

A Classic Bookcase in the Craftsman Style

Of the many qualities that help define the Arts-and-Crafts style, perhaps the most apparent is straightforward and honest joinery. Wedged joints and through-tenons show the world how a piece was made. Open-grained woods like white oak give a piece an unabashed look, perhaps even a rustic quality that says, "Here's what I am—sturdy, well-made furniture." No abstractions get in the way, no conceptualizing need be done. This frank simplicity is just the style the progenitors of the Arts-and-Crafts movement in England hoped for—a style in direct counterpoint to the machines and machined look of the Industrial Age and its products—and it's just the style for the bookcase I made to fit in my bungalow.

The bookcase is just 50 in. high and 31 in. wide. Quartersawn white oak, the quintessential Arts-and-Crafts material, was clearly the wood of choice. For the sides and shelves, I glued two boards together, then scraped and sanded them. Wedges made of the same oak secure the through-tenons to the mortised sides and give the bookcase its strength and honest face.

Mortise-and-tenon joinery usually requires precise fitting; however, these long through-tenons need to be a bit loose to fit easily through the mortises. The wedges provide holding power at three locations. The back of the wedge pushes against the outside face of the side. This does nothing until the angled front of the wedge starts to press against the angled slot cut into the tenon. Then the wedge pulls the tenon through the joint until the tenon shoulders lock against the inside face of the case side.

Cut mortises with a plunge router and template

I cut the mortises using a plunge router, a $\frac{5}{8}$ -in. straight bit, a $\frac{3}{4}$ -in. template guide and a mortising template (see the top photos on p. 49). The template, made of $\frac{1}{2}$ -in. medium-density fiberboard (MDF), is milled as wide as my case side and with perfectly square



Wedged tenons
and clean lines
dignify this
oak original

BY GARY
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ends. First mark the centerline of the template. On this centerline, lay out the mortises. Cut the mortises with a $\frac{3}{4}$ -in. straight bit on the router table, using a fence with stops clamped onto it. Cut the two outer mortises using the same stops and fence setting; flip the board over to cut the second one. For the center mortise, simply move the stops over to the proper position. If the template is square, the mortises will locate properly and be the same size. Finally, glue and screw a fence onto one end of the template.

Only the centerlines of the mortises need to be laid out on the case sides. Clamp a side to the bench, align the centerlines on the template with the centerlines on the side and clamp the template in place. Next, set the bit depth. Put a folded index card on the benchtop and rest your router on the edge of the case. Then zero the bit down to the card and set the turret stop on the router to its lowest depth. This setting will allow you to rout almost through the case side but without blowing out the mortise or marring your benchtop. Then set another turret stop for the center mortises, which aren't through-mortises.

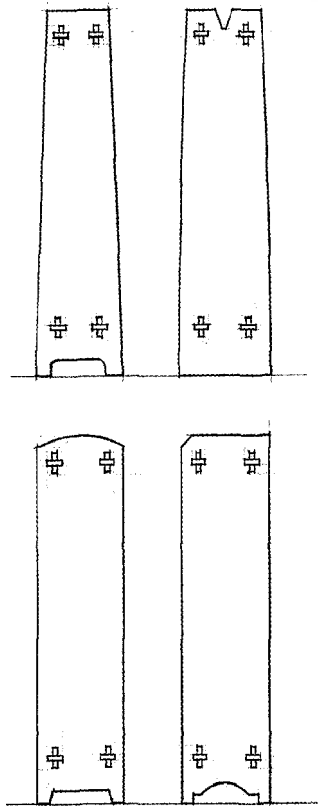
After routing, chop the mortise corners square with a chisel. I found that the standard 25° angle on my chisels really took a beating in this oak; they looked like I had been prying nails with them. To get through the job, I adjusted each chisel's edge about 5° with a secondary bevel. When chopping mortises, remember to pull the chisel back

hard to the mortise wall to keep it lined up. You want these corners to be cut square and neat. I use a block of wood as wide as my mortises to check each for consistency. I also bevel the edges of the mortise with my chisel to give a nice shadow line and to prevent tearout when fitting the tenons.

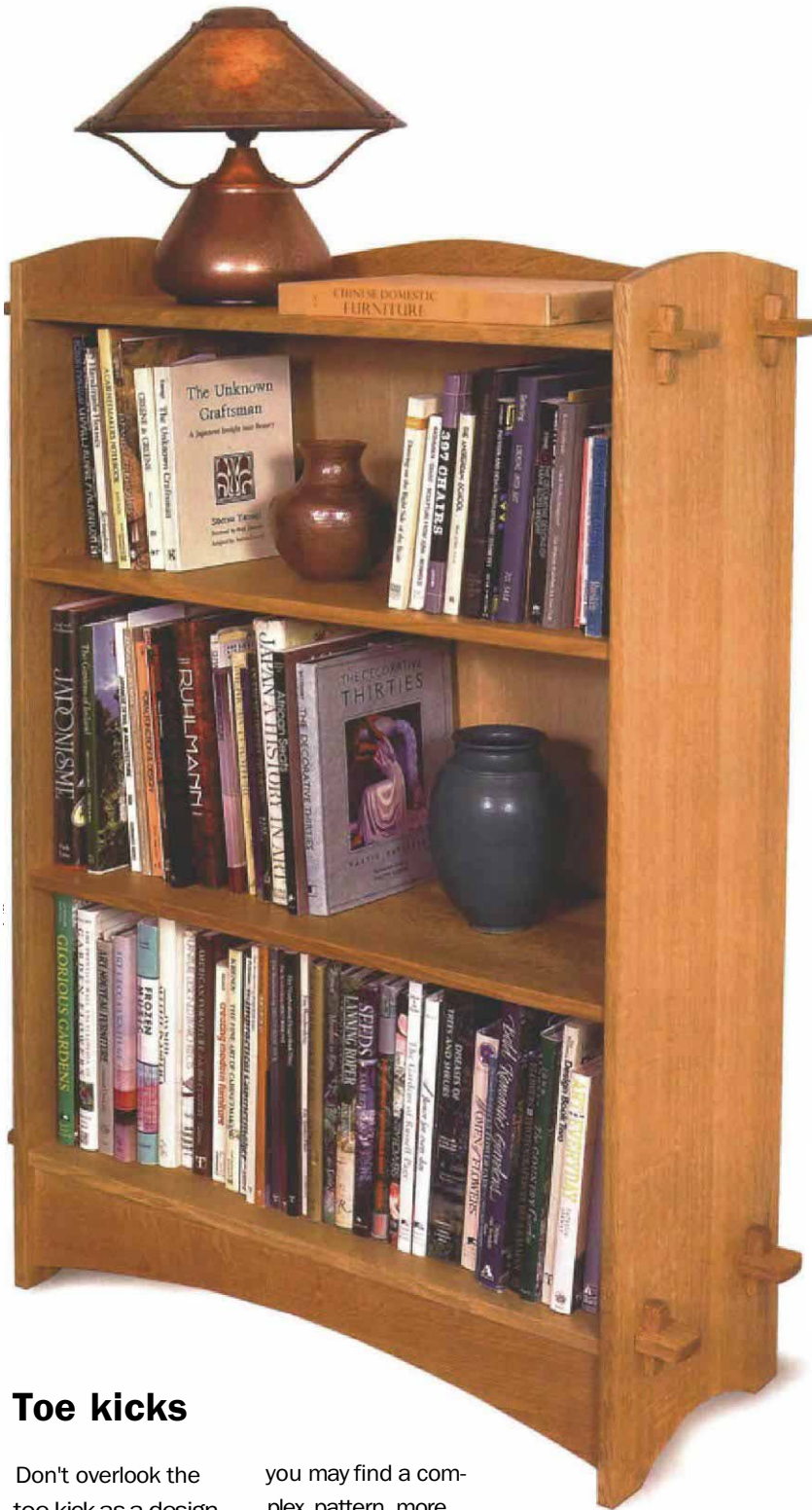
Cut tenons and wedges to fit easily

Cut the cheeks and shoulders of the tenons with a plunge router and a straight fence (see the bottom photos on p. 49). The fence

Profiles



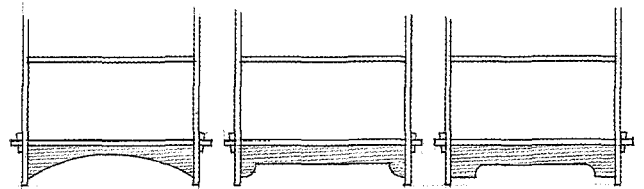
The way the bookcase is shaped on its sides and rails strongly influences the appearance of the piece. Try drawing out a few shapes on cardboard to see them full scale. Flat or beveled bottom edges, simple indents, shallow arcs or other combinations of shapes all lend a certain feel to a piece. My advice is to keep the shaping details consistent throughout. So a negative shape cut out of the bottom of the sides can be nicely recalled at the top, in the toe kick or in the backslash.



Toe kicks

Don't overlook the toe kick as a design element. It greatly influences how the bookcase "stands" and can also help tie all of the pieces in the case together. A toe kick can be of a simple design, but

you may find a complex pattern more suitable. The toe kick on this case echoes the shallow arc of the top rail; arcs also appear in the sides, at both top and bottom. The motif is a unifying element.



Wedges

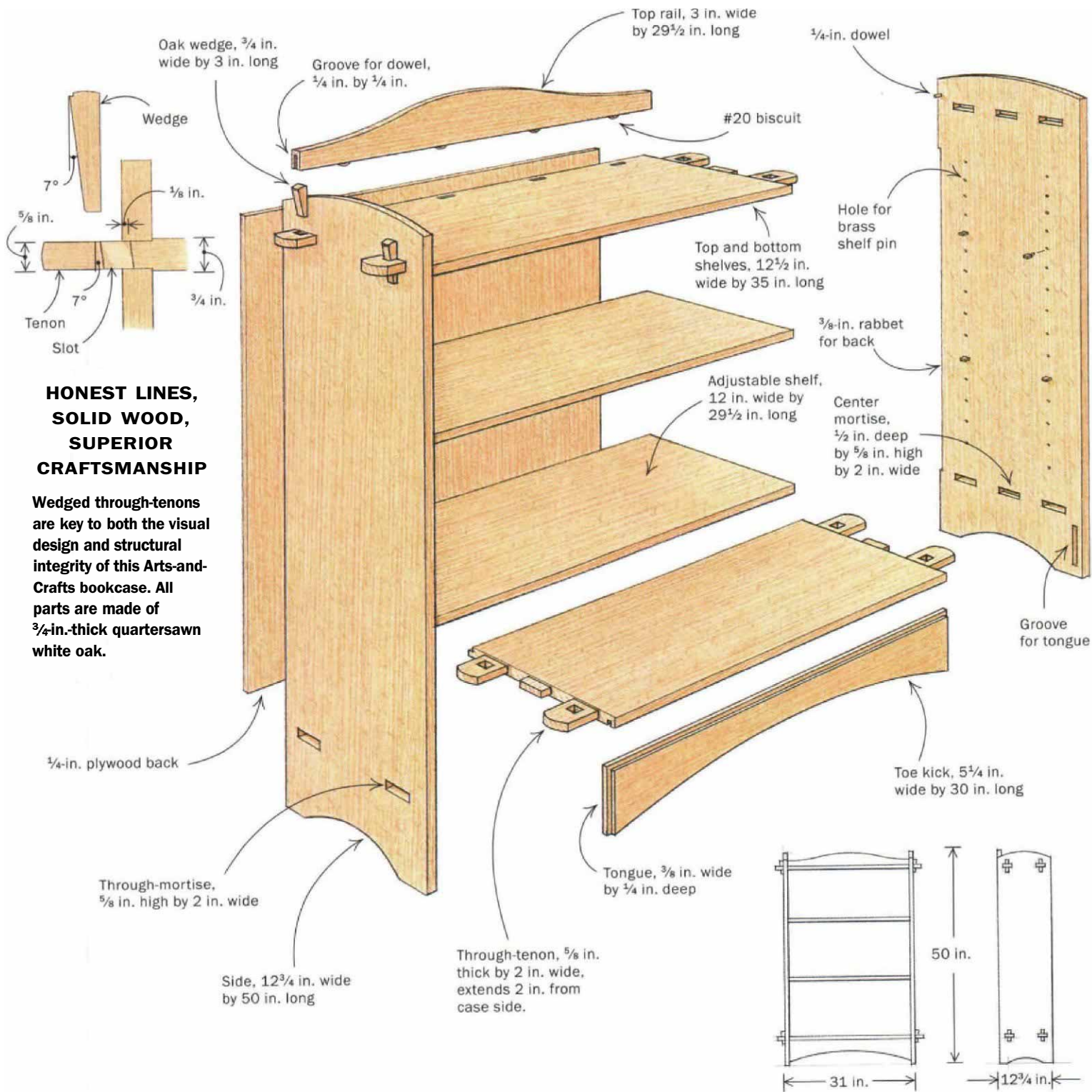
The material of the wedges and their shape and placement can really make a difference in the look and feel of the bookcase. Using a contrasting species, like darker rosewood, gives the wedges a visual punch. But be sure the wedge material is as tough as the white oak.

Oak wedges can be colored to provide contrast. An ebonizing solution of vinegar and rusty nails or

steel wool will give oak a color anywhere from a dusky gray to black, depending on the solution and the amount of tannin in the oak. Wedges can be shaped any number of ways. Double wedges allow you to mortise straight through the tenon at no

angle. The angle of the wedges themselves creates the necessary

force. The number of wedges can be varied to suit your taste; for instance, you can put three wedges at the bottom and two at the top.



**HONEST LINES,
SOLID WOOD,
SUPERIOR
CRAFTSMANSHIP**

Wedged through-tenons are key to both the visual design and structural integrity of this Arts-and-Crafts bookcase. All parts are made of 3/4-in.-thick quartersawn white oak.

rides tightly against the end of the board to locate the tenon shoulder. Cut one face of all of the boards about 1/16 in. deep and back to the tenon depth, then cut the second face so that the tenons will fit easily into the mortises. Next, on the bandsaw, rough out the waste between each of the tenons. Then reset your router bit to the full depth of the board and, in several passes, cut the shoulders between the tenons.

I set up the router table with a fence to finish-cut the roughed-out edges of the tenons so that they slide easily through the mor-

tises. Use a rabbeting plane to pare the tenons down on both their faces and edges. The fit should be smooth; you shouldn't have to fight the joint home, nor should you be able to see Paris through the gaps. Work one tenon at a time until you can push all of the joints home by hand.

Dry-assemble the case, then mark the outside face of the case side onto each tenon. Be sure to locate the end of the slot for the wedges 1/8 in. in from this line so that part of the slot lies inside the face of the case side. If you cut the slot flush with the case side,

the inside face of the slot will push against the wedge, preventing it from providing a totally snug fit.

Next, make a mortising template to router-cut the wedge slots in the tenons. The slot needs to be angled on its front edge, so glue a 7° angled block to the bottom of the template. Your plunge router will then rout at that angle. Rout each wedge slot with a 1/4-in. straight bit and a 5/16-in. o.d. template guide, and chop its corners square with a chisel.

To make all of the wedges the same size and angle, you'll need to make a simple tapering jig for the bandsaw. Cutting out the triangular shape of the wedges on a 3-in. by 5-in. piece of 1/4-in.-thick scrap ply gives you a place in which to hold your wedge stock as you pass it by the blade. Move the fence over to the proper spot and cut all of the wedges. Next, plane each wedge edge until the wedge fits easily through the mortise. Then clean up the angled face until it just starts to snug up when it's about 1 in. above the top face of the tenon.

Have a plan before assembly and glue-up

Once the through-tenons on the shelves fit easily into the mortises on the case sides, it's time to add a top rail, or backsplash, above and a toe kick below. The toe kick needs to be strong, just in case it gets used as it was so aptly named, so rout stopped grooves into the case sides and a through-groove into the bottom shelf, referencing off each board's back edge. Then rout a tongue into the toe kick so that it can slide home after the case is glued together.

The top rail doesn't need the strength of a tongue-and-groove joint, so after the case is together, glue the rail onto the top with biscuits. To keep it from twisting, add two dowels to the case sides. These dowels fit slots cut into the ends of the top rail. For easy assembly, use the offcuts from the top rail and toe kick as clamping blocks when gluing up these two curved rails.

Shape the bottom of the case sides on the bandsaw and finish with a template router. Rabbet the case sides for the back on a router table. For a long-grain cut like this, a climb cut—one made with the rotation of the router bit—can help avoid tearout. File the shaped edges slightly round, then scrape and sand the entire case with 180-grit paper. Raise the grain with a damp rag and resand to get rid of any puffed fibers.

Nothing will save you more from heart palpitations and profuse sweating than planning out a strategy for glue-up. Dry-fitting your case and laying out your clamps, glue, hammer and wedges will help make this assembly an occasion for whistling.

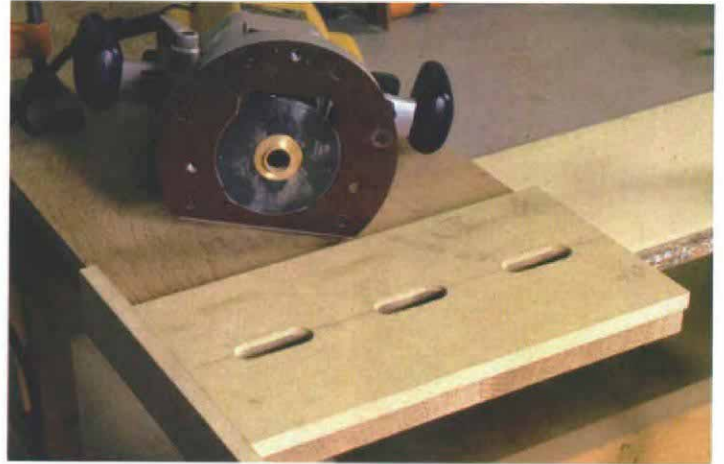
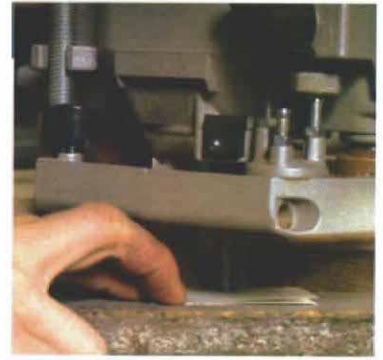
Glue up one side at a time. With one side in place but unglued, apply glue to the tenons of the other side, gluing only the long grain. Don't over-glue these joints or you'll have a mess to clean up. Clamps pull everything in tight, with maybe a wallop or two from a dead-blow hammer.

After clamping, place the wedges and bang them home. I use a metal hammer for this because the sound it makes will change when the wedge is in far enough. Do not bang the wedge past this point. You'll bust out the short-grain end of the tenon. This is why I left the tenon ends poking through the case sides at a relatively long 2 in. This much wood provides enough room to put in the wedges safely. □

Gary Rogowski, a contributing editor to *Fine Woodworking*, teaches a class on building this bookcase at *The Northwest Woodworking Studio*.

MORTISES

Router-cut mortises rough out quickly. With this template (below), you don't have to mark mortises on the case sides, just the centerlines. Use a folded index card (right) to set your router depth so that the bit will not break through the sides when cutting mortises. Pop out the thin waste with a chisel,



TENONS

A router with a fence cuts clean shoulders between tenons. First, bandsaw the waste between the tenons.



An angled block sets the bevel. With the template tipped 7°, your router will automatically bevel the slot in the through-tenon to accept a tapered wedge.