

A Classic Case

Floating-tenon joinery and curly cherry update a traditional Arts and Crafts design

BY GREGORY PAOLINI



Anyone familiar with American furniture would immediately identify this bookcase as an Arts and Crafts design. However, it differs from traditional pieces in two important ways. Arts and Crafts furniture usually is made from quartersawn white oak, but I built this bookcase from curly cherry. Traditional Arts and Crafts pieces are joined with mortises and tenons, while I use a modern variation—the floating tenon (*FWW* #158, pp. 36-39).

In floating-tenon joinery, a wooden spline (the floating tenon) joins mortises routed in both pieces (see photo, facing page). I find floating-tenon joinery to be much faster than traditional mortise-and-tenon, and plenty strong.

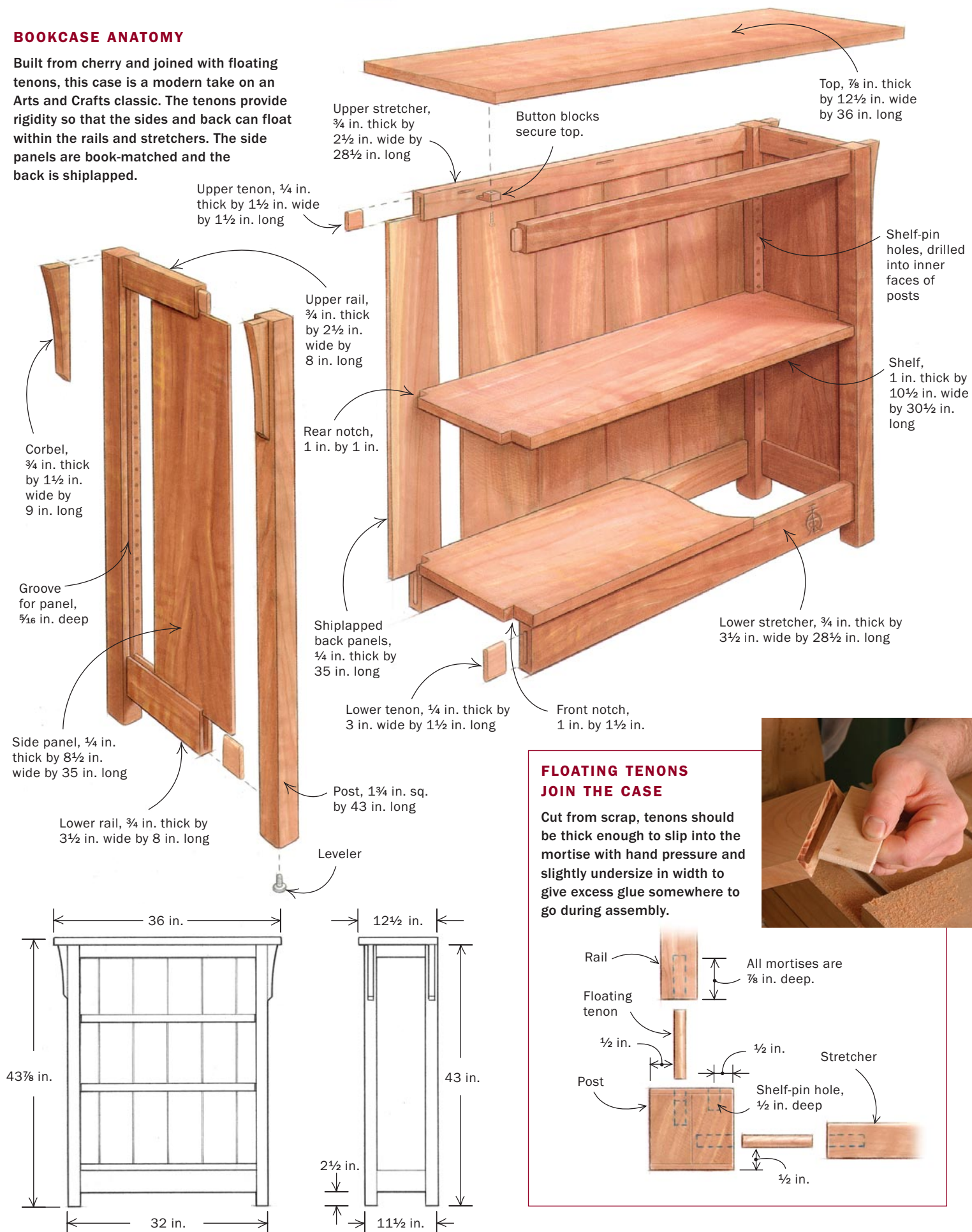
I spent time choosing highly figured boards for the front rails and the side panels, which will be most visible. The back is of shiplapped cherry, resawn (sliced in half to produce two thinner boards) from 4/4 stock. Shiplapping is a method of slightly overlapping boards by rabbetting the opposite edge of each side. Shiplapped boards rarely end up sitting exactly flush with each other. Those who don't like that look might substitute plywood or tongue-and-groove boards for the back.

Prepare the stock before you begin

As with all projects, I make sure the lumber is dried properly, and acclimate it to my shop for a couple of weeks. After that, I

BOOKCASE ANATOMY

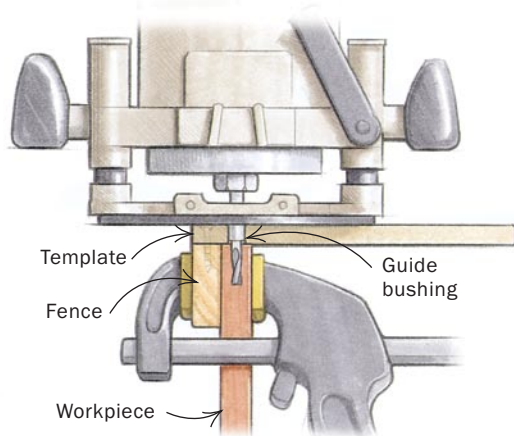
Built from cherry and joined with floating tenons, this case is a modern take on an Arts and Crafts classic. The tenons provide rigidity so that the sides and back can float within the rails and stretchers. The side panels are book-matched and the back is shiplapped.



Routing the rail mortises

A SIMPLE MORTISING JIG

Fitted with a guide bushing the same diameter as the slot, a plunge router easily mortises the ends of the rails and stretchers.



Slot the jig on a router table. The jig's hardwood fence rides along the router table's fence, accurately slotting the jig's MDF base.



Mark centerlines on both the jig's slot and the workpiece. Line up the centerlines and clamp the stock in the jig.



rough-cut all of the boards slightly oversize, and let them sit for an extra day or two in case the wood still wants to shift a bit.

Face-jointing is a critical, but often overlooked, step in dressing lumber. Jointing one face flattens the board, removing flaws such as cupping or mild twisting. To keep track of it as a reference surface, I mark the jointed face with chalk. After face-jointing, I square one edge of each board, being sure to feed it through the jointer with the flattened face against the fence. When I plane the stock to thickness, the jointed face rides across the bed of the planer, ensuring a flat board.

Like the shiplapped back, the side panels are resawn from 4/4 stock. I leave the stock destined for resawing as thick as possible, planing it only to remove the rough face.

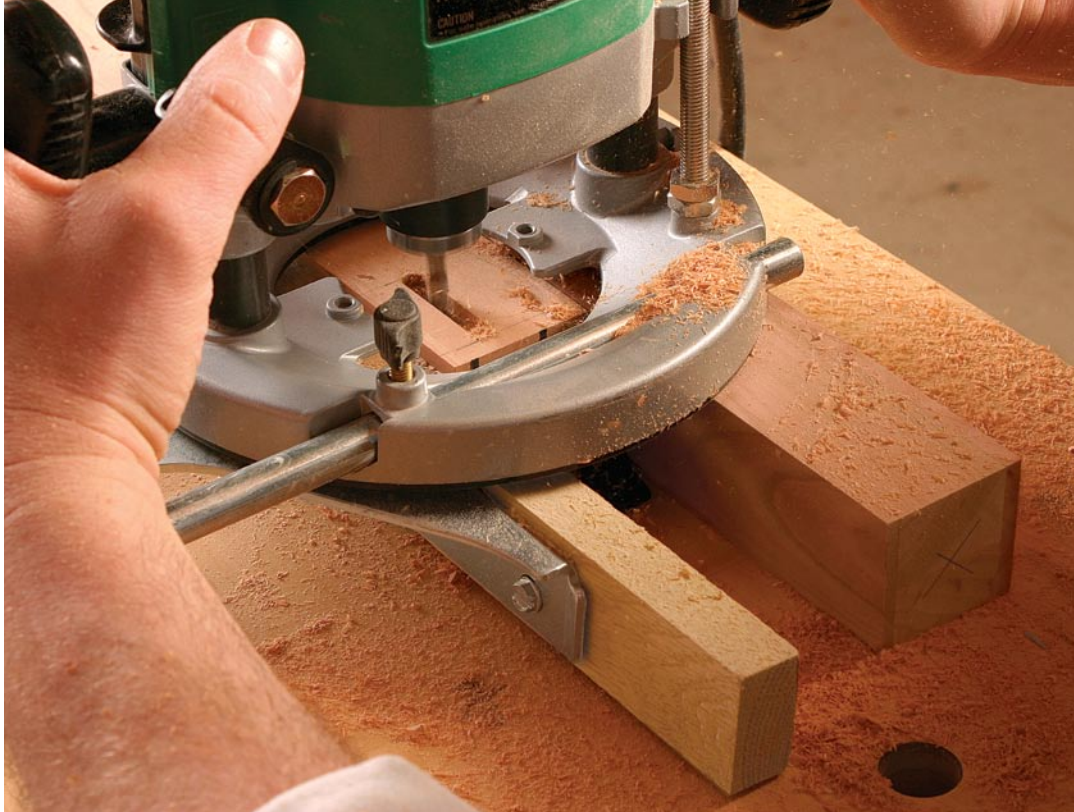
My bandsaw is a basic 14-in. model with a 6-in. riser block to add capacity. It's not terribly powerful, so to help it

out while resawing wide stock, I start by kerfing both edges of the boards on the tablesaw. This leaves less wood in the center of the board to bandsaw, and the kerfs help guide the bandsaw blade to ensure a straighter cut.

The boards resawn for the back are planed to finished thickness, and then weighted down in a stack to keep them flat. These boards can vary in width, which adds a little character to the bookcase, and should be left a little oversize for fitting to the back of the case.

The side panels are book-matched (resawn panels are glued edge to edge so that the grain of each mirrors the other). When the glue has cured, scrape away the excess, and plane the sides to their final thickness. As with the back, I leave the side panels oversize and fit them to the case later.

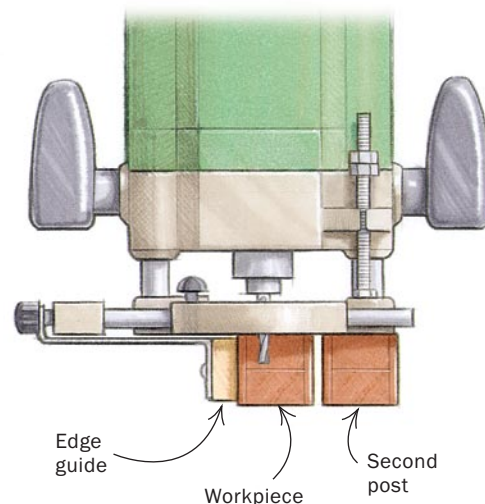
I couldn't find any 8/4 stock for the posts, so I glued each one from two pieces of



Routing the post mortises

SUPPORTING THE ROUTER

When mortising the posts, there's not much surface area to support the router. A second post laid beside the workpiece adds support.



4/4 stock planed to 7/8 in. To give the illusion that these posts came from one piece of wood, I ripped some cherry to about 1/8 in. thick, and used it as a thick veneer on the sides of the posts that showed the glue-line. Although this technique also results in glue-lines, they're so close to the corners of the posts that they're barely noticeable.

Floating tenons speed construction

As with traditional mortise-and-tenon joints, floating tenons should be about one-third the thickness of the stock. In this case, the finished thickness of the bookcase rails is 3/4 in.; the tenons are 1/4 in. thick. Accordingly, I cut the mortises with a 1/4-in. spiral upcutting bit on a plunge router using a simple jig (see photos, facing page).

I make the tenons by ripping and planing lengths of stock to fit the mortises. The tenon edges are bullnosed on a router table. The tenons should be thick enough to slip into the mortises with hand pressure, and a little undersize in width to give air and excess glue somewhere to go. The mortises are just over 3/4 in. deep; I cut the tenon stock into 1 1/2-in.-long pieces.

Mortise and groove the frame

I mortise the posts using a plunge router and a fence. The bit is the same 1/4-in. spiral upcutting bit used to mortise the rails and stretchers. I have to set up the router and fence anyway to groove the posts

for the side panels and shiplapped back, and the panels are the same thickness as the tenons. So, cutting the mortises at the same time is only a matter of deepening the groove at the top and bottom of the post. To provide additional support for the router, I place a second post alongside the one being routed (see drawing, right). So as not to strain the router bit, it's important

Grooves for the back and side panels



Mill the grooves in the rails and stretchers on the tablesaw. This method is a safer, easier alternative to routing the thin edges of these pieces.



A plunge router fitted with a fence mills the grooves in the posts. Use the same router setup used to cut the mortises in the posts.

Assemble the bookcase in stages



Prefinishing saves hours of time cleaning glue squeeze-out. Shop towels shoved into the mortises keep them finish free to ensure glue adhesion. Glue-up starts with the sides (right). Allow them to dry overnight before removing the clamps.

to make several light passes instead of one heavy pass. When a router bit spinning at 20,000 rpm breaks, bad things happen. Before putting the router away, I cut small grooves in the upper rails and stretchers. Later on, I will use them to secure the top with button blocks (see drawing, p. 33).

Bookcases get loaded with hundreds of pounds of books, and it's tough on the joints if the piece is not level. I like to add adjustable levelers to the bottoms of the posts. I use common metal pad levelers available at most hardware stores, and screw them into threaded inserts that I install in the base of each post.

The next operation on the posts is to drill an array of holes for the adjustable shelf pins. To keep them out of view, I locate the bores for these pins on the inner faces of the posts. I use a jig that I made, with holes drilled at the cabinetmaker's standard 32-mm spacing. These holes are drilled to accept a $\frac{3}{8}$ -in. router bushing. With my plunge router so equipped, I "drill" the holes with a $\frac{1}{4}$ -in. spiral upcutting bit.



Finally, I ease the bottoms of the posts by holding them at an angle and spinning the bottoms against a sander.

Dry-assemble to check final dimensions

With all the joints cut, I dry-assemble the bookcase and measure for the back and side panels. Both the side panels and the back will expand and contract due to seasonal humidity—about $\frac{1}{8}$ in. per foot of width. How you size the panels depends on the season. For example, if it's humid, the panels should fit snugly because they'll dry and shrink when the season changes. If your shop is very dry, keep the fit looser (to allow some expansion).

Now is also the time to measure the final length and depth of the shelves, and lay out the notches at the corners where the shelves will fit around the posts. I cut these notches on a bandsaw, but you could just as well use a handsaw or jigsaw. Leave a $\frac{1}{16}$ -in. space between each post and its corresponding notch to accommodate seasonal movement.

After I have sized the side panels, back, and shelves, I do one last dry-fit and make any required adjustments. When I know everything will fit together, I sand all the pieces to 220 grit.

Making and attaching the corbels is the final step before finishing. I bandsaw



Next come the stretchers and the back. You may want to enlist a helper when putting together the shiplapped back.



Top off the assembly with the final side. Use pine blocks on each side of the corbels to transfer clamping pressure to the posts.

them, then smooth the sawn surfaces with a spokeshave and a little sanding. Because the corbels are only ornamental, they can be attached with brads and glue.

Finished—but not done

To minimize the problems glue squeeze-out can cause, I finish all the parts before assembly. Prefinishing takes discipline; after all this time, you just want to see the bookcase take shape. But finishing the parts first means you won't have to spend tedious hours trying to clean up glue squeeze-out later.

I apply a coat of Zinsser Bullseye Seal-Coat sanding sealer over the raw wood to minimize grain raising. The sealer also adds a nice amber hue typical of traditional oil-based finishes, but lacking in the water-based ones I use. I let it dry overnight, then apply several coats of Minwax Polycrylic. Be sure to apply the same number of coats to all sides of the pieces to minimize the chance of the wood warping.

Putting it all together

I assemble the bookcase in stages, starting with the sides. The best way I've found

to glue the mortises and tenons together is to apply a thin bead of glue along the top of the mortise, and let gravity pull it down. As soon as I've clamped the assembly, I check it with a carpenter's framing square.

After the sides have cured, I move on to assembling the front and the back (see photos, above). You might want to use polyurethane glue for assembling the back; it has a longer open time than yellow glue.

While clamping the bottom is straightforward, the top with its corbels causes a problem. The solution is to use small pine blocks on each side of the corbels to transmit clamping pressure to the posts. Once the glue has cured, I can easily remove any squeeze-out, which doesn't bond to the topcoat very well. Then I attach the top with button blocks to allow for wood movement, and install the shelves. I finish up with a quick coat of wax for its tactile benefit. □

Gregory Paolini is a Roycroft Renaissance Artisan who builds furniture part time in his Depew, N.Y., basement shop.



Add the top and shelves, and this new heirloom is ready. The shelves are all removable, resting on shelf pins or the bottom stretchers, and notched to fit around the posts.