

Greene and Greene: Master the Details



Perfect the classic cloud lift and ebony accents
while building this iconic bed

BY MARTIN McCLENDON

I'm a big fan of Arts and Crafts furniture, so when it came time to build my daughter her first big-girl bed, I looked at a lot of beds in the style. But I returned time and again to beds designed by Charles and Henry Greene for the Gamble House in Pasadena, Calif. The design features the Greenes' signature cloud lifts, and ebony plugs and splines that pop against the cherry parts. Though classic, the design fits well in a modern setting, including a little girl's room.

For this article, I made a queen-size version of the bed. The cloud lifts might seem

difficult, but I'll show you how to bandsaw them and how to make the ebony plugs.

The biggest challenges are fitting the spindles between the cloud-lift steps in the rails, and fitting the mitered top rail between the posts. I have great techniques for both. Stepped mortises in the top rail hide the spindle's top shoulder, which means you don't actually have to fit it.

Start with the post and rail joinery

When working with shaped parts, it's smarter to cut joints while the parts are

still square. But with this bed, there are grooves and mortises that can be cut only after the cloud lifts are cut into the rails in the foot and head boards. So, the joinery is broken into two sessions: one before the cloud lifts are cut and the other after.

Start with the posts. They join the upper rail with a splined miter joint. Before cutting the posts to length, cut the 45° miters on the top of them, but don't cut the miters on the upper rail yet. Because the joint is so prominent in the completed bed, it must be perfectly tight. The easiest way to

How to handle the tricky miter

Getting the head- and footboard square is a challenge, because the top rail meets the posts with a miter. Dialing in the rail's length is the most critical step.

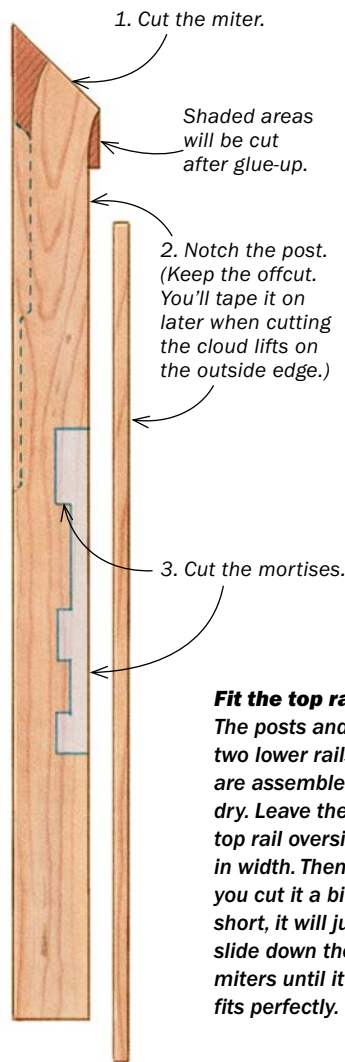
get it there is to fit the top rail after all the joinery below it is cut and you can dry-clamp the posts to the bottom and middle rails. That creates a rigid, square assembly that allows you to dial in the top rail's fit.

Now cut the posts to length, chamfer the bottom edge to prevent splintering, and cut them to width. You have to leave about $\frac{3}{8}$ in. extra near the top to accommodate the inside curve of the miter where the top rail meets the post. Cut this notch on the bandsaw. Smooth the cut with a hand-plane, using a file to get into the corner.

Next, cut the mortises for the head- and footboard rails and the side rails. I hog out most of the waste at a drill press using a Forstner bit, then square up the mortises with a chisel. Finally, the bed bolt needs a counterbore and clearance hole in the post. Drill the counterbore with a Forstner bit, and then the clearance hole. Now cut the grooves in the rails for the bottom panel, and the inside edge of the two stiles that partially frame the upper panel. They're all through-grooves; cut them with a dado set.

The last bits of joinery before cutting the cloud lifts are the tenons on the ends of

START WITH THE POST



Use a sled for the miters. Your miter gauge won't hold these big pieces as securely or give you as accurate a miter.

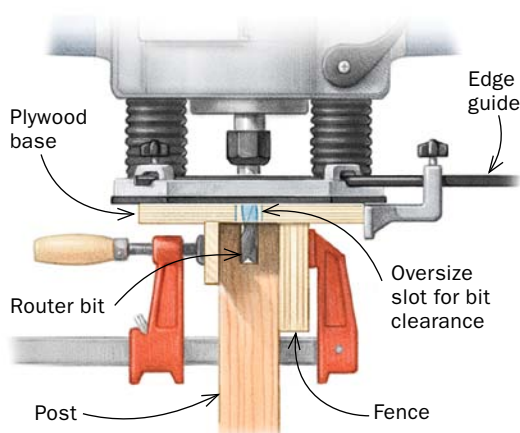
Fit the top rail.

The posts and two lower rails are assembled dry. Leave the top rail oversize in width. Then if you cut it a bit short, it will just slide down the miters until it fits perfectly.



SIMPLE JIG FOR ROUTING SLOTS

Center the jig's slot on the workpiece, and use the router's edge guide to align the bit for the cut. To ensure perfect alignment, be sure to register the jig and edge guide the same way on every piece that's routed.



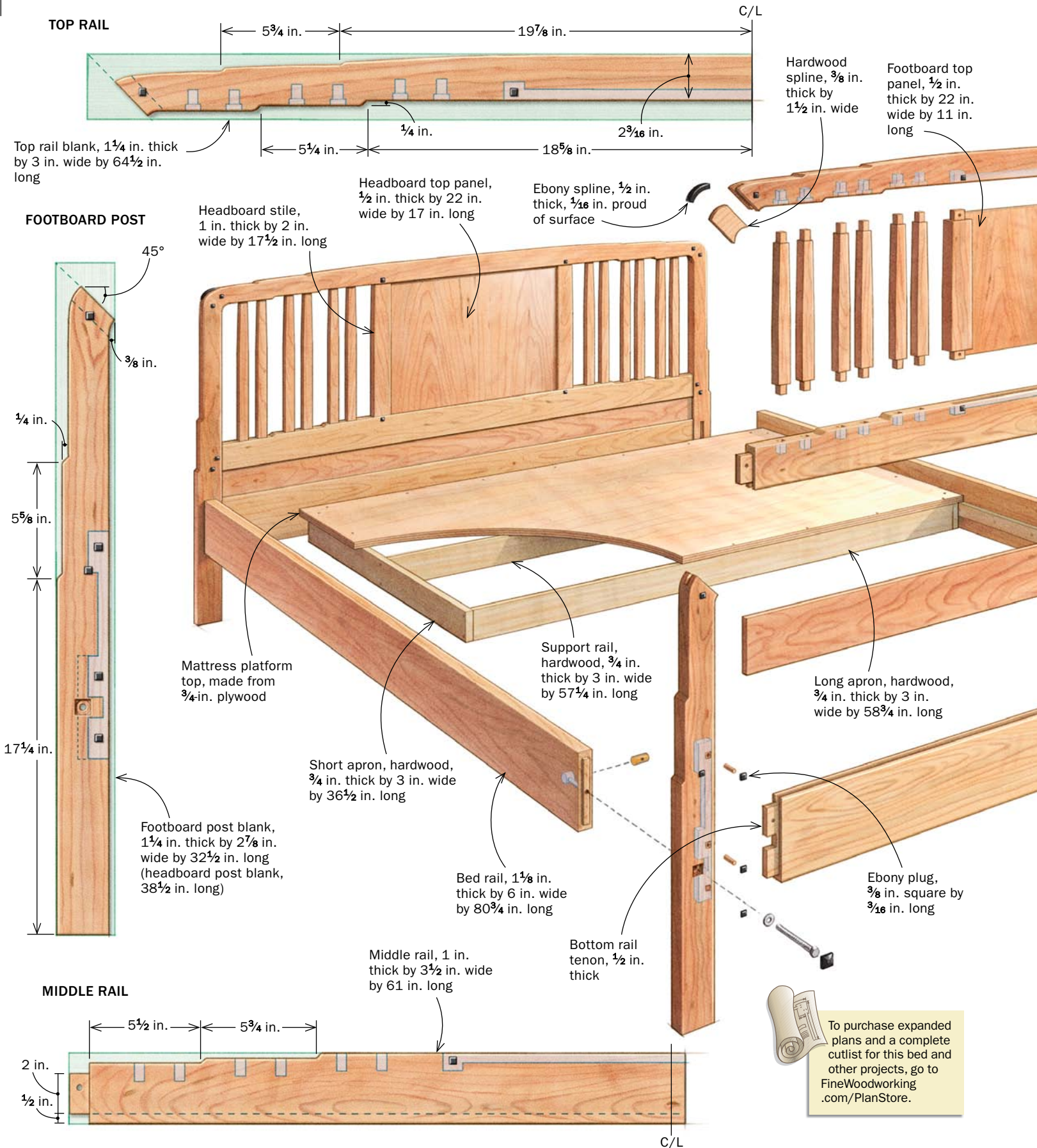
Mind the edge guide. Use a spiral bit, and pull the router toward the outside of the joint to keep the edge guide tight.



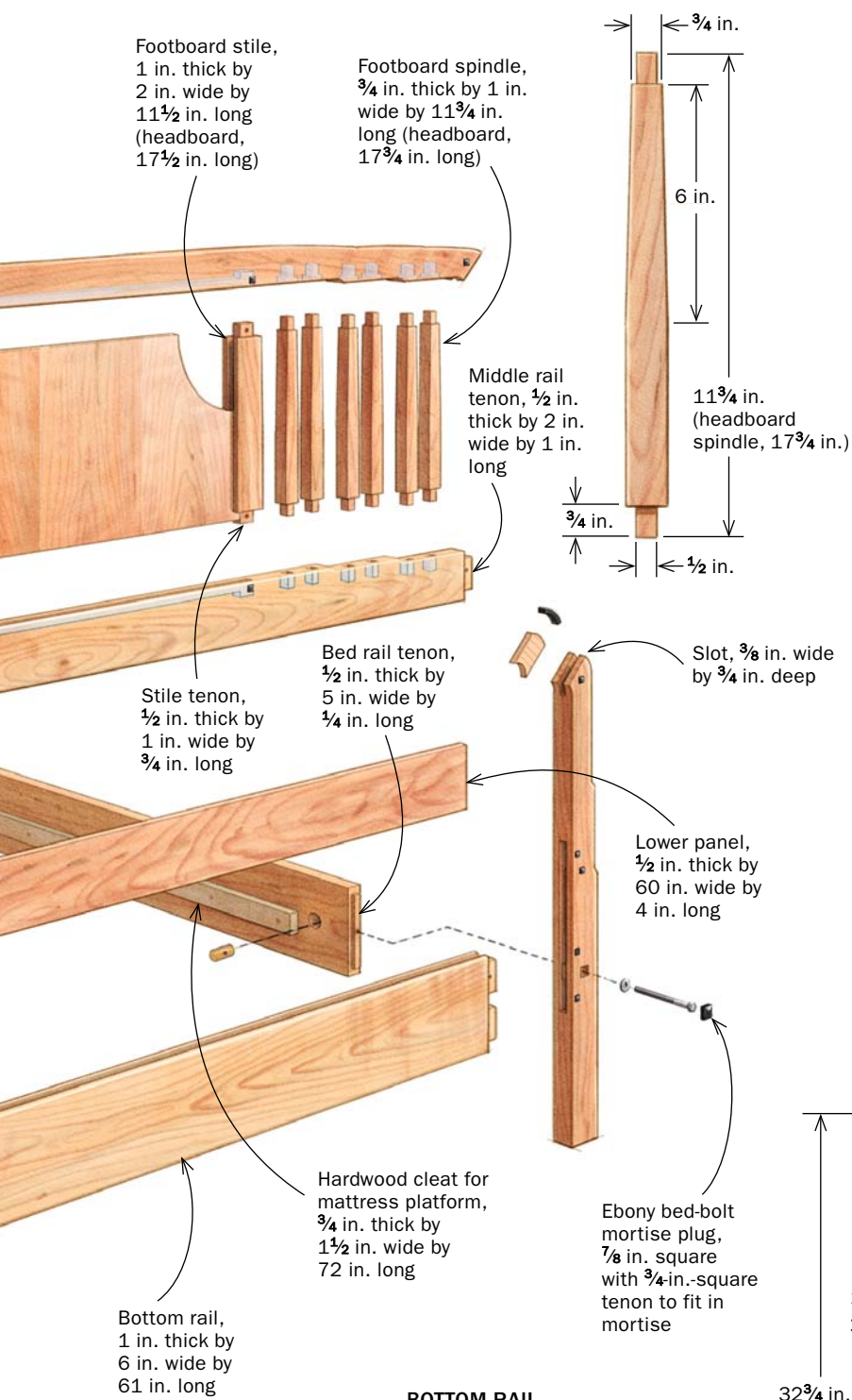
Grain direction matters. Cut off the spline across the grain, so it will move in the same direction as the post and top rail and won't push the joint open.

Arts & Crafts bed

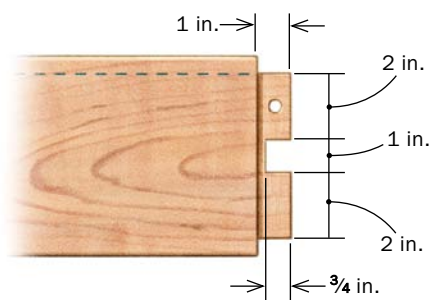
Cloud lifts and ebony accents highlight this queen-size version of a timeless Greene and Greene design. Stepped mortises in the top rail take the pain out of fitting the spindles.



FOOTBOARD SPINDLE



BOTTOM RAIL



the rails. Because all of the head- and footboard rails are long, cut the shoulders at the tablesaw, using a sled to support them, and then the cheeks at the bandsaw. The double tenon on the bottom rail is made the same way, but cut the inside edge of each tenon with a handsaw and remove the waste between them with a coping saw. Clean up the shoulder with a chisel. Finally, use a shoulder plane to trim the tenons to fit the mortises.

The side rails are even longer, so cut the tenons on those with a rabbeting bit and a handheld router. This is a quick job, because the tenons are just ¼ in. long.

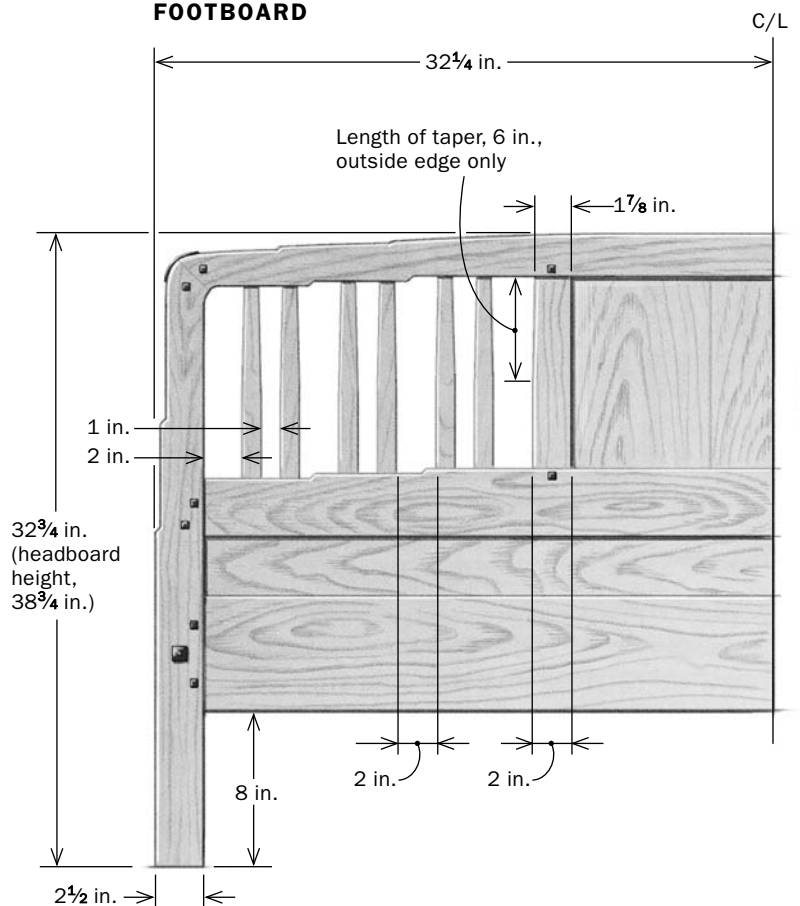
Don't cut the tenons on the footboard and headboard stiles now. You'll get a better fit if you do them later, at the same time as the spindles.

Perfect miter where it counts

To fit the top rail, dry-assemble the head- and footboards. Clamp the bottom and middle rails between the posts and check that the assembly is square.

Start with a top rail that's a bit wider than its final dimension. Cut a miter on one end of the top rail, mark for the miter on the other end directly from the assembly, and cut the second miter. Put the rail in place. If you cut it a bit short, don't worry. It will slide down until the joint is tight. And because the rail is oversize, it won't come down beneath the top of the posts. When it fits nicely, just mark the bottom edge from the dry-fit joint and rip it to width. Don't worry about the top. It will be spot on after the cloud lifts are cut.

FOOTBOARD



Cloud lifts lighten the rails

A hallmark of Greene and Greene furniture, cloud lifts give an Asian feel to Arts and Crafts design, but they make fitting the spindles difficult. By burying the upper tenon shoulder in the rail, McClendon gives himself some leeway there, and needs a tight shoulder only at the bottom.



Stopped cuts create the clouds. Use the fence for the long horizontal sections, and cut the angled transitions freehand.

Don't cut the curves on the inside and outside corners of the miter joints yet. Having them square makes it easier to clamp up the head- and footboards during assembly.

The miter joint needs a spline to reinforce it. That means both the post and the rail need a groove along the miter. I rout it, using a jig and edge guide.

Next, mill up a blank to fit the grooves. I use cherry because it's strong and a lot less expensive than ebony. Later, I'll cover the spline with a decorative ebony cap. Cut the splines to size and set them aside. You don't need them until you glue up the head- and footboards.

Now for the cloud lifts

After both top rails have been fitted, it's on to the cloud lifts. Use a full-size template to lay out each part.

I make the cloud lifts entirely at the bandsaw. The long, straight side can be cut with the workpiece against the fence. When it's not possible to start at the end of the workpiece, like on the bottom edge of the top rail, I cut a notch into the edge wide enough for my bandsaw blade to fit into. That lets me cut in both directions from the notch and get a clean, straight cut. The short angled cuts that serve as transitions for one level of the cloud lift to the next are cut freehand at the bandsaw.

The only cloud lifts you should not cut at this point are those in the top edge of the top rail. It needs to be square so that you can mortise the bottom edge for the spindles. For now, clean up the cuts you've just made. I use a smoothing plane where



Clean up with a chisel. It's the best tool for the small transition. For the horizontal surface, use a block plane, switching to the chisel near the corner where the plane can't reach.

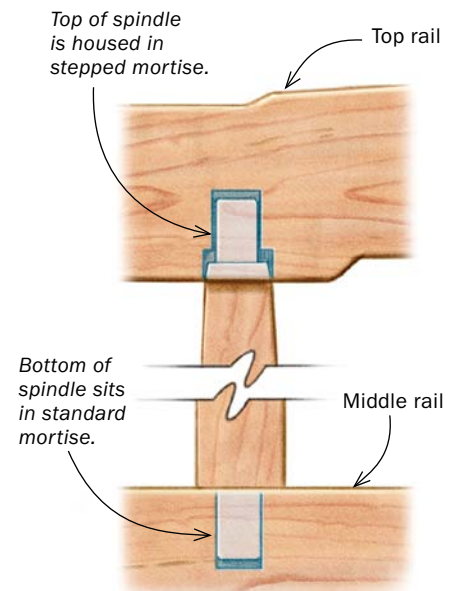


Two holes for a stepped mortise. Drill the larger hole first and then center the smaller bit in the dimple left by the larger one. Use a Forstner bit for both. Square them up, again starting with the bigger mortise before the smaller one.



STEPPED MORTISE

The advantage of a stepped mortise here is that you don't have to cut shoulders to match the cloud lifts perfectly or make the distance between shoulders perfect (the cloud lifts make this tough to do), because the shoulders are housed inside the mortise.



Assemble in stages

The length of the rails and the large number of spindles make this a tricky glue-up. Use glue with an extended open time and you won't have to rush, which could lead to mistakes.



Glue the posts to the lower rails. The bottom panel is pre-finished and floats in the grooves (as does the top panel).



Put the spindles and panel in the top rail first. It's far easier to get the tenons into the stepped mortises now than trying to do it after the spindles' bottom tenons are locked into the mortises on the middle rail.

possible and a combination of a block plane, scraper, and sandpaper where the smoother can't reach. Take care to keep these edges square to the faces of the rails.

Stepped mortises simplify joinery

Now it's time to cut the mortises for the spindles. As I did with the rail mortises in the posts, I use a Forstner bit at the drill press and a chisel to square them up. The mortises in the top edge of the middle rail are standard mortises. Those in the bottom edge of the top rail are stepped.

The stepped mortises have a couple of big advantages. For one, it is difficult to nail the shoulder-to-shoulder distance on the spindles when working between the shaped cloud lifts. By having only one standard shoulder to fit, at the bottom, and burying the top one in the rail, you get some leeway on length. You could, of course, just run the top of the spindle into a single mortise, with no tenon at all, but remember it is tapered. So the first step in the mortise accommodates the taper, while the second, deeper one accepts a straight tenon for a strong glue joint.

After mortising the rails, rout the stopped grooves for the upper panel. There are also mortises in those grooves for the tenons of the stiles. I cut the grooves and the mortises with a spiral bit in a handheld router. Use an edge guide to keep the bit centered and cutting straight.

At this point, it's safe to cut the cloud lifts into the top edge of the top rails.

Now cut the tenons on the spindles. I use a miter gauge to guide the spindles past the blade and cut the tenon shoulders, then I cut the cheeks with my tenoning jig



Bring it all together. As you clamp the assembly, make sure that the tenon shoulders on the spindles are seated squarely on the middle rail.



Knock in the spline. With so much glue surface, it takes a bit of force to get it all the way in. Keep your mallet blows straight to avoid breaking off the spline.



Clamp the miters last. The horns left on the leg and top rail provide a square clamping surface, so there's no problem getting enough pressure on the joint to create a tight glue line.

Classic ebony details complete the look

The Greene brothers combined pillowed ebony plugs and splines with their signature cloud lifts, calling attention to sturdy joinery in an elegant way.

TWO-PART SPLINE PROVIDES STRENGTH AND BEAUTY

A cherry spline reinforces the joint, but the eye-catcher is the decorative ebony spline that frames the outside corner.



Round the corner and rout a slot. Use a coping saw to cut away the waste on the inside and outside of the corner, checking to make sure the saw is cutting square to the faces of the leg and rail (left). McClendon uses a bearing-guided slot-cutter (leevalley.com, No. 16J83.04) to cut the shallow slot. It takes two passes to cut it to full width (right).



Transfer and lay out the curve. McClendon uses a contour gauge to read the curve inside the slot (above). Then he traces the curve from the gauge to an ebony blank (right).



Glue in the decorative spline. Don't worry about cleaning up the bandsaw marks on the inside curve. It is the tight joints along the sides that matter most (above). After the glue sets, start pillowing the outside edges with a chisel to remove most of the waste (right), then use a sanding block and P220-grit sandpaper to round over the facets.



Online Extra

To see the jig McClendon uses to align the barrel nut and bolt, go to FineWoodworking.com/extras.

PEGS ARE FUNCTIONAL, PLUGS ARE DECORATIVE

McClendon needed only one peg at every major joint, and covered it with an ebony plug. But the original had more, so he added extra plugs (but not pegs) for a more authentic look.



Mortise on top, peg below. Use a chisel to square the top holes (left). Don't try to go the full depth at once. For the deep pegs, McClendon used dowels from a woodworking-supply store. Use a spare dowel to drive the peg home (right).



Pillow first, then cut and install. Soften the edges by gently rounding them with sandpaper and a sanding block before cutting them off (above). Measure carefully before cutting, to get the right protrusion. Spread glue on the bottom and the walls of the mortise and then use a dead-blow mallet so you don't damage the plug (right).

assembly). I use a $\frac{1}{8}$ -in. roundover bit in a router table. Skip the section of the middle rail that meets the stiles. Those surfaces are flush to the stiles. Use a handheld router to round over the edges of the side rails.

Finally, make the panels. Sand all of the parts to P220-grit and pre-finish the panels.

Round top corners after assembly

This can be a challenging glue-up, so do a dry-assembly first to check that everything comes together square before you spread any glue. Also, use a glue with an extended open time, like Titebond Extend.

After the head- and footboard are glued up, it's time to round the inside and outside edges of the miter joint in the top

corners. Draw the arc, rough it out with a coping saw, cutting proud of the line, and then smooth the cut, working down to the layout line with a rasp, a file, and a small sanding drum in your cordless drill.

Next, use the rasp, file, and sanding drum to refine the cloud lifts. Use a handheld router and $\frac{1}{8}$ -in. roundover bit on all of the outside edges. Take a final pass by hand with P220-grit sandpaper to soften and unify the lines. Now peg all of the joints from rails to posts and stiles to rails.

Next, square up all of the plug mortises and make the plugs. Cut some little sticks of ebony at the bandsaw. Clean up the sides with a block plane. Round over the end with a random-orbit sander, and then

hand-sand it up to P220-grit. Measure to the bottom of the plug mortises, add the $\frac{1}{16}$ in. that they protrude from the surface, and nip the plug off the stick with the bandsaw. Glue it into place.

An ebony spline covers the cherry spline used to reinforce the miter joint. This detail should be pillowed after it is installed for a nice even projection (see photos, p. 38).

Now for the finish. Raise the grain and sand with P220-grit. I used three coats of Minwax wipe-on gloss polyurethane. Rub out the last coat with 0000 steel wool, and then apply a coat of wax. □

Martin McClendon is a hobbyist furniture maker in Racine, Wis.