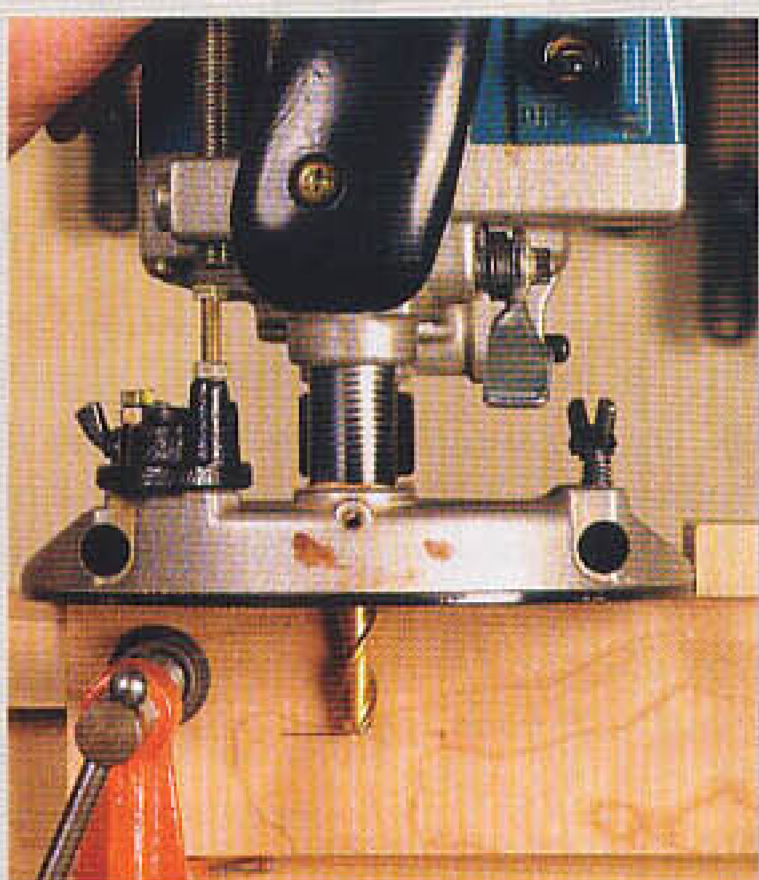
AUXILIARY FENCE RIDES IN A GROOVE



CUT MORTISES FIRST

Once the jig is made, it takes little time to rout a mortise. A standard straight bit works just fine, although a spiral upcut bit does a better job clearing chips from the mortise.

Clamp the workpiece to the mortising jig. *A pair of sturdy hold-downs anchors the workpiece to the jig.*



Set the bit depth. *With the desired mortise depth marked on the workpiece, adjust the bit depth on the router.*

Center the bit. *After marking the location of the mortise, adjust the edge guide to center the bit in the mortise.*

Drawings: Vince Babak

a fit, and there isn't enough surface contact for a good glue bond.

A joint is too tight if a mallet or clamp is needed to put it together. It's too loose if it goes together with little or no resistance. A joint that's just right goes together by hand with only a moderate amount of pushing and wiggling.

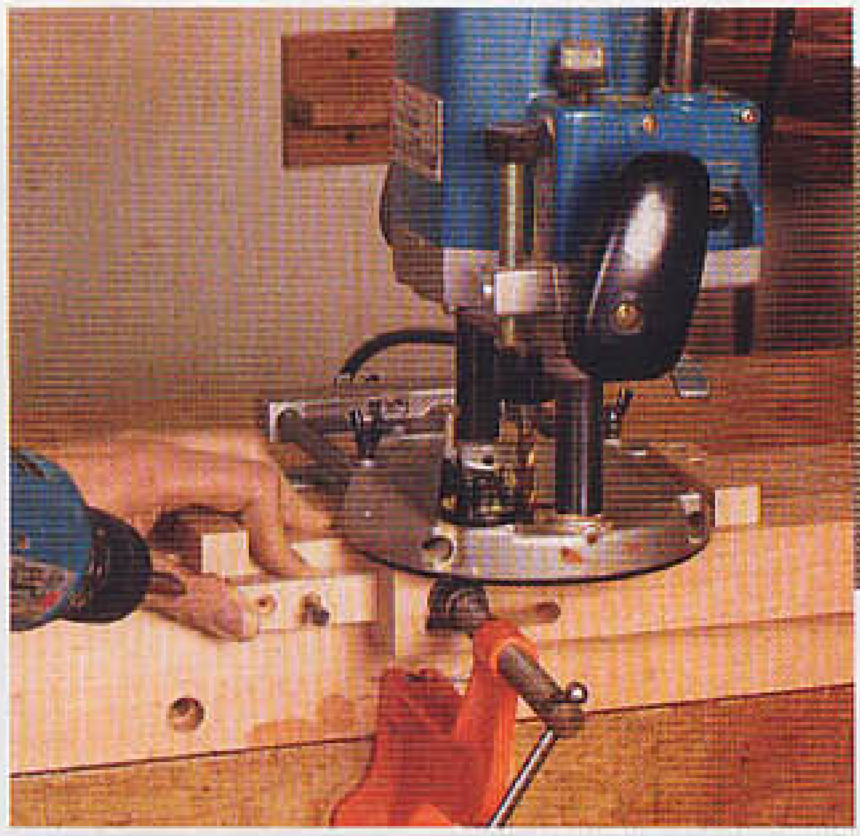
One more point here: The end of the tenon shouldn't extend to the bottom of the mortise. To allow room for excess glue, cut the tenon about 1/32 in. shorter than the depth of the mortise.

Keep in mind, though, that it's difficult to get perfect-fitting mortise-and-tenons if the stock isn't properly prepared. So make sure the moisture content isn't too high or low. And be sure to mill all of the parts on a jointer and thickness planer, or by hand, until each workpiece ends up flat, straight, and square.

Cut the mortises first

In general, it's best to cut the mortises first and then cut the tenons to fit the mortises. First, though, you need to get a few things together, and you need to make a jig.

Use a plunge router and a straight bit—A plunge router, rather than a fixed-base router, is pretty much a must to cut mortises. Any effort to tip the bit of a fixed-base router into a workpiece to create a mortise is not only dangerous, but it's also likely to produce an inaccurate cut. A mid-size (1½ hp to 2½ hp) plunger is sufficient, as this technique creates mortises by making lots of light cuts.



A stop block for multiple mortises

When several identical workpieces require mortises, Miller adds a stop block to the front of the mortising jig (facing page), allowing him to position each piece quickly.

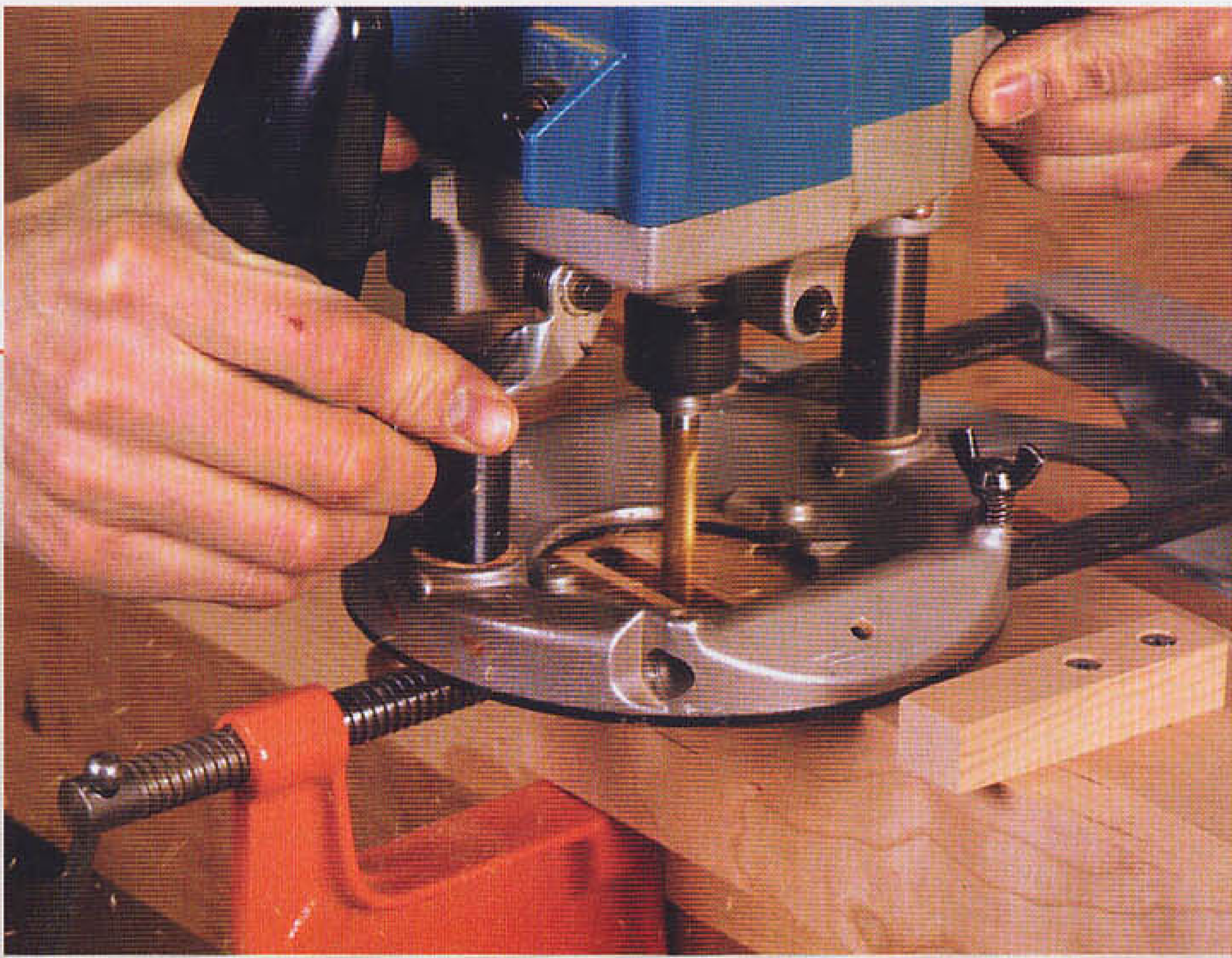
The diameter of the router bit determines the width of the mortise. For example, a ¼-in.-wide mortise is cut with a ¼-in.-dia. bit; and a ¾-in.-wide mortise is cut with a ¾-in.-dia. bit. You also could choose a mortise width that requires moving the router over and taking extra passes to widen the opening. But because straight bits are available in so many sizes, you can usually find one to match the mortise width you need.

Make a jig to guide the router—It's important to support and guide the plunge router as it cuts. A jig goes a long way toward providing the necessary support, ensuring a well-cut mortise. The jig I use is very simple (see the drawing on the facing page), with just three wooden parts: a body, a spacer strip, and a guide strip.

A pair of hold-downs made by The Adjustable Clamp Co., style No. 1600 (312-666-0640; www.adjustableclamp.com), are used to secure the workpiece to the body. With the hold-downs in place, the jig accepts stock up to about 2¾ in. wide. To work with wider stock, simply remove the hold-downs and secure the workpiece with a couple of C-clamps.

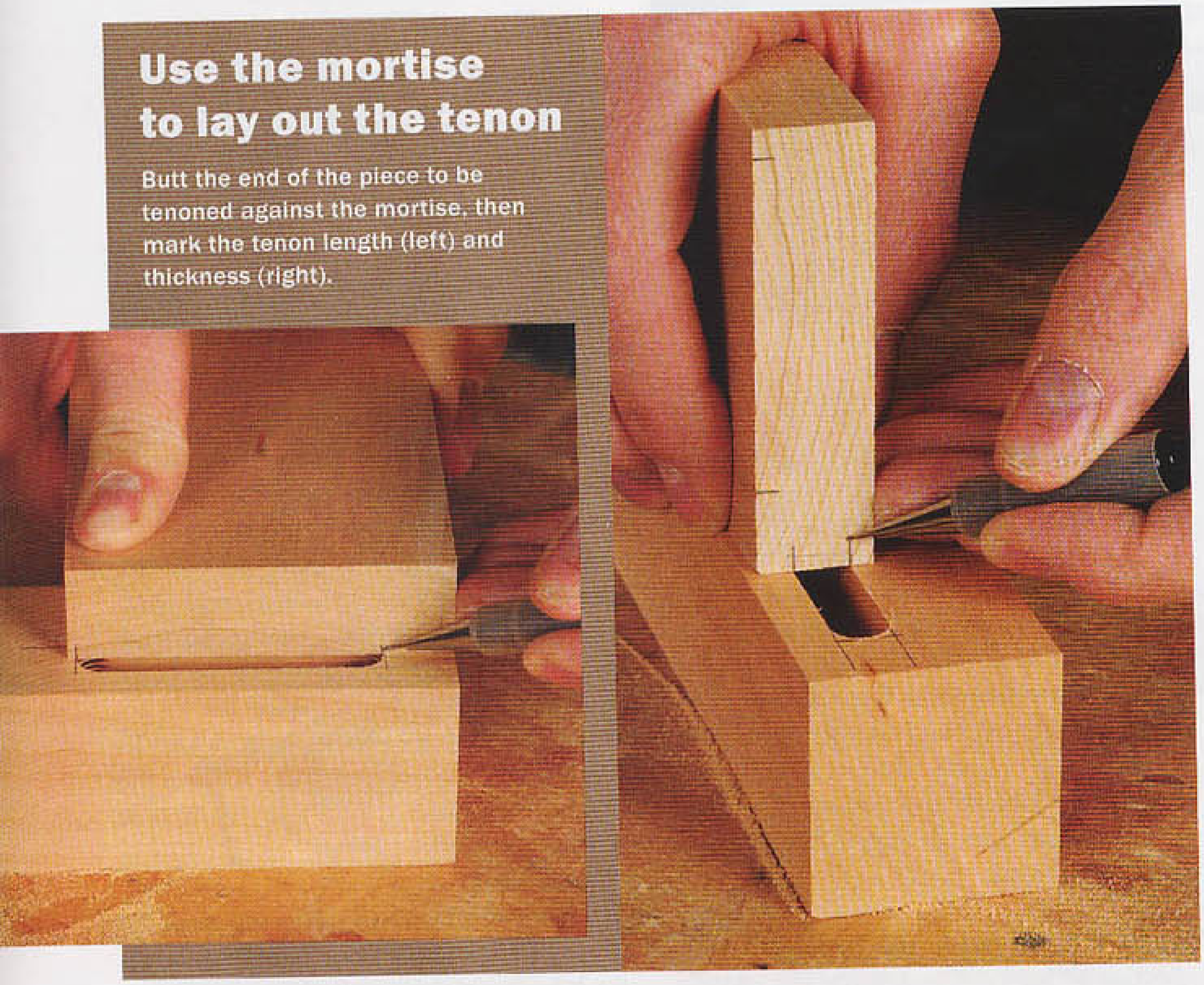
You'll also need to make a wooden auxiliary fence to attach to the edge guide of the router. The auxiliary fence offers two benefits. It increases the length of the edge guide, providing extra support during a cut. And

Stop blocks establish the mortise length. *Stop blocks on each side of the router base limit the travel of the base.*



Take light cuts until you reach the final depth. *To produce smooth, straight-sided mortises, make multiple passes with the router, with each pass removing no more than 1/32 in. of stock.*

Photos, except where noted: Tom Begnal



Use the mortise to lay out the tenon

Butt the end of the piece to be tenoned against the mortise, then mark the tenon length (left) and thickness (right).

because the auxiliary fence fits into a groove created by the spacer and guide strips, it prevents the edge guide from shifting away from the body, and that means the router can't wander from a straight-line cut.

In use, the fence slides back and forth in the groove. The clearance between the fence and the groove should be no more than the thickness of a sheet of paper. To help the parts slide easily, I like to add a thin coat of wax to both the groove and the auxiliary fence.

Using the jig to cut mortises—Once the initial setup has been completed, it takes just a few moments to create each mortise. Start by laying out the location of the mortise on the workpiece. Then clamp the workpiece to the body of the jig. Make sure the top surface of the workpiece is flush with the top of the jig.

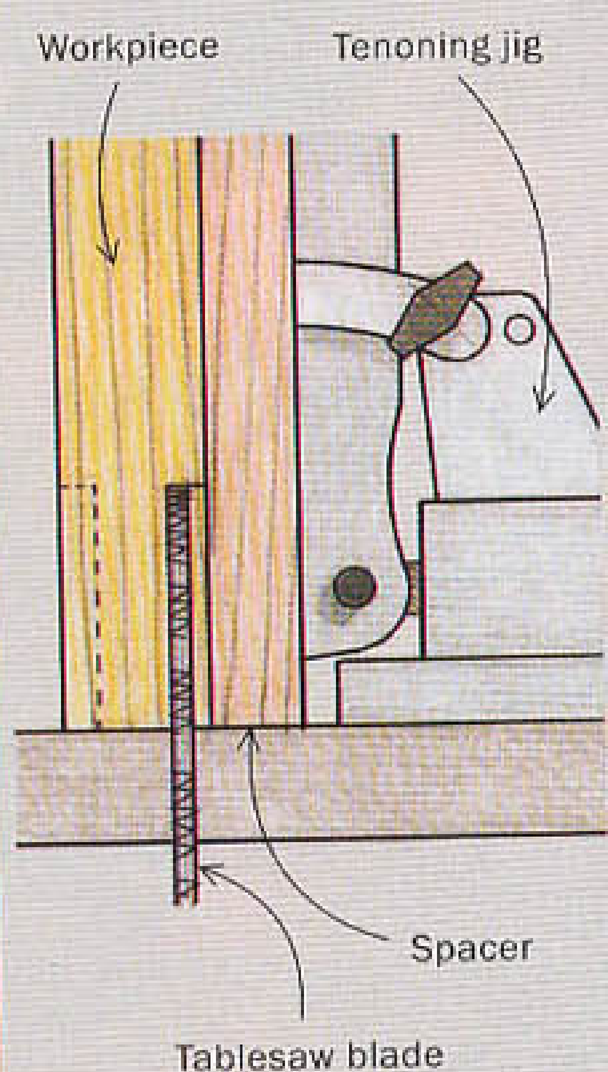
Adjust the plunge-router depth stop to establish the final depth of cut. Next, place the router on the body of the jig, with the auxiliary fence of the edge guide in the groove. Now adjust the edge guide until the router bit is centered in the mortise.

CUT TENONS LAST

1 INSERT THE SPACER

Spacer makes tenons of uniform thickness. *The spacer should be a hair thinner than the width of the mortise plus the width of the sawkerf.*

2 CUT THE FIRST CHEEK



Clamp the spacer in the jig and against the scrap stock in back. *Adjust the jig to line up with the tenon mark, then cut the first cheek.*

Next, screw two stop blocks to the top of the jig, one on each side of the router base. The stop blocks help save time and improve accuracy, even when cutting just one mortise. Position the blocks so that the bit stops when it reaches each end of the mortise.

When cutting mortises in more than one workpiece, add a stop block to the front of the jig. Locate the block so that when the workpiece butts up to it, the mortise is positioned exactly where it needs to be relative to the two upper blocks.

Now you're ready to start cutting. Try not to remove more than ⅓₂ in. of stock per pass. That's the secret to a well-cut mortise. Cuts deeper than ⅟₁₆ in. sometimes can cause the bit to deflect slightly, which can produce a mortise with rough sides. Also, the sides are less likely to be perfectly straight or flat. Deflection also can make the mortise slightly wider than the bit diameter.

As you cut, move the router smoothly back and forth, using the stops to limit the mortise length. After each pass, lower the bit another ⅓₂ in., then engage the plunge lock and cut again. Continue cutting and lowering until you reach the depth-stop setting that represents the full mortise depth. Although it requires lots of passes, the process is surprisingly quick. It takes some practice to get comfortable with this technique, but the mortises that result make it well worth the extra time and effort.

Cut tenons to fit the mortises

With the mortises cut, you can start working on the tenons. Once again, you'll need the aid of a jig. But this time, all of the hard work is done using a tablesaw rather than a router. The tenoning jig supports the workpiece as it passes vertically over the blade, helping to create a pair of cheek cuts that are flat, straight, smooth, and parallel.

Almost any sturdy tablesaw tenoning jig will work, as long as the guide bar is snug in the miter-gauge slot. A sloppy fit can affect accuracy. Also, the jig must hold the stock perpendicular to the saw table in two planes: front to back and left to right.

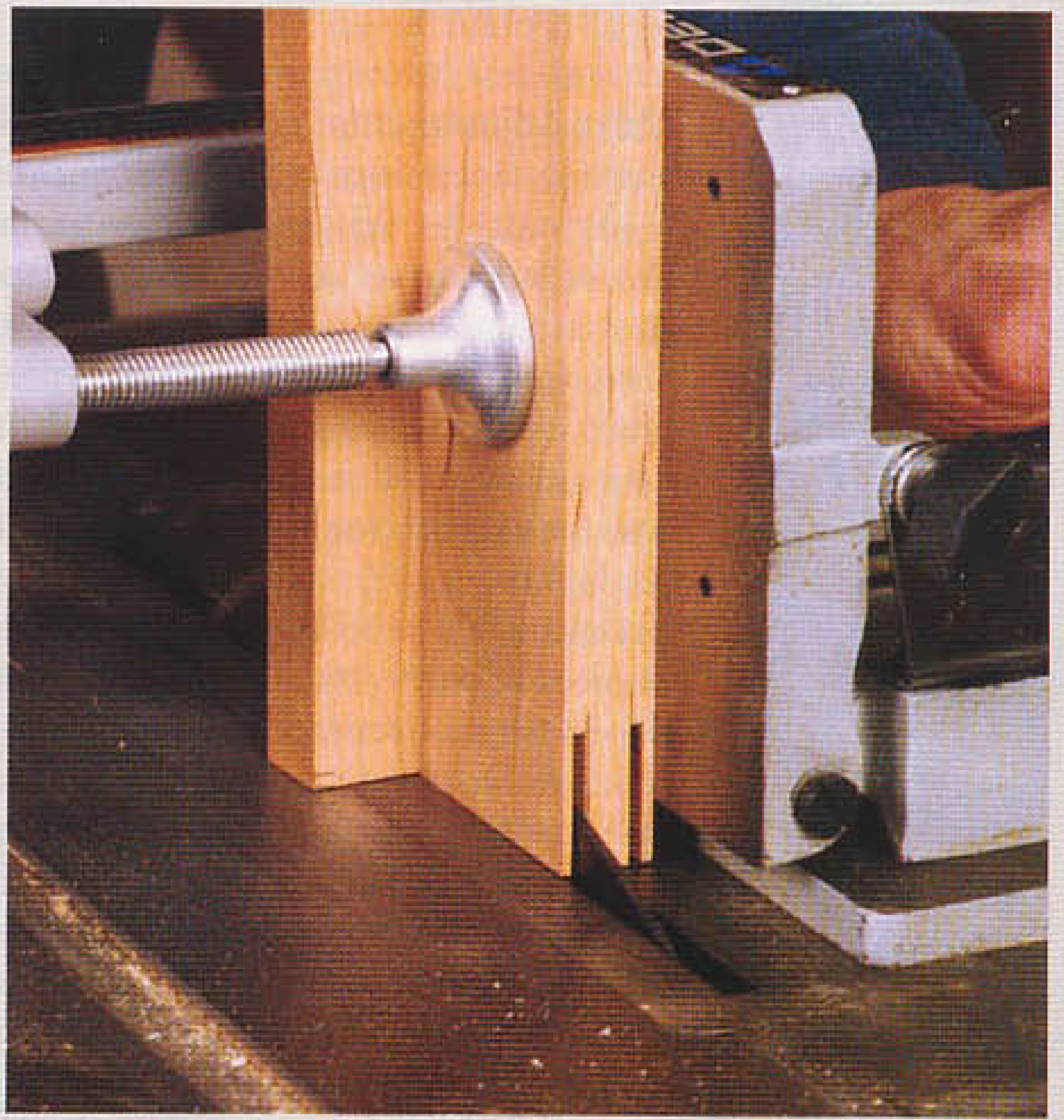
A general-purpose blade works fine here. But it must be sharp. Keep in mind, though, that even a sharp blade forced to work too hard is likely to deflect and produce tenon faces that are not parallel. So don't feed the stock too aggressively. To help prevent tearout, back up the workpiece with a piece of scrap stock (see the photo for step 3 below).

Key to this system is a shopmade wooden spacer that's used with the tenoning jig. The spacer is sized so that the thickness of the tenon is established in just two cuts: one with the spacer in place and one with it removed. The spacer automatically creates the tenon thickness you want, no matter where the tenon is positioned on the end of the board. Also, because you always reference off the same side of the workpiece, the spacer prevents any variation in the thickness of the workpiece from affecting the size of the tenon.

The thickness of the spacer should be a hair less than the width of the mortise plus the width of the sawblade kerf. A dial caliper proves handy here.

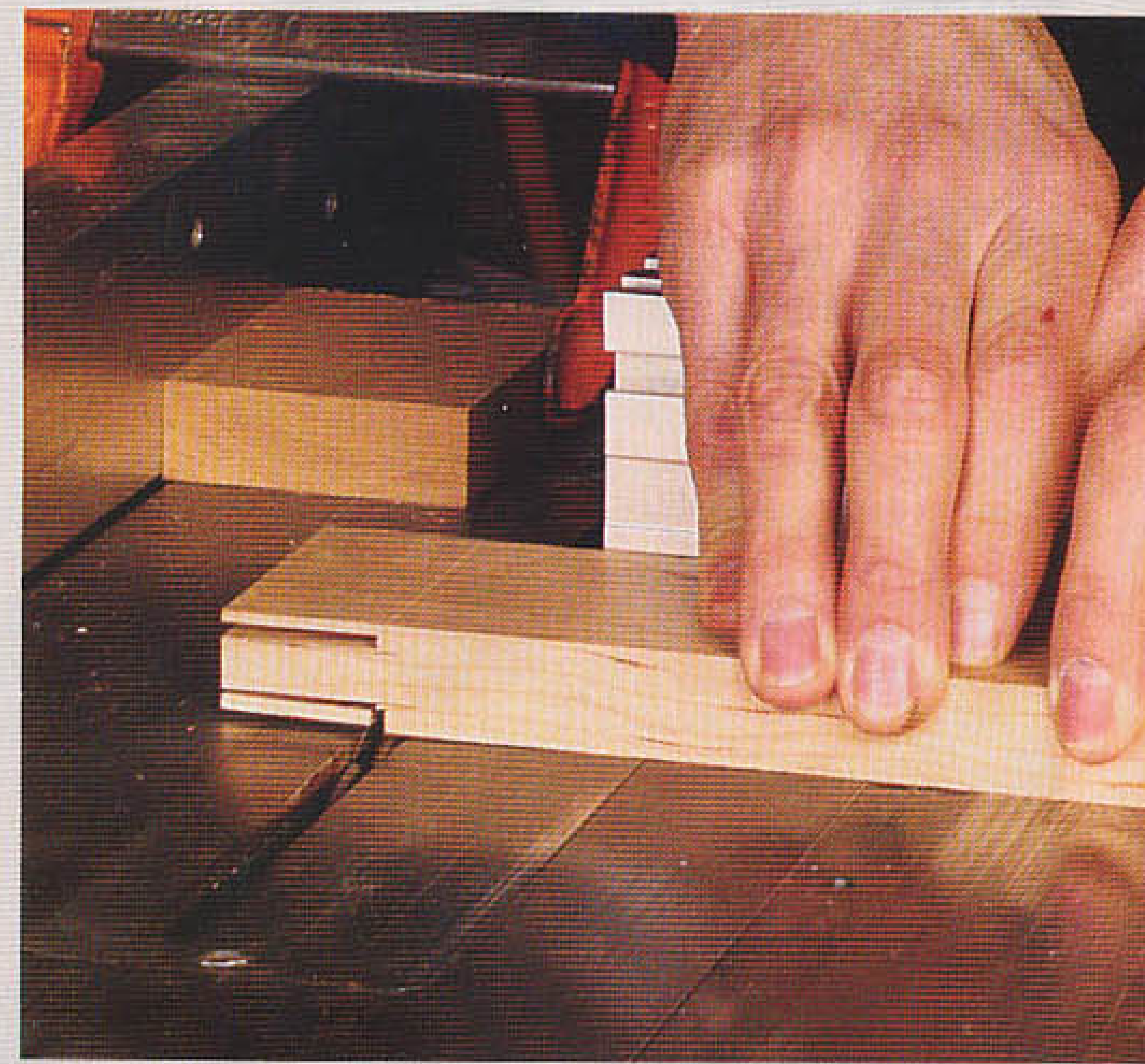
I usually do the initial setup of the tenoning jig using a throwaway test piece that matches the thickness of the workpiece. To avoid confusion, mark one face of each workpiece as the working face. That way,

3 REMOVE THE SPACER AND CUT THE SECOND CHEEK



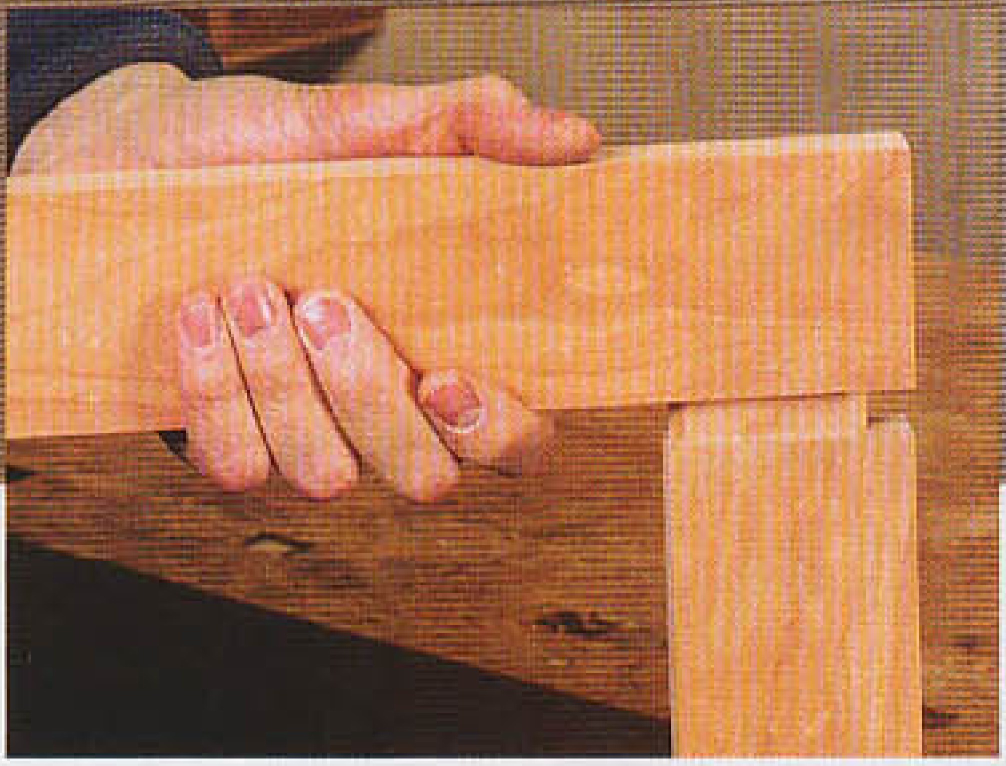
Spacer-free second cut. *After making the first cheek cut, remove the spacer and slide over the workpiece to clamp it directly against the jig.*

4 CUT THE TENON SHOULDERS



Use the miter gauge and a stop block. *For consistent tenon shoulders, clamp the stop block to the rip fence and make the shoulder cuts using a miter gauge.*

Fine-tune the tenons for a perfect fit



The edges of the tenon are rounded over with a rasp to match the rounded ends of the mortise (top). A tenon slipping into a mortise sometimes can squeegee glue from the mating surfaces; applying a light chamfer all around the end of each tenon minimizes the problem and helps ensure a strong joint (center). A perfectly fitted tenon will slide in with only moderate hand pressure and not fully slip out of its mortise when held upright (bottom).

you can orient each piece correctly as you insert it in the jig.

Next, use one of the mortises to mark the tenon on the test piece. Once marked, add the spacer to the jig, then clamp the test piece, making sure the working face is against the spacer. Raise the blade to equal the tenon length. Adjust the tenoning jig as needed to make a cut at the marked line. Now, make the cut in a single, smooth pass.

After the first cut, remove the spacer and reclamp the workpiece with the working face against the jig. Then make the second cheek cut.

The shoulder cuts are made with the miter gauge. Set the blade height to cut just shy of the tenon cheek. You might have to change the height of the sawblade for each tenon cheek if the tenon isn't centered on the workpiece. Clamp a stop block to the rip fence to establish the distance from the end of the tenon to the shoulder cut.

The miter gauge also is used to make the shoulder cuts on each edge of the tenon. I then use a chisel or a tenon saw to make the two vertical cuts that establish the final width of the tenon.

At this point, the tenon is squared, while the mortise is rounded. Although you can use a chisel to square the mortise corners to match the tenon, it is much easier to round the tenon corners with a rasp. The last thing I do is apply a light (1/32-in.) chamfer all around the end of the tenon.

Make adjustments to get a perfect fit

Cutting a mortise-and-tenon includes many variables, ranging from the grain of the wood to the accuracy of measurements to the sharpness of the cutting tools. So despite all of my best efforts, I sometimes end up with a joint that doesn't fit as well as I'd like. When that happens, a little hand-tool work soon has the joint fitting just right.

A tenon that's too fat can be thinned in a number of ways. The best approach often depends on how much material has to be removed. It's best to avoid going back to the tenoning jig at this point because, when making trimming cuts, all of the cutting force is on one side of the blade, and that can cause the blade to deflect slightly. If the blade deflects, you end up with a tenon that's slightly tapered.

Machinist's vise can help sometimes— A joint that fits together, but only after the

Three ways to trim a fat tenon

Pressure from a vise sometimes can thin a slightly thick tenon just enough to fit comfortably in a mortise (left). A shoulder plane can do a good job shaving small amounts of material from the cheek of a tenon (center). A router plane is an effective cutter. In use, the sole of a router plane bears on the face surface of the workpiece, so the tenon is just about certain to end up flat and parallel (right).

parts have been subjected to lots of difficult pushing and wiggling, needs only a slight adjustment. When that's the case, I'm often able to create a perfect fit simply by squeezing the cheeks of the tenon in a heavy-duty machinist's vise. This can take a lot of force if the tenon has some size.

Rasps or sandpaper work, too, but use care—A joint that can't be fully fitted together is going to need more than a simple vise squeeze to produce a good fit. It means some material has to be removed from the tenon cheeks.

A rasp can do the job. So, too, can a piece of sandpaper glued to a flat block of wood. However, both of these methods have pitfalls. In particular, unless you're very careful, the cheeks are likely to end up rounded over slightly. Also, it's difficult for rasps and sandpaper to get into the corner of the shoulder and the cheek.

Handplanes are the best option—One of the most effective tools for thinning tenons is the shoulder plane (also called a cheek plane or rabbet plane). It's a unique tool that can cut right up to the shoulder of the tenon.

When cutting with a shoulder plane, remove an equal amount of material across the full width of the tenon. Before getting the hang of the tool, it's not uncommon to have little, if any, material removed at the beginning of a cut, and too much material removed at the end of the cut.

Another good tool for shaving the cheeks of a tenon is the router plane. I like the tool because, as it cuts, the base of the plane rides on the face of the workpiece. That means the cheeks are going to remain flat and parallel to the workpiece faces. But it takes some practice to get comfortable with the blade-adjustment process, and the plane typically needs a lot of tuning.

Tenons aren't always too thick after they come off the tablesaw; sometimes they end up a bit too thin. When that happens, the joint usually can be salvaged by gluing a patch of wood to one or both cheeks. If necessary, plane the cheek perfectly flat before adding the patch. The patch should be thicker than what's needed, so you can plane down the patch for the perfect fit. □

Jeff Miller builds furniture in his Chicago shop (www.furnituremaking.com). He also teaches and writes about woodworking.

Shim a tenon that's too thin

A tenon that ends up a little too thin can be thickened by gluing a slim piece of stock to a cheek.

Pennsylvania Tall Clock

The base and waist support the hood and give this clock stature

BY LONNIE BIRD

PART TWO

When you stop to examine the construction of most tall clocks, the joinery that goes into the casework really is fairly simple. This clock is no exception. In the previous issue of *Fine Woodworking* (#171, pp. 60-67), I covered the joinery and the details that go into making the hood, which is the top case of the three stacked boxes that make up this clock and the one that requires the most work. In this issue, I'll explain how to make the base and the waist—the two cases that support the hood and give this tall clock some of its commanding stature. Compared with the hood, the base and the waist are quite simple in construction.

Build from the bottom up

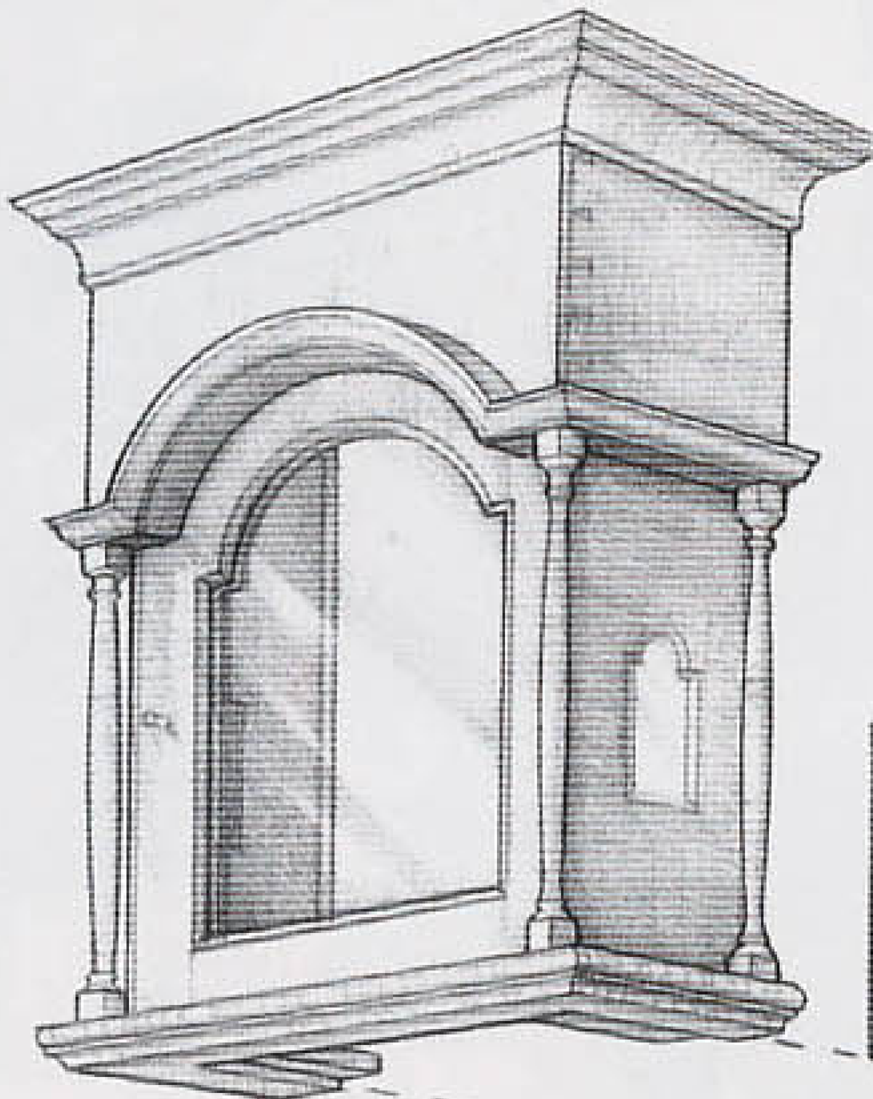
Start with the base, and begin by dovetailing the bottom to the case sides. Because the bottom of the base is not visible in the completed clock, I used less-expensive poplar rather than figured maple, the primary wood. When laying out the dovetails, allow room for the rabbet that accepts the back of the clock. The back, also made of poplar, will not be attached to all three cases until the very end—after all of the finishing has been completed, the movement installed, and the doors hung.

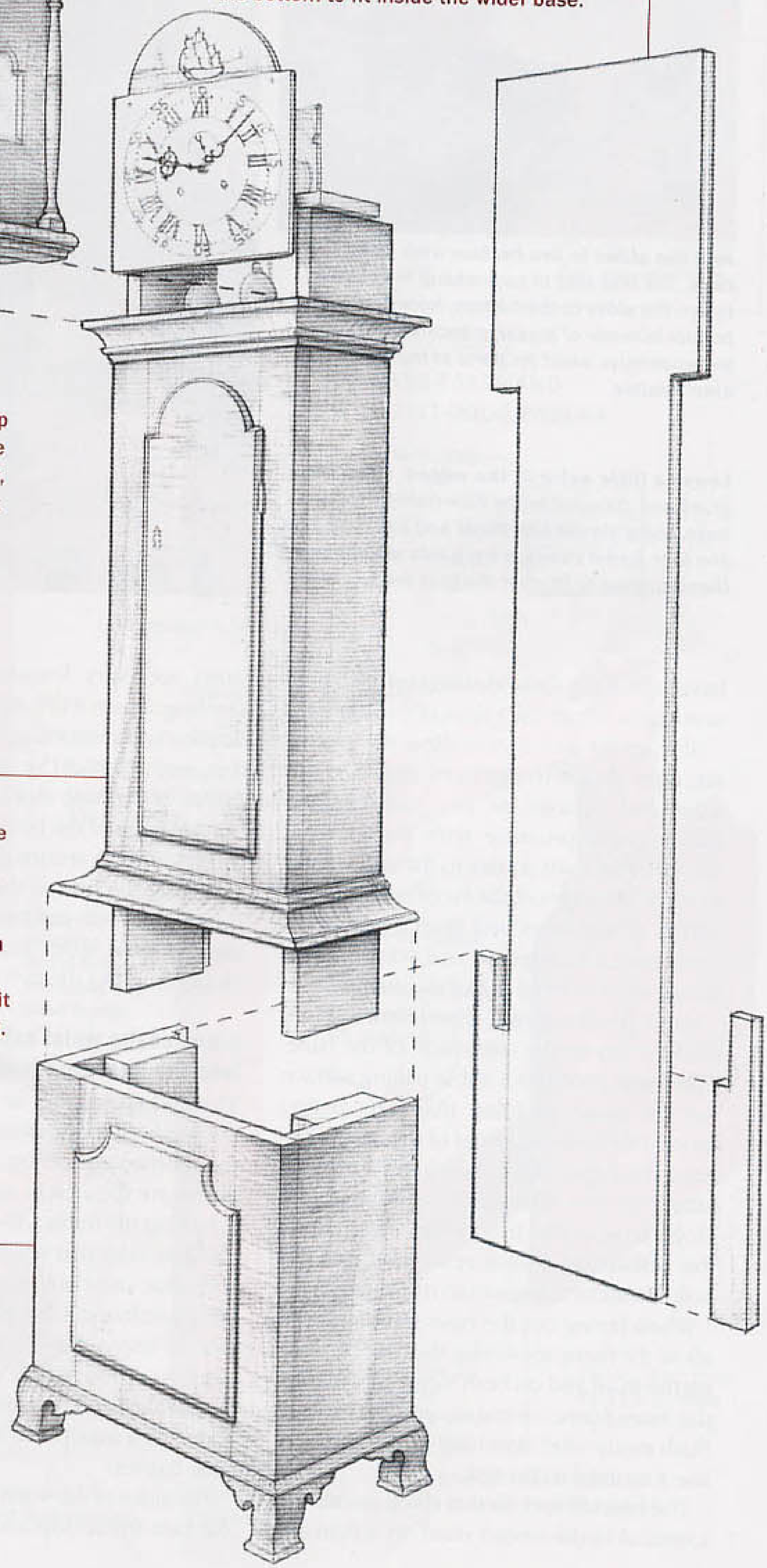
For the face frame of the base, lay out and cut the mortises on the stiles, then cut the tenons on the top and bottom rails to fit. Before gluing together the face frame, cut the decorative curved corners on the top rail that correspond with the front panel that will be added later. The outside rabbeted edges of that panel will cover the inside edges of the face frame, so you don't

Photos: Rodney Diaz

THREE BOXES AND A BACK

Building a tall clock may seem overwhelming to some woodworkers, but by breaking down the project into stages, you'll see that it's not very complicated. In the previous issue (#171, pp. 60-67), Bird focused on building the hood for this clock. In this issue, he explains how to build the base and the waist, which are relatively simple.





BACK

Measure the width at the back of the hood and the overall height to dimension the back board. After ripping the back to width, notch the edges to fit inside the narrower waist, and then edge-glue extra pieces at the bottom to fit inside the wider base.

HOOD

Of the three cases that make up this clock, the hood is by far the most complex. The arched door, turned columns, and prominent crown molding allude to architectural details.

WAIST

The waist, or middle section, is merely two sides joined to a face frame. The waist has no top or bottom because it has to extend upward into the hood—where it supports the seatboard on which the clock movement rests—and downward into the base—where it is screwed and glued to blocking.

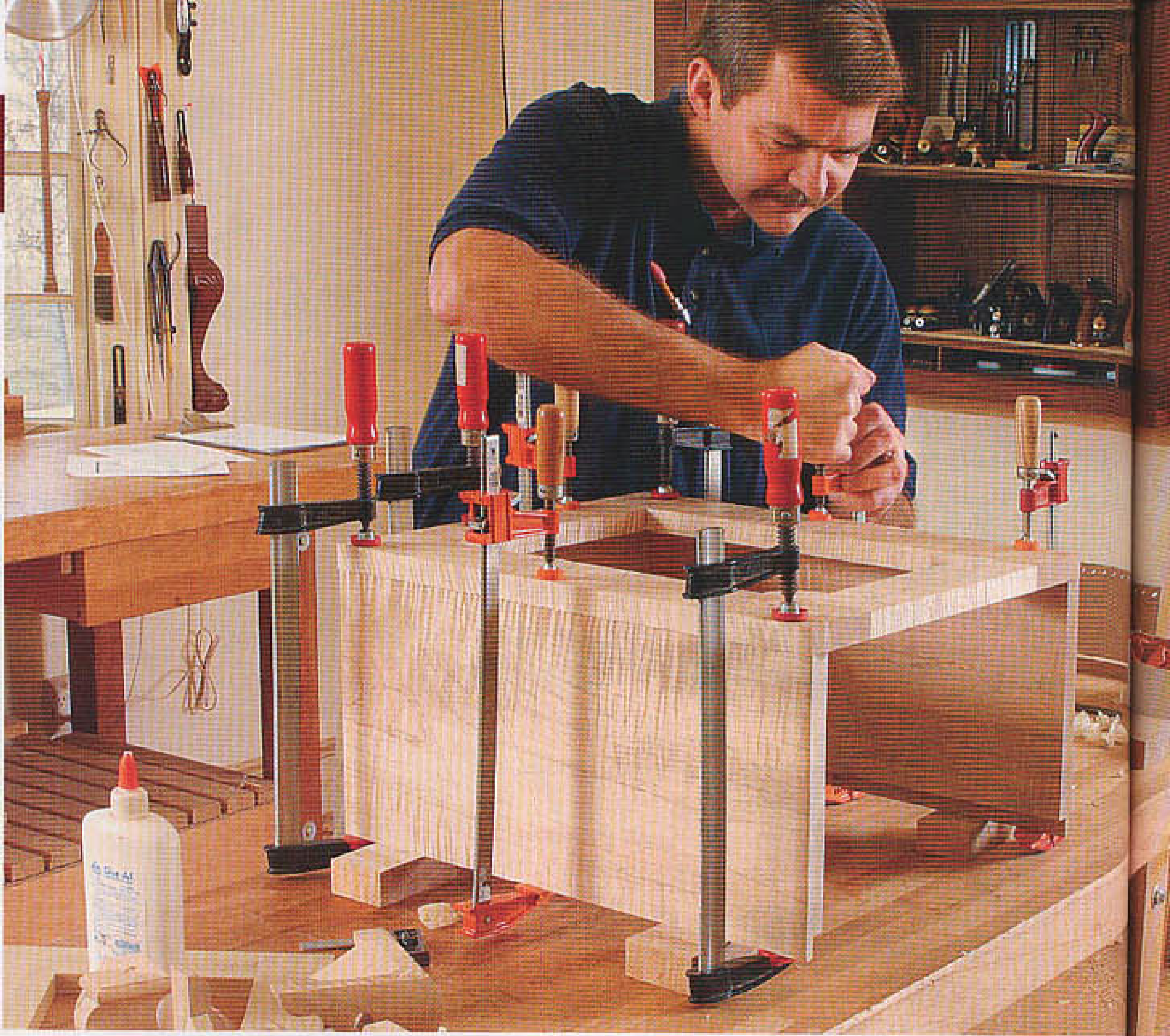
BASE

Like the waist, the base is simple in construction—two sides glued to a face frame. But unlike the waist, the base has a solid bottom joined to the sides, and a bottom frame, onto which the four separate feet are screwed into place.

Drawings: Bob La Pointe

FIRST, ASSEMBLE THE BASE CABINET

Join the sides to the bottom with dovetails. *The first step in assembling the base is to join the sides to the bottom. Note that the bottom is made of poplar, a secondary and less-expensive wood for parts of the clock that aren't visible.*



Leave a little extra at the edges. *Sides are glued and clamped to the face frame for the base, using simple butt joints and plenty of glue. The face frame overlaps each side slightly and is then trimmed to fit after the glue dries.*

have to be fussy about cleaning up the bandsaw marks left on the edges of the top rail.

Glue up the face frame, allow the glue to set, then glue it to the front edges of the sides and bottom. As you put the face frame under pressure with the clamps, monitor that it sits square to the sides. I like to leave the edges of the face frame slightly proud of the sides and then bring them flush with a handplane and scraper after taking the assembly out of the clamps.

You'll need to build a base frame, ⅝ in. thick, to go on the underside of the base. This frame provides a stable nailing surface for the small molding that gets nailed around the front and sides of the base (covering the edges of the frame) and a place to attach the feet. Glue the base frame to the clock base at the front edge only, attach the remainder with screws, and slot the holes to allow for seasonal movement.

When laying out the base-frame joinery, allow the frame to overlap the case by 1/32 in. on the front and on both sides. By building the base frame oversize, you can trim it flush easily after attaching it to the base: I use a router for that task.

The bracket feet on this clock are almost identical to the ones I used on a Pennsylvania secretary featured in *Fine Woodworking* issues #154, #155, and #156. (For details on constructing these ogee bracket feet, see *FWW* #154, pp. 52-53.) Clamp pieces of the base molding in place on the bottom edge of the base cabinet, to see exactly where to secure the ogee feet. After screwing the feet to the underside of the base frame, you can nail the base molding around both sides and the front of the clock, mitering the two front corners.

Sides of the waist extend into the base and hood

The middle section, or waist, is just a face frame glued to the two sides. After cutting the mortise-and-tenon joinery on the face frame, cut the arch in the top rail before assembling the frame. Also, cut the rabbets in the case sides that will accept the back, and then glue and clamp the sides to the assembled face frame. Just as I did with the base, I like to leave the stiles of the face frame slightly proud when gluing them to the waist sides, and then trim them flush with a router or a handplane and scraper, after the glue has set.

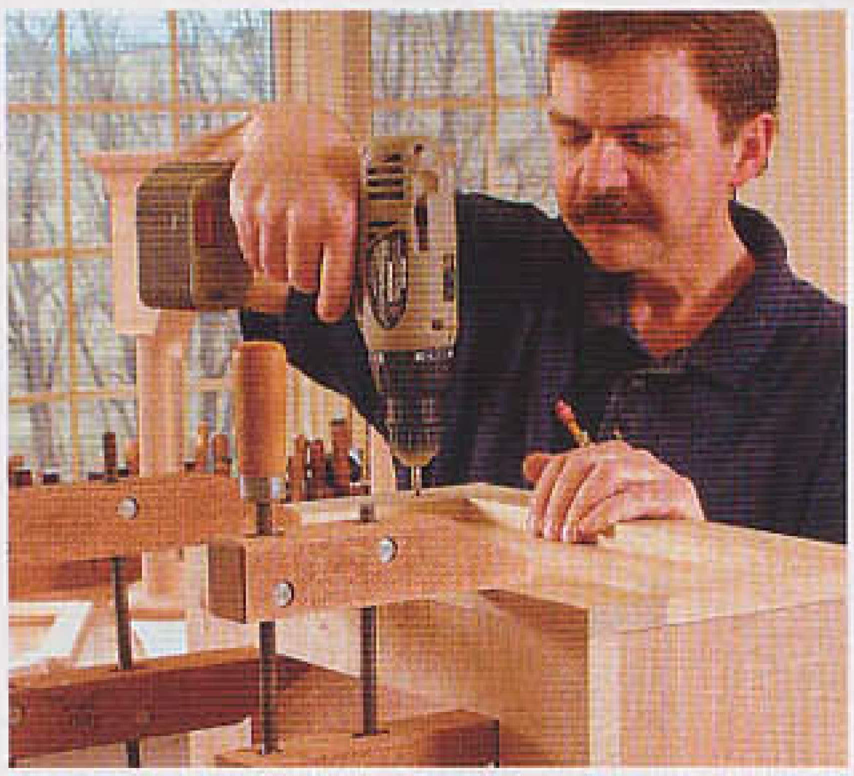
The sides of the waist extend well beyond the face frame, top and bottom. That extra length gives you a way to connect the three cases that make up this clock.

Fit the three cases together

With the cases for the hood, base, and waist built, you're ready to assemble the clock. The upper extensions of the two waist sides support the seatboard—the platform on which the movement rests. Keep in mind that the hood isn't permanently attached to the case; it simply slides off from the front to allow access to the movement. However, the waist and base are permanently attached, using thick glue blocks where they are joined together.

To ease assembly, position the base and waist faceup on the workbench. Measure the difference between the outside width of the waist and the inside width of the base. The thickness of the glue blocks, which also work as spacing blocks, will each be one-half of that difference. Glue and screw the blocks to the inside of the base. Next, adjust the vertical position of the waist, and then glue and screw it in place to the blocks inside the base.

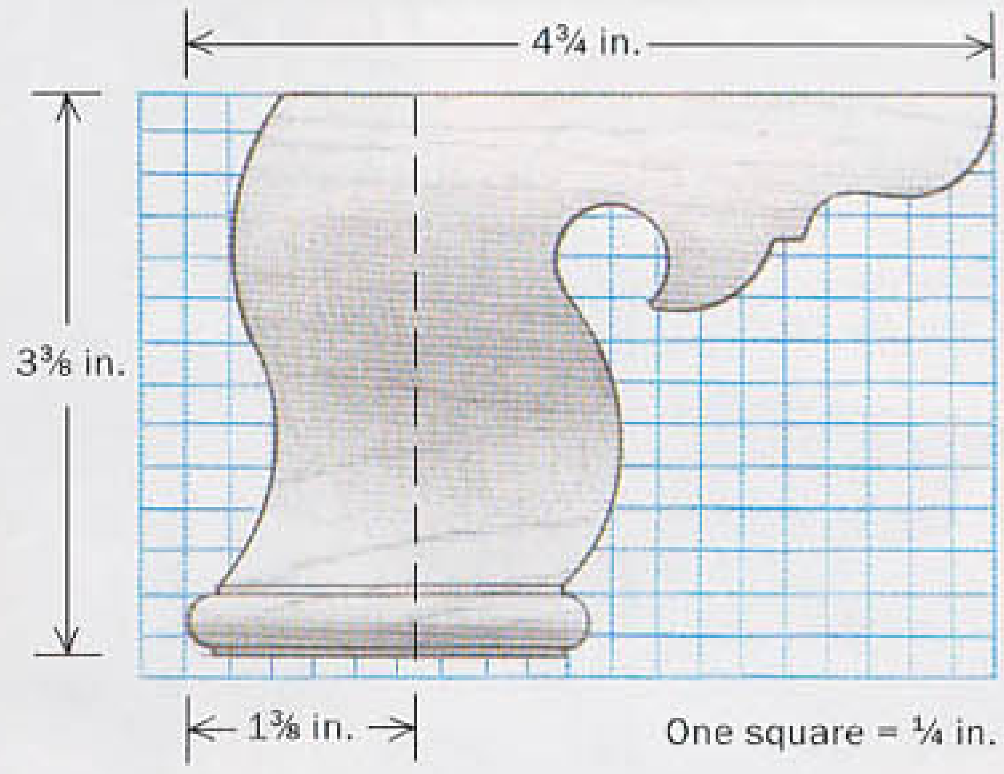
Now add the transitional moldings at each end of the waist. Keep in mind this very important detail: The upper molding



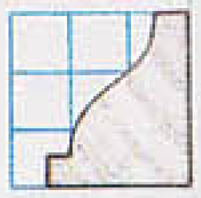
Add a frame to the bottom of the base. *The poplar base frame, screwed to the underside of the case bottom, serves as a stable nailing surface for the small molding that trims out the sides and front of the bottom edge.*

ALIGN THE BRACKET FEET TO THE BASE MOLDING

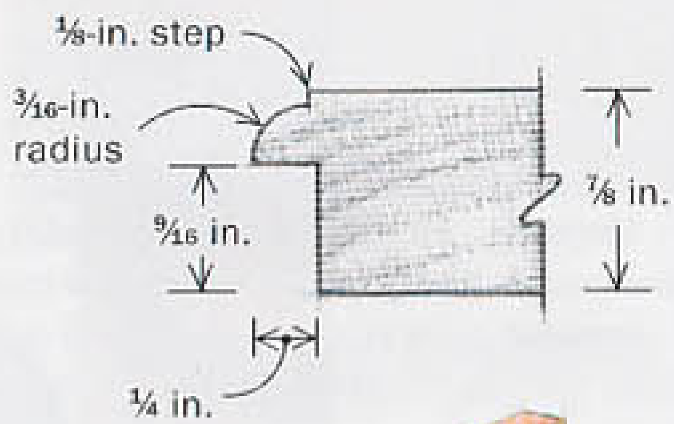
Dry-fit and clamp the base molding in place, mitering the two front corners, as a guide to follow when installing the feet. After that, you can nail the molding in place.

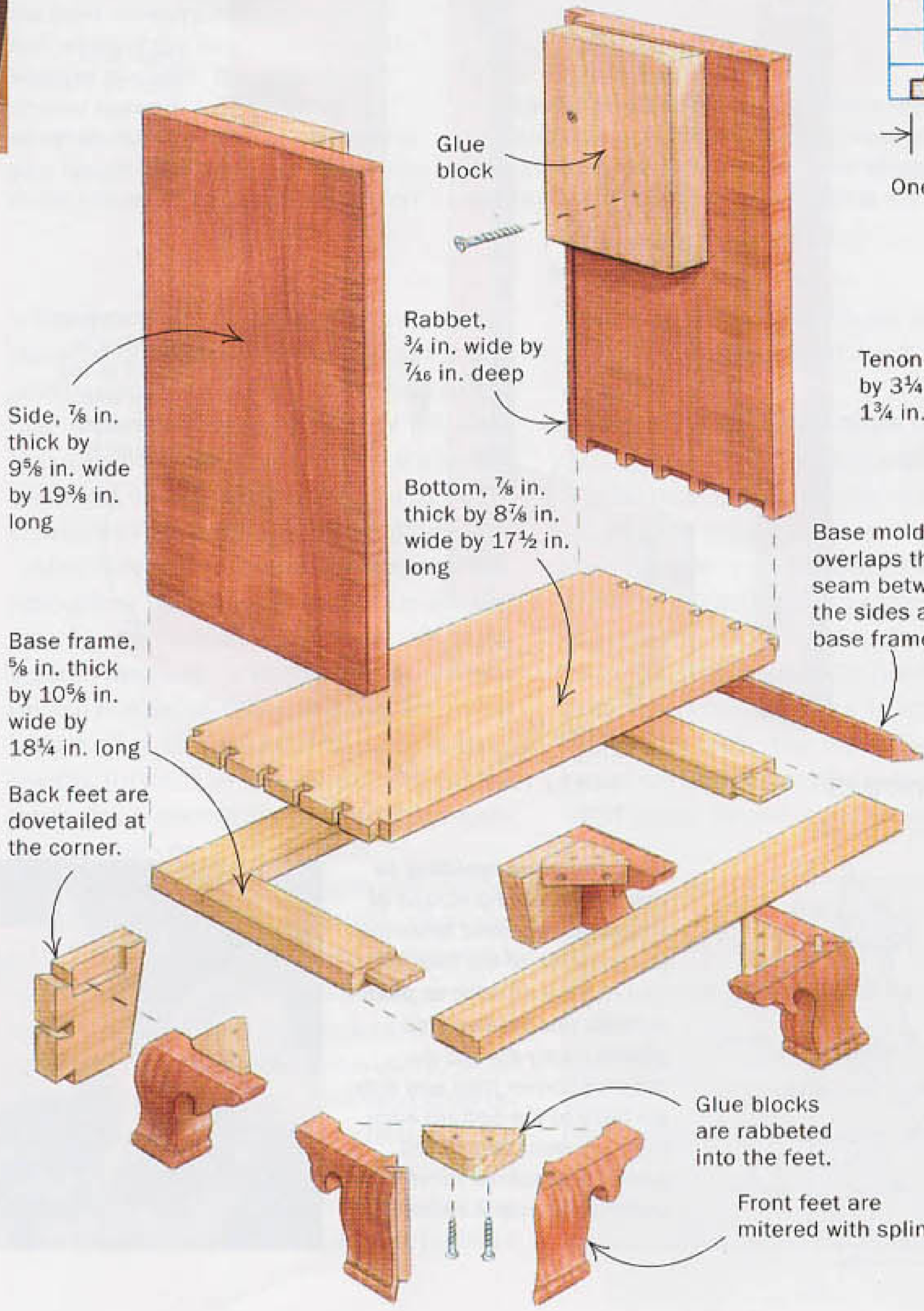


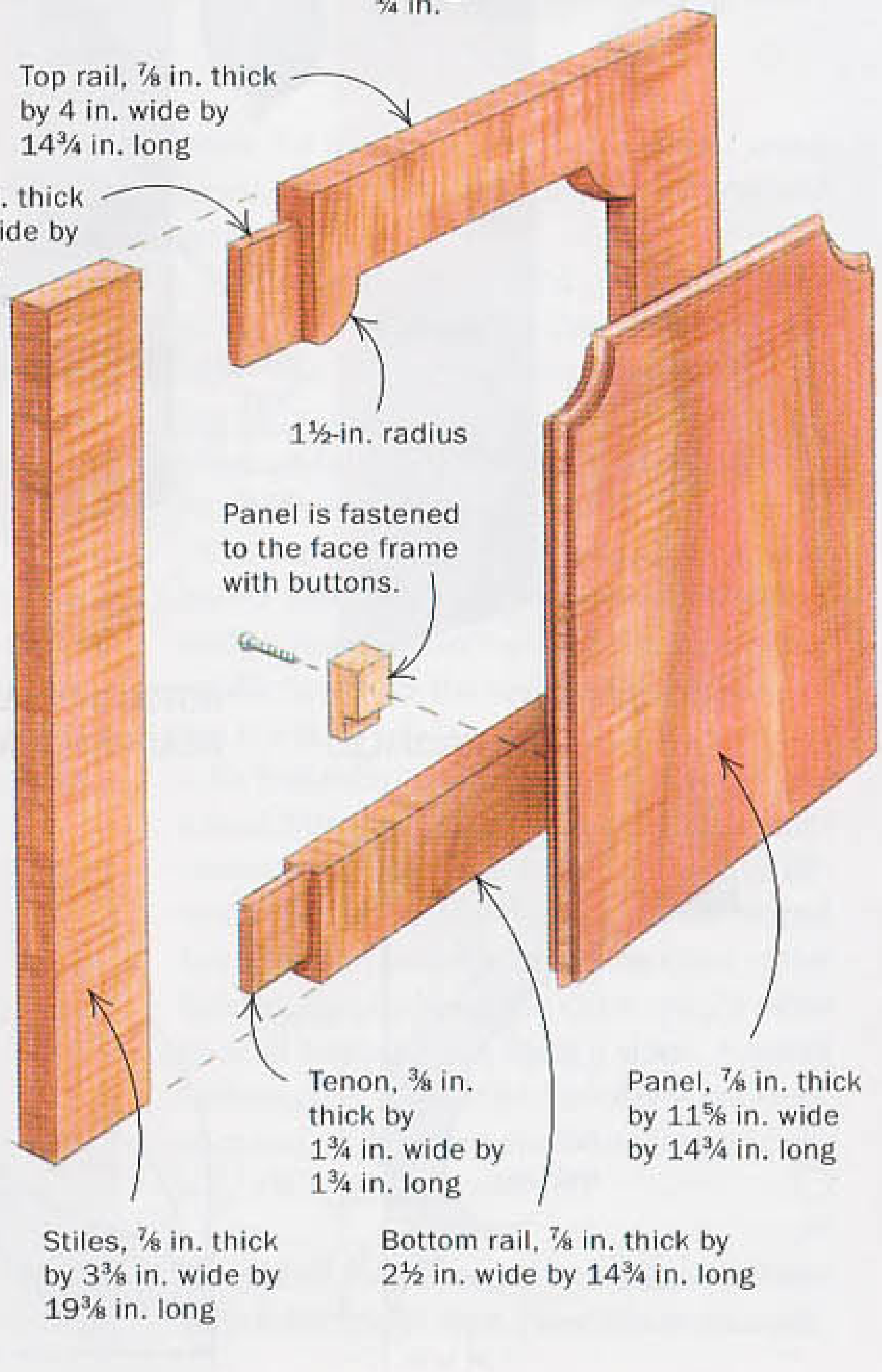
BASE-MOLDING PROFILE

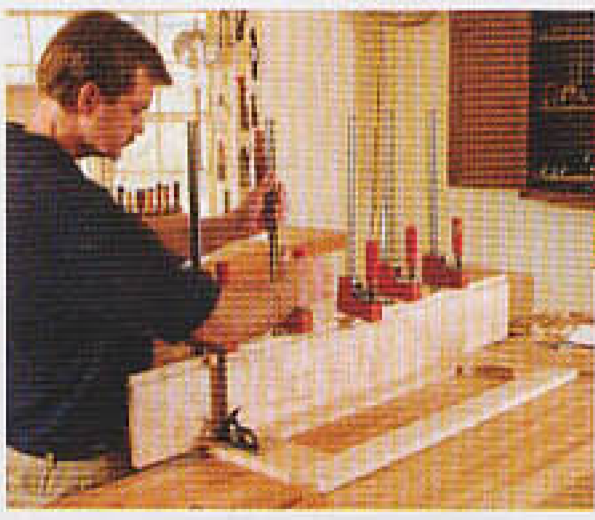


BASE-PANEL AND WAIST-DOOR PROFILE



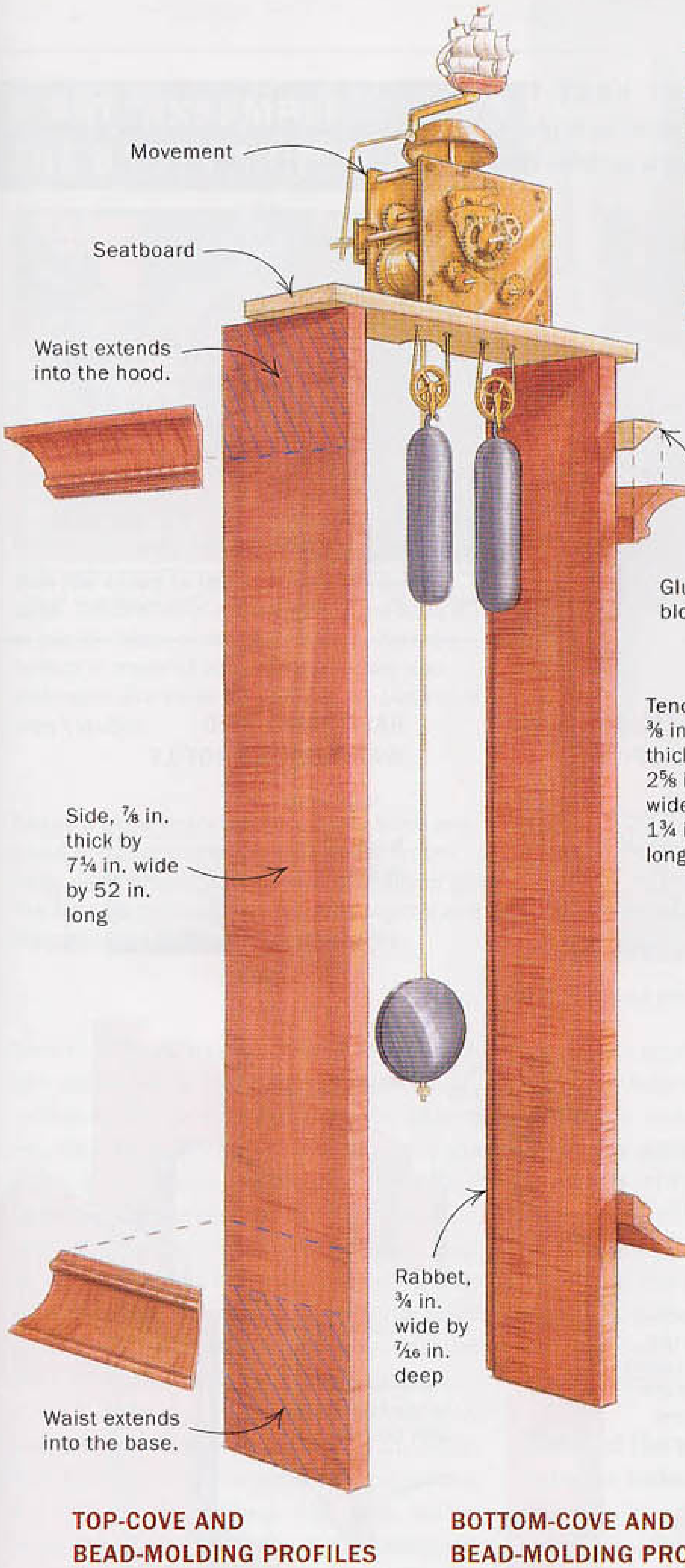
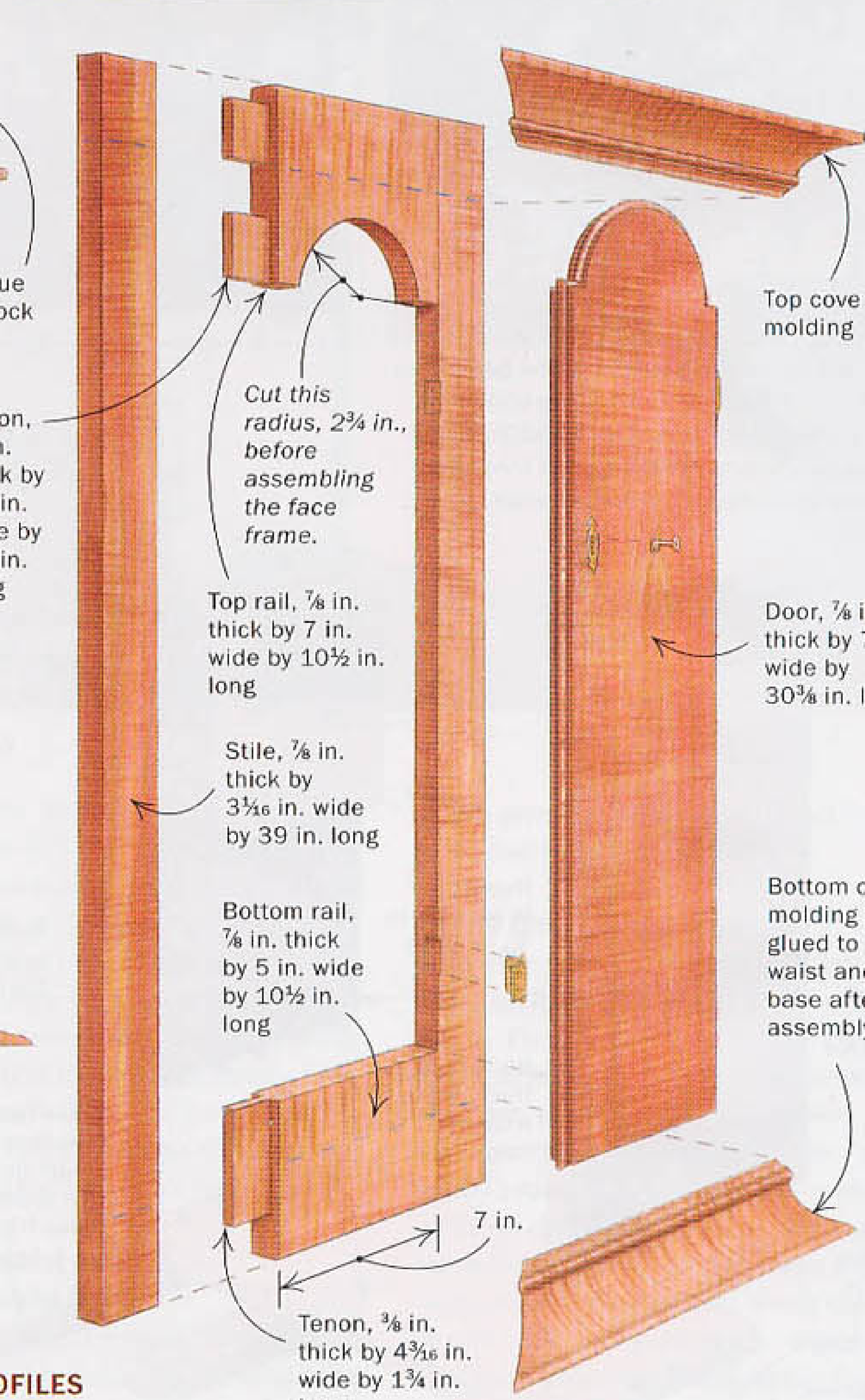




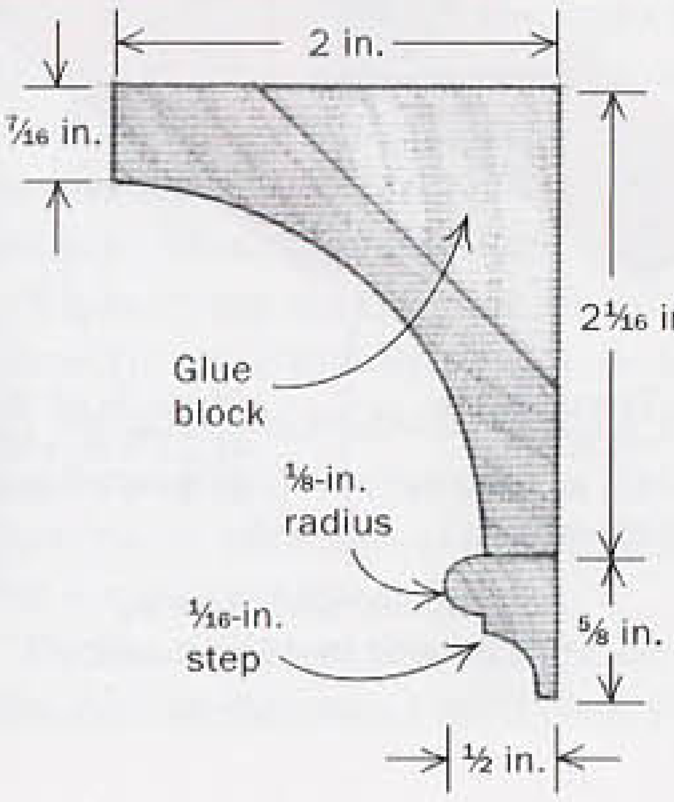


BUILD THE WAIST AND ATTACH IT TO THE BASE

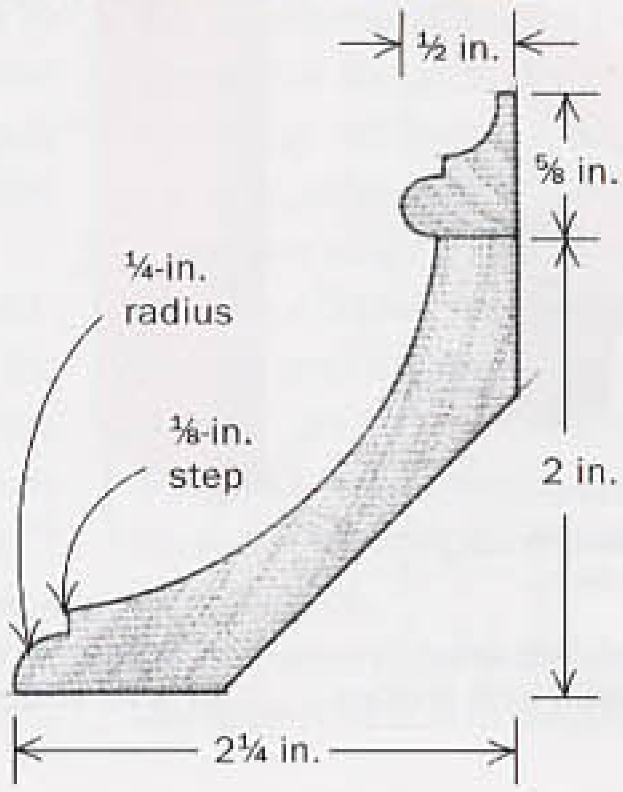
The waist is simply a face frame joined to the two sides with butt joints, glued and clamped in place. Monitor the joint with a square as you apply pressure with the clamps.

TOP-COVE AND BEAD-MOLDING PROFILES



BOTTOM-COVE AND BEAD-MOLDING PROFILES



Glue the cove molding to the waist. *Clamp scraps of 1/4-in.-thick plywood to define the baseline of the molding and to have an edge to push against. For the two side pieces, apply glue to the mitered corner joint and only partially to the bottom edge, near the front, which will allow for seasonal movement in the solid maple sides.*

Glue blocks join the waist to the base. *After assembling the waist and the base cabinets, measure the outside width of the waist and the inside width of the base. The difference divided by two is the thickness at which you should mill each of the two glue blocks. Glue and screw the blocks to the insides of the base cabinet first.*

Attach the waist to the base. *Where the waist sides extend down into the base cabinet, use plenty of glue and screws to secure the two cases to one another. Position them carefully before driving the screws through the waist sides into the glue blocks in the base. Once the glue sets, the waist and base become one cabinet. The bottom cove molding will conceal the gap between the two components.*

will support the hood, so it is a structural element to the clock design, not just a decorative one. Also, exactly where you secure that upper molding to the top of the waist will affect the fit of the movement within the hood, so you want to be precise when laying out the position of the molding.

After mitering and attaching the molding, strengthen it by adding triangular-shaped glue blocks behind it, between the molding and the case. Next, nail a strip of wood on each side of the waist to serve as a kicker. The kickers keep the hood from tipping forward as it is slid on and off the waist. For authenticity, you can use reproduction nails or small cut nails.

After the glue on the triangular blocks behind the top molding has set, slide the hood into position and measure the width at the back of the hood and the overall height to dimension the back board. After ripping it to width, notch the edges to fit inside the narrower waist, and then glue on extra pieces at the bottom to fit inside the wider base. You can use reproduction nails or screws to attach the back board to the rabbets within the waist and base, but wait until you've put a finish on the clock before securing the back board in place.

Door and lower panel show off the wood

The last step is to construct the front panel for the base and the door to the waist. Both pieces are solid planks rabbeted around the outside edges, with only a small amount of the thickness sitting proud of the face frames. The lower panel is fixed in position (from inside the base, with wood buttons), while the door is hinged and fitted with a lock. The waist door and base panel are both great places to show off figured grain, so you can choose your best stock for the widths required. Avoid using glued-up material because the seams will be distracting.

When measuring for the panel, add ³⁄₁₆ in. along all four edges for the rabbeted overlaps. The door overlaps its opening, too, but only on three sides: An overlap on the hinge side would cause the door to bind when opened.

Cut the base panel and waist door to size and rabbet the edges. Then shape the edges with a ³⁄₁₆-in. thumbnail profile—the same profile used on the sides and windows of the hood.

To hold the lower panel in place, I use wood buttons, which allow for seasonal movement. Each button is fastened to the inside of the panel with a single screw and has a lip that catches the inside edge of the face frame. To hang the door, you'll need special hinges for a lipped door. A small half-mortise lock will keep the waist door shut (see "Choosing and Installing a Lockset," *FWW* #162, pp. 80-85). □

SOURCES OF SUPPLY

CLOCK MOVEMENTS AND PARTS

Green Lake Clock Co.
651-257-9166
www.greenlakeclock.com

Merritt's Clock and Watch Supplies
610-689-9541
www.merritts.com

Lonnie Bird teaches woodworking classes at his shop in Dandridge, Tenn. (www.lonniebird.com).

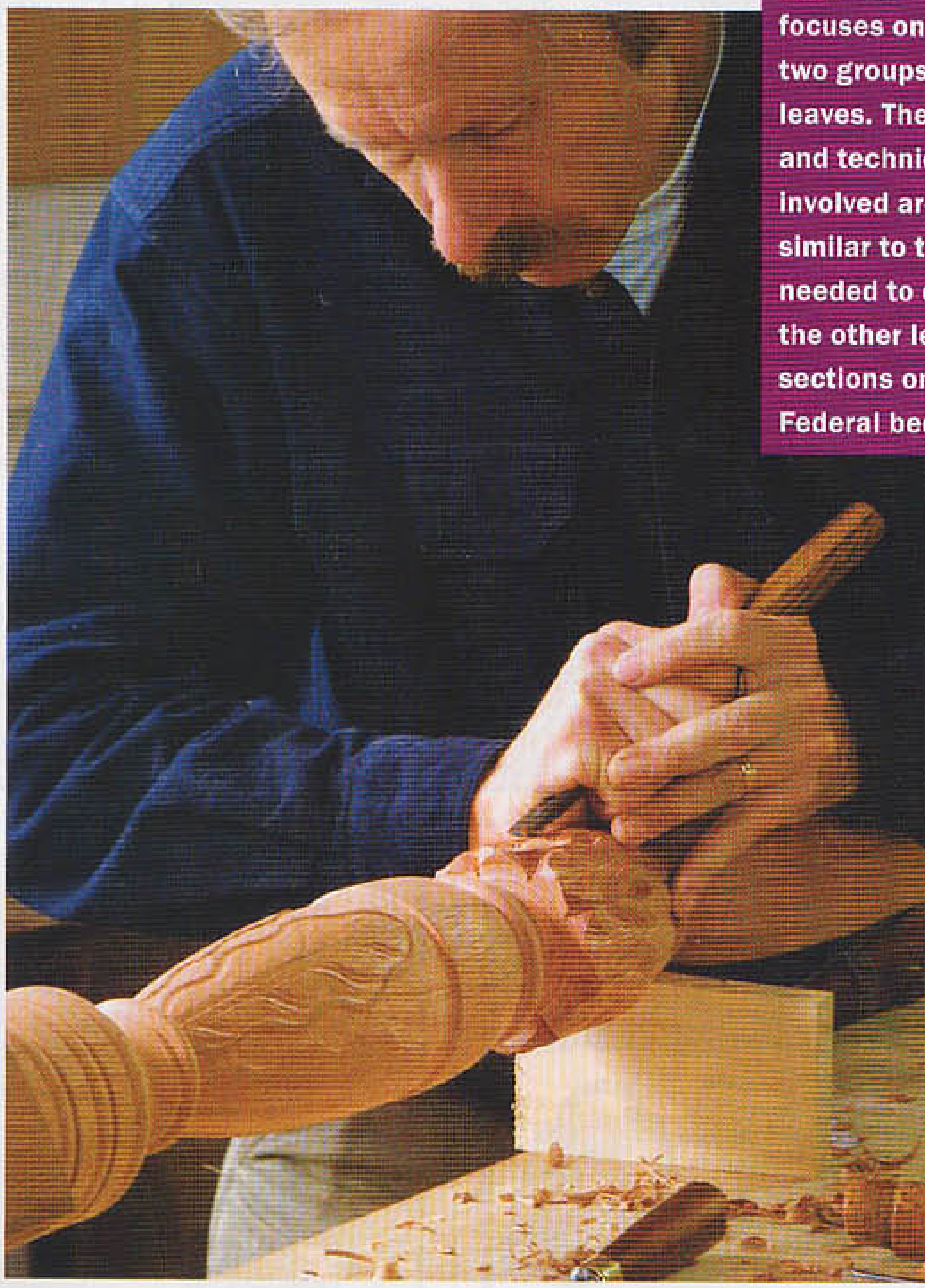
Carving leaves on a turned post

BY ALLAN BREED

The ability to carve in the round is useful not only on beds—the Federal example covered here—but also on table pedestals and legs, chair legs, chest columns, finials, clock columns, and other turned work. Often this type of carving is easier for the beginner because the cutting is done with the grain as one works downhill (from the larger diameter to the smaller).

Heavily carved bedsteads were less common in the Colonies than in Europe, where designers such as Chippendale and the team of Ince and Mayhew were concocting regal examples. In the Colonies, though, high-post bedsteads were nearly always plain, hidden by ornate bed hangings.

By the 1790s in the United States, neoclassical taste demanded more ornate bedposts incorporating fluted and beaded sections with leaves carved onto vase- or urn-shaped turnings.



This article focuses on these two groups of leaves. The tools and techniques involved are similar to those needed to carve the other leaf sections on this Federal bedpost.

I can't cover all of the elements of this bedpost in one article, so I'll focus my efforts on two carving lessons I think will prove the most useful. Both are leaves—two different versions of corn leaves. If you can master these, you will be able to move on to the more detailed acanthus leaves that fall between these sections. I'm assuming that if you tackle this post, you can handle the reeds and beads involved, or seek out past articles on these areas (try *FWW* #163, p. 65, for a good way to form the reeds).

Nothing special about the turning

The turning on the post, or shaft, is conventional. In other words, I don't make any allowance for the depth of the carving because the relief usually is quite shallow. I suspect that 18th- and 19th-century shops used the same turned posts for plain and carved pieces, making it easier to respond quickly to the taste and budget of the customer.

For stock, straight-grain wood will allow predictability and ease of carving. The more figured the wood, the more difficulty you'll have getting clean surfaces. Also, because a carving places the focus solely on the interplay between light and shadow, setting it on a visually complex background is not a good idea. However, many of these beds had fancy veneer applied to the square, flat sections of the posts where it could be appreciated.

There are two turning tricks that will help later to allow a cleaner carving. First, for a clean transition at the base of the leaves, make an extradeep score with the skew. This will allow the waste to break away cleanly when the base of the leaf is carved. Also, it is easier to undercut the end of the bell-shaped section on the lathe

Photos, except where noted: Asa Christiana; photo, this page (right): Dan Gair, Blind Dog Photo

than it is when carving the tips of those leaves.

Layout is done with carving tools

After turning, I center the work on a benchtop indexing head used solely for carving, but the lathe also could be used. Some lathes have indexing holes on the head pulley. If yours does not, use dividers and trial and error to walk off the divisions of the leaves. In this case, the sets of eight and four leaves require 16 divisions, serving to outline them and find their centerlines. To continue these divisions lengthwise down the post, use a compass with one leg on the bench or lathe bed and the pencil on the work.

In successful carving, the tools often are used both to lay out and carve the designs. The sweep or shape of each gouge determines each curve and cut. On longer corn leaves, for example, the outline is a series of linked arcs made with a single gouge. Unless the carving is complex, I often lay out the design by eye, trusting the tools and using no paper patterns. Although I must commit to the final shape, doing so will create uniform results on all the leaves and allow faster progress in layout and carving.

You'll find that the same tools

THE SHORTER LEAVES END IN MIDAIR

The first leaves Breed carves are the wavy corn leaves on the bell-shaped section of the post. They are a bit easier than the others because they drop away into space at their ends, unlike the longer leaves that hug the post and require a smoothly relieved section around them. The actual gouges Breed uses are in parentheses, although the exact sizes of the tools are less important than their general shapes.

Divide the leaves. *Carving begins with a V-tool, sometimes called a V-parting tool (#16-3-mm), used to create a smooth dividing line between the leaves. Stop this cut about ½ in. from the base.*

Carve the centerlines. *Use a V-tool (#12-10-mm) to create a deeper cut down the center of each leaf. Continue this cut down to the base of the leaf.*

A scoop cut narrows the base. *Use a spoon gouge (#9-7-mm) to add scoop cuts between the leaves, which creates the impression of a tapered base on each leaf.*

Chop out between the tips. *To define the ends of the leaves, start with the V-tool (#12-10-mm), enlarging the divisions between the leaf tips and removing the bulk of the material for the next cut.*

Round the leaf ends. *Two cuts with a gouge (#5-16-mm) used in the inverted position form the end of each leaf. For cuts like these, a mallet will drive the tool more cleanly than hand power would.*

Make a divot at the midpoint. *To finish defining the undulating edges of the leaves, come in from both sides with a gouge (#5-20-mm), using a rocking motion to chop out a lozenge-shaped area.*

Sculpt the bases of the leaves. *Invert a gouge (#5-16-mm) to round off the areas flanking the scoop cuts, making the base of each leaf angle slightly inward toward its center.*

Model the faces of the leaves. *Make six diagonal cuts (#9-13-mm) from the center to the edge of the leaf. You may have to switch directions to avoid tearout. Anchor your hand and pivot the gouge through the cut.*

Soften the hard corners to create a wavy face. *Invert a gouge (#3-16-mm) to soften and blend in the hard corners left at the edges of each cut. This is a typical process for undulating areas.*

Vein the leaves. *Each diagonal ripple gets three small veining cuts. Use the backswept V-tool to cut these without tearout. Make a deeper, central cut followed by two lighter cuts flanking it.*

are used over and over in traditional designs. Don't hesitate to adjust patterns to the tools you have; no one will notice. The important thing is that the work looks consistent and flows well, not that the leaf is the same size as the model.

A few basics

Short chopping cuts often are made with a mallet. For longer, more continuous cuts, use your two hands only. Rest your front hand on the work as a brake to control the depth of cut. The back hand acts as the gas, and both work together to give both power and control.

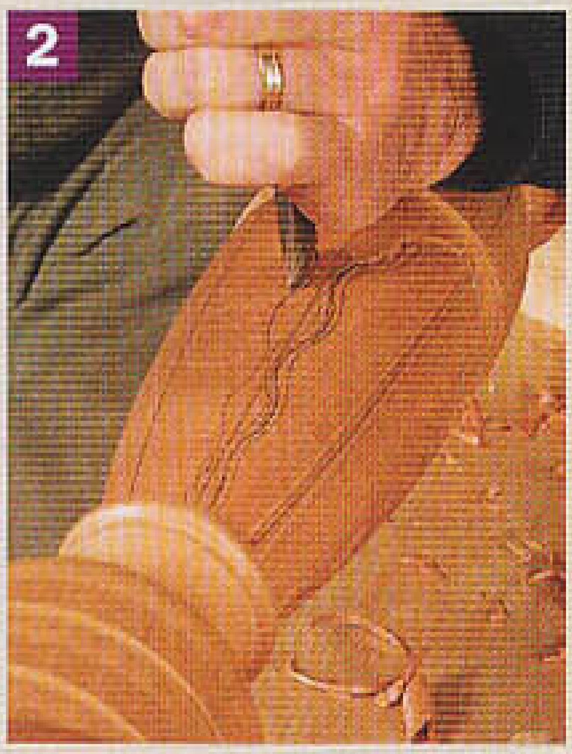
It's important here to introduce the concept of safety cuts. A carving tool is a wedge that drives wood in both directions when plunged straight down. Safety cuts are made first, ⅛ in. outside an intended outline, to direct the compression away from the leaf to the waste area.

I usually sand with 400-grit paper at the end. Don't sand every nook; just keep the paper flat and touch the large areas. □

THE LONGER LEAVES REQUIRE DIFFERENT TECHNIQUES

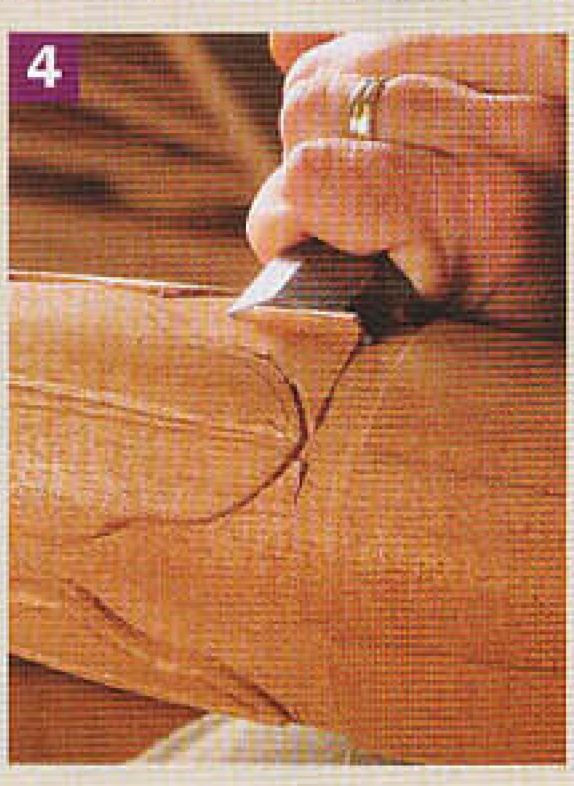
The long leaves on the post are characterized by shallower, more elongated cuts. The shallow relief around the edges and ends of the leaves presents a new challenge, because it must appear to be as smooth and uniform as the other turned areas.

A paper pattern sometimes helps. *In this case, Breed starts with a pattern of a leaf—cut from a rubbing he made of the original bedpost—tracing it onto the post to get a rough idea of the size, placement, and outline of each leaf.*



Mark and cut the outline. *Create the wavy outline by making a series of linked marks with a gouge (#5-20-mm). Then make safety cuts ⅛ in. outside the line. Last, chop the actual outline, angling the cut slightly away from the leaf.*

Chisel out the waste between the leaves. *Use a large chisel to remove as much material as possible between the leaves. Then, in the narrow areas, finish with a small skew or straight chisel, trying to leave behind a smooth, uniformly deep surface.*



Simulate the turning motion. *At the ends of the leaves, there is room to cut across the grain with a large chisel to create a smoothly rounded surface that appears to be turned. The leaves should appear to float on the post.*

Two cuts form a central rib. *Start working on the face of the leaf next. Use the V-tool (#12-10-mm) to make two long, slightly tapering, adjacent cuts, keeping the layout line intact as a guide.*

A narrow channel defines the outside edge. *Make a pencil line about ⅛ in. from the leaf's edge to mark the edge of the next cut. Start at the point of the leaf and make a fairly deep cut (#11-6-mm gouge). Think of this as a series of linked arcs to create a fluid motion.*

Continue modeling the leaves. *Make a series of deep S-shaped cuts with a V-tool (#12-10-mm) to divide the leaf into sections. Then round the corners using a gouge (#3-16-mm) in the inverted position. The face of the leaf now should bulge outward smoothly.*

Again, finish with the fine details. *Use a V-tool (#12-10-mm) to create veins that fan outward in the S-shaped modeling cuts. As always, change directions where necessary to avoid tearout.*