

A Kentucky Quilt Rack

Shaping and joinery with a router and jigs

by Kelly Mehler



This walnut quilt rack has only six parts and can be built with just a few patterns and jigs. It blends tradition with contemporary styling and fits in the decor of most any room. The curved rails complement the flat ends, which are accented with wedged tenons.

You can build this quilt rack with curved rails and wedged mortises and tenons in one day from a single walnut board. I've made hundreds of them using production techniques that require only a bandsaw, a tablesaw and a router. Simple pieces like this rack, which was designed by my former partner Peter Blunt, provided steady income and helped establish our fledgling furniture shop years ago. Having to make a living from these small production runs also taught us how to make efficient jigs and fixtures like the ones discussed here. You can make just one quilt rack by simply following the dimensions in figure 1 on the facing page. But if you take the time to make a few simple patterns and jigs, you will ensure symmetry, reduce trial and error, and be set up to make another quilt rack whenever you want.

Shaping with patterns and jigs- I make a pine or plywood pattern for each part and then use these patterns to lay out the components on the rough stock and to make templates for shaping jigs. You can make the patterns for the end and the side rail from the scaled drawings in figure 2 on the facing page and from the dimensions given in figure 1. When making the patterns, I bandsaw close to the line and then file and hand-sand the edges smooth. As you do this, take care to achieve a fair line, because the pattern is the exact shape of the part. I draw the tenons on the

stretcher and rail patterns, but I don't cut the tenons to width; later I mark their width on the workpiece with a separate tenon pattern. The mortises and handhold should be cut in the pattern for the end pieces, so that you can easily orient the pattern to avoid defects when you lay out parts on your stock. Rout the mortises in the end patterns by guiding the base against a straightedge fastened to the pattern stock. I limit mortise length by stopping the cut at pencil marks on the patterns. To cut the handhold, drill a hole and cut close to the line with a coping saw or jigsaw, and then smooth the edges with a rasp and sandpaper.

After making the patterns, I use them to make shaping and mortising templates. I made the shaping templates $\frac{1}{16}$ in. undersize to accommodate the $\frac{1}{16}$ -in. setback between the router's $\frac{5}{8}$ -in.-OD guide collar and the $\frac{1}{2}$ -in.-dia. straight spiral bit that I use to shape and mortise the parts. The guide collar is screwed to the router base and follows the edge of the template. Because of the setback between the collar and the bit, the template's guide holes must be $\frac{1}{16}$ in. larger in radius than the bit for interior cuts, such as the mortises, as shown in figure 3 on p. 62. The handhold cutout must also be $\frac{1}{16}$ in. larger all the way around.

Preparing stock-To give the quilt rack a pleasing, uniform look, I like to make it from one board that's wide enough to yield

Fig. 1: Quilt rack

Wedges are $\frac{1}{2}$ in. wide, $1\frac{1}{4}$ in. long and taper from $\frac{1}{8}$ in. thick to thickness of sawkerf.

Tenons are cut to fit mortises and are $\frac{1}{8}$ in. longer than thickness of ends.

Cut handhold to pattern and crown inside edge.

Side rails are $\frac{3}{4} \times 2\frac{3}{4} \times 30$. Shape to pattern.

Center rail, $\frac{3}{4} \times 1\frac{1}{4} \times 30$, tapers to $\frac{3}{4}$ in. in middle.

Bevel and round top outside corners of side rails.

Mortise, $\frac{1}{2}$ in. wide by 1 in. long

Wedges in rails are vertical. Drive them gently so you don't split end.

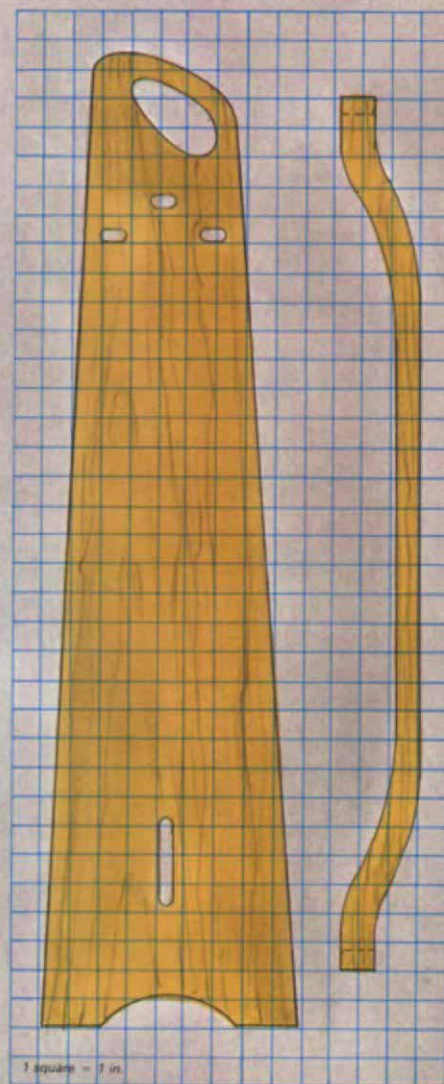
Stretcher, $\frac{3}{4} \times 4 \times 30$

Shape end, $\frac{3}{4} \times 8\frac{1}{2} \times 33\frac{1}{2}$, to pattern.

Mortise, $\frac{1}{2}$ in. wide by $3\frac{3}{4}$ in. long

Wedges in stretcher are horizontal and can be driven hard against the end's endgrain.

Fig. 2: Patterns for ends and side rails



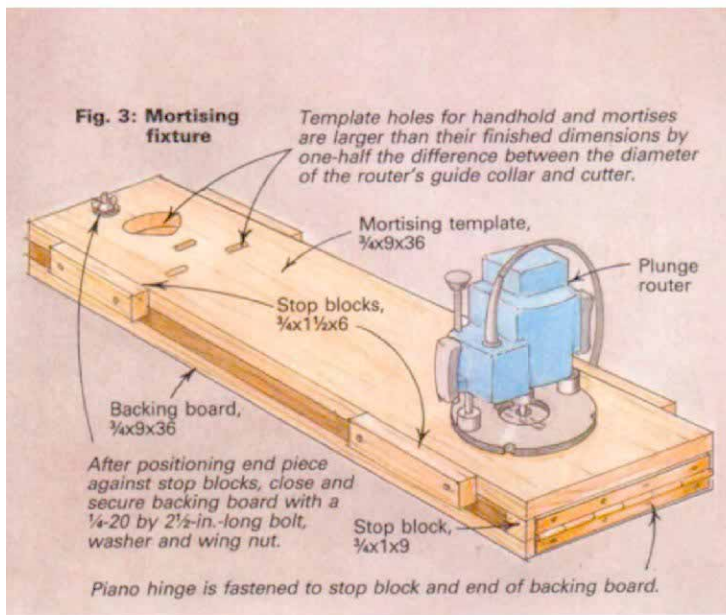
both ends. If you start with a $\frac{1}{4}$ walnut board, 11 in. wide and 10 ft. long, you should have enough stock for one quilt rack. Lay the patterns on the board in the most economical way, but avoid defects, such as knots, that could weaken thin parts. Minimize short grain in the curve of the narrow side rails by orienting their patterns to take advantage of the board's grain direction.

I cut my walnut board into easily handled 3-ft. lengths, flattened one surface and jointed one edge of each piece. Then I planed everything to $\frac{3}{4}$ in. thick. Next I ripped the individual parts to width on the tablesaw: the end pieces to 9 in. wide, which is their largest dimension at the bottom; the stretcher to 4 in. wide; the side rails to $2\frac{3}{4}$ in. wide; and the center rail to $1\frac{1}{4}$ in. wide. Cross-cut the bottom of the end pieces square (the top is sawn to a pattern line and need not be square) and label the outside on the bottom of both pieces so you don't confuse them later. Then I set a stop on my tablesaw's sliding table and crosscut the stretcher and rails to the same length. Save the end scraps for test-cutting joints and for making repairs, if necessary.

Routing mortises and handholds in the ends—During production runs, I rout mortises and handholds in up to 20 end pieces. So to simplify setup, I made a mortising fixture that combines a template and a backing board, which are hinged together at the

bottom end (see figure 3 on the next page). The backing board eliminates tearout on the back side of the workpiece when through mortises are cut. Register the workpiece against stop blocks on the template, and then close and fasten the backing board with a bolt and wing nut to sandwich the workpiece tightly between it and the template. Then I clamp the fixture between dogs on my workbench and rout the mortises and handhold. Don't try to cut all the way through the workpiece in a single pass because the bit may overheat. Instead, make two or three plunge cuts at increasing depths. The backing board will cause chips and sawdust to become trapped in the mortises, preventing the router's guide collar from bearing against the template. As you make each pass, stop and blow or vacuum out debris. When cutting the handhold, be sure you move the router clockwise, the same direction that the bit is cutting. And before removing the end from the fixture, be sure all the mortises are cut cleanly and completely. Finish the ends by bandsawing their taper and top shape to the pattern line, and then joint their long edges. I clean up the top on a stationary disc sander and smooth the bottom of the cutout on a drum sander.

Cutting tenons—You should cut the tenons on the ends of the stretcher and rails before you shape them so you can work from straight, square edges. I cut the tenons in a three-step process: cross-



Above: The author crosscuts shoulders on the stretcher and rails by using a sliding table with a stop set for the tenon length.

Below: Mehler traces a side rail from a pattern that has stops on its side and end. This way he can locate the rail on the workpiece.



cut the shoulders on the tablesaw; rout the cheeks on a router table; and round the edges of the tenon while fitting them in the mortise.

First, set up the tablesaw and crosscut the shoulders on the faces of the parts. I set the blade height at $\frac{1}{8}$ in. by making test cuts on a 4-in.-wide scrap piece and check that I left a $\frac{1}{2}$ -in.-thick tenon. Then I clamp a stop block on the sliding table, setting it to accurately crosscut the shoulders at the tenon's length, which should be $\frac{1}{32}$ in. longer than the thickness of the end piece. Letting the tenons protrude in this way helps you ensure that glue doesn't get into the tenon's endgrain and discolor it. After assembly, I belt-sand the protruding tenons flush with the surface.

Second, I remove the guide collar and fasten the router under a table to form the tenon's cheeks. My table sits atop a 55-gal. drum—the latest in high-tech stands. Make test cuts in the scrap piece to set the straight bit's height to $\frac{1}{8}$ in. (leaving a $\frac{1}{2}$ -in.-thick tenon) and to set a fence so that the bit cuts just short of the crosscut shoulder. When the setup checks out on the scrap piece, I use the scrap as a push block to guide the narrow ends of the rails against the fence, thereby eliminating tearout on the workpiece and making these cuts safer.

Since the corners of the rails are rounded and to conceal the joint, all the tenons (including the stretcher's tenons) needed four shoulders and cheeks. To cut the shoulders on each tenon's edge, leave the stop block set at the tenon length on the tablesaw's sliding table and rest the blade height to leave the rail tenons 1 in. wide and the stretcher tenons $3\frac{1}{4}$ in. wide. Be sure the blade is square when cutting the $1\frac{3}{8}$ -in.-deep outside shoulder on the unshaped side rails. I then bandsaw the cheeks on each tenon's edge, stopping the cut just short of the crosscut shoulders.

Third, round the tenons' corners and fit them to their mortises. I first chamfer the corners with a chisel and then bullnose them. I do this by wrapping a strip of coarse sanding cloth (I use a 1-in.-wide strip of 60-grit sanding belt) around two of the corners at a time and by sanding in a shoe-shine motion. Clean up the corners near the shoulders with a chisel and fit each tenon to its mortise to be sure you have an easy, albeit close, fit.

Cutting and shaping the stretcher and rails—After tracing the finished shapes of the stretcher and rails from my patterns (as shown in the bottom photo), I rough out the parts on the bandsaw. Then I trim them to final size on the router table. To do this, I reinstall the guide collar, continue to use the $\frac{1}{2}$ -in. bit and clamp the parts in the shaping jig to ensure uniformity. Each jig, like the one in the top photo on the facing page, consists of a template that follows the router's guide collar, several stops that position the workpiece on the jig's template, and fixture clamps that secure the workpiece to the jig. The fixture clamps must be attached to the jig where they won't be an obstruction to cutting.

To shape the roughed-out pieces, position and clamp them in the jig and hold the template against the router's guide collar as you feed the workpiece against the rotation of the cutter. To avoid cutting against the grain and to eliminate tear-out in the sharp curves on the side rails, you must flip the rail end for end in the jig after cutting both sides of one end. After shaping all the rails and the stretcher, round over all four corners of the rails with a $\frac{3}{8}$ -in.-radius bearing-guided roundover bit in the table-mounted router. Instead of founding over the corners of the stretcher and the end pieces, I just sand their corners dull. Then I sand the edges of all the parts on my pedestal drum sander. And to give the side rails a lighter look, I thin and bevel over their top, outside curve (see the bottom photo on the facing page).

Before assembly, I scrape and sand both sides of the stretcher and the insides of the ends, and I crown the inside edges of the



Above: Mehler shapes a side rail on a table-mounted router using a jig and template following a collar on the router table. After shaping one end of each side rail, he reverses it in the jig for shaping the curves without cutting against the grain. **Below:** The edges of all the pieces are smoothed with a pedestal drum sander. Mehler gives the side rails a lighter look by beveling and rounding their top, outside curve.



Mehler assembles the rack with slow-setting hide glue, as Ginger watches patiently. This clamping jig applies pressure close to the tenons, but allows room for him to drive in their wedges.

handholds with a file and sandpaper. I hand-sand the rails and belt-sand the outside of the ends after assembly. Lastly, I bandsaw two kerfs in all the tenons for wedges, and then bandsaw the wedges from a 1/2-in.-thick walnut board. As shown in figure 1 on p. 61, the wedges' wide end should be just a bit thicker than the kerf.

Assembling the pieces—Before assembly, carefully lay out the parts so you won't put them together upside down or inside out; in the rush of assembly, it's easy to make a mistake. I use liquid hide glue (available in small quantities from hardware stores) because its slower setup gives me more time to assemble the quilt rack and clean up excess glue. With a small brush, I apply the glue to all four sides of each tenon (but not to the shoulders' endgrain), and then I brush it in the mortises, working from the outside surface of the end pieces, where clean up will be easier.

With one of the ends laying on blocks on the bench and with paper protecting the bench from drips of glue, I insert the stretcher and rail tenons in their mortises in first one end and then in the other. Then I stand the rack on the floor and secure the ends together with the aid of a clamping jig, as shown in the above, right photo. This jig was designed to provide clamping

pressure near the tenons while still leaving them exposed so the wedges can be inserted.

Since I broke the rules by orienting the rails' wedges so they press against side grain rather than endgrain, I'm careful not to drive them in and split the end piece. But the wedges expand the tenons enough to hold the rack together; so I remove the clamps. I wipe away excess glue with warm water, and handsaw the wedges flush with the tenon ends. When the glue has set (usually overnight), I belt-sand the protruding tenons with 120-grit and then finish-sand everything by hand.

I usually finish my quilt racks with a light coat of tung oil and allow it to dry for three to seven days. The oil enhances the wood's color and helps fill its pores. When the oil has dried, I sand the rack with 220-grit paper and then spray it with lacquer sanding sealer. When that is dry, I sand with 280-grit before spraying it with two or three coats of moisture-resistant, high-gloss lacquer. Finally, I rub the surface with 0000 steel wool until it has a satin finish. If you plan to use the quilt rack as a towel rack, you should use a moisture-proof finish, such as spar varnish. □

Kelly Mehler operates Treefinery Woodshop and Gallery in Berea, Ky. His video Build a Shaker Table is available from The Taunton Press.