Scribing Rails to a Round Column

A router jig helps create a smooth transition for this tricky connection

BY MARIA KLEMPERER-JOHNSON

When I was approached to rebuild a porch in the Fall Creek neighborhood of Ithaca, N.Y., I knew it would be a rewarding project. The clients—both landscape architects—care about aesthetics and construction details. Their porch was barely hanging on, but its original character was visible beneath the peeling paint and rotting boards.

The most gratifying part of the project was designing and building the railing—the original was undersize both in terms of code and appearance, and the connections to the columns were a cobbled mess of rusty toe screws and brackets. The challenge lay with cleanly attaching the railings—particularly the sloped stair rails—to three tapered round columns.

I've seen myriad awkward solutions to this tricky detail. Sometimes the column is "flattened" with an applied block; other times handrails are hung off brackets on the side of the column, or they land on an extra newel post. I wanted a more elegant connection, so I built a jig that allowed me to cut the curve of the column on the sloped handrail. I started by making a radial template sized for the diameter of the columns—this took care of the level railings. Then I built a scaffold to hold that template at the slope of the stair. It turned out to be a lot of work—work I didn't anticipate when bidding the job. But the fun of solving a challenging carpentry problem made it worthwhile. □

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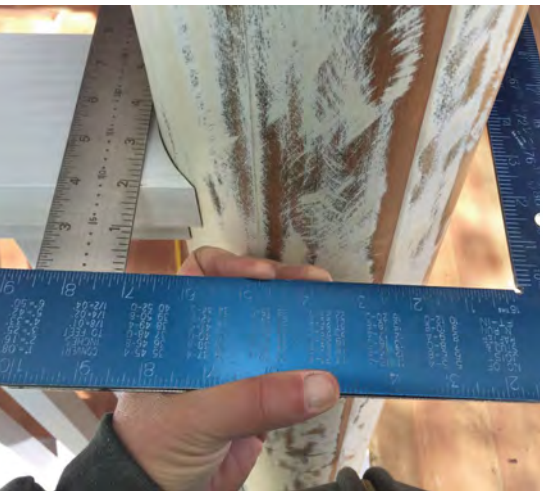
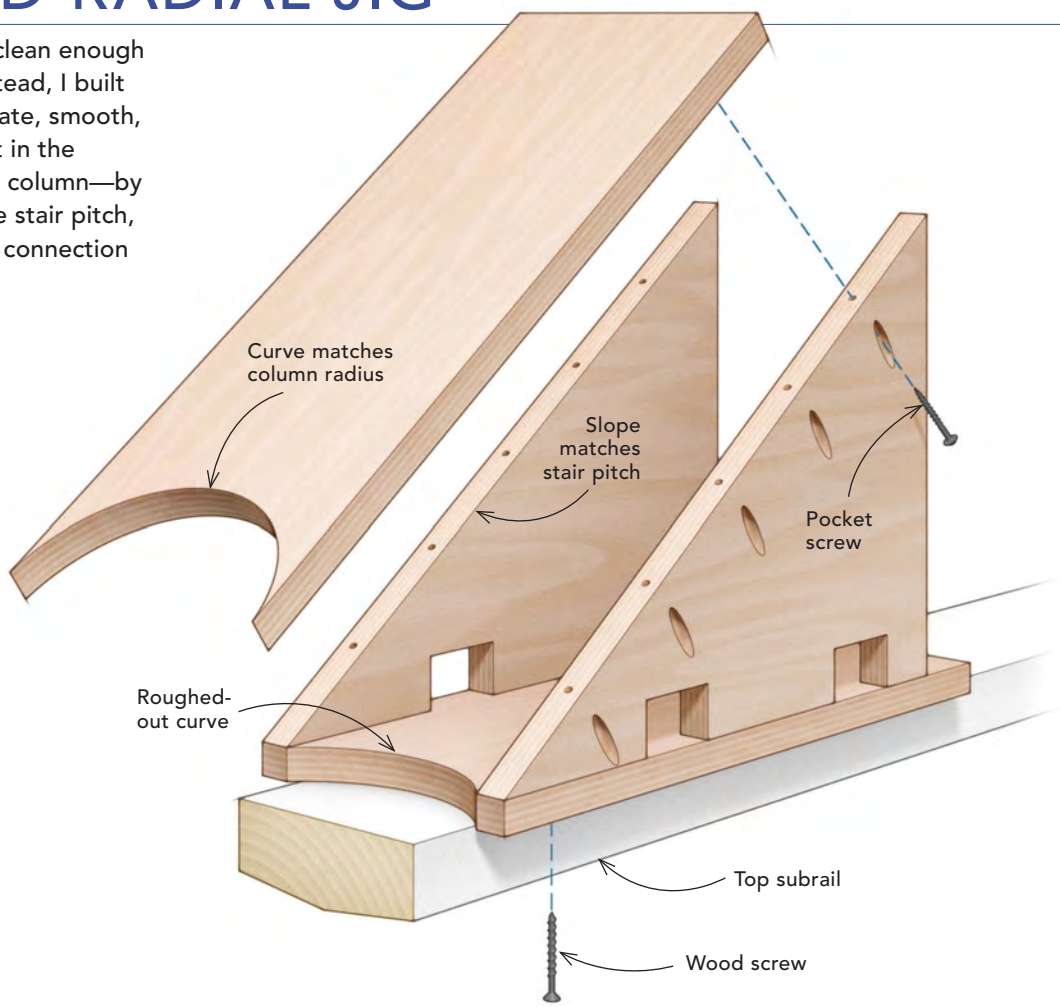
Photos by Kiley Jacques, except where noted.

BUILD A SLOPED RADIAL JIG

Even a steady hand won't produce curves clean enough for such a visible location as a stair rail. Instead, I built a router jig, which allowed me to get accurate, smooth, repeatable results. The radius of the cutout in the sloped top piece matches the radius of the column—by setting that piece on an angle matching the stair pitch, that radius is elongated, creating a perfect connection from sloped rail to plumb column.



Get the radius. *Measure the diameter of the column at the railing connection using a pair of framing squares. Where the tongue and the blade of the squares meet is the diameter of the column; divide that number in half to establish the radius.*



Transfer the radius. *Use a compass to mark the curve on a piece of plywood from a pivot point located 1 in. in from the edge (this will be the top board of the jig). Secure the board to your bench with countersunk screws on both sides of the curve to be sure all parts of the piece remain immobile as they are cut free.*

Add the pivot pin. *To cut the curve, I use my router's edge guide as a trammel (my router's guide has a pivot point built in; you can also build a trammel jig). Drive a ¼-in. drill bit into the pivot point on the board and into the support below, and leave the bit in place to act as the pivot pin.*

Cut and trim. *Slide the edge guide onto the pivot pin and cut the radius, starting the router off the board and moving in a clockwise motion. After cutting the curve, trim the extra width at the tablesaw so the board is only as wide as the curve.*

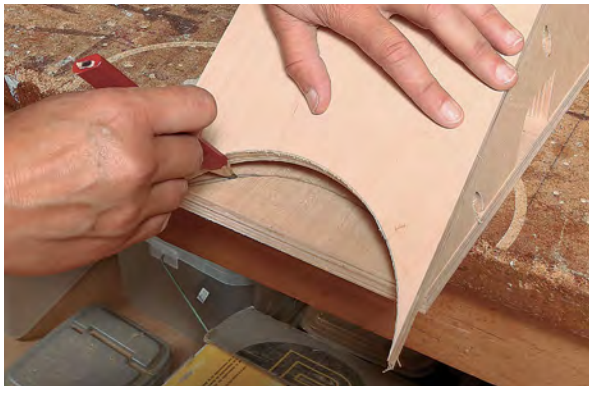
Test it out. *Check the fit against the column. This radial template can be used alone to copy the curve onto the horizontal railings before it's incorporated into the sloped jig to make the cuts for the pitched handrail.*

Drawings: Christopher Mills

Measure and cut jig sides. *The pitch of the jig should match the angle of the stairs. For stairs with 7-in. risers and 10-in. treads, lay out two 7:10 triangles on a piece of plywood and cut them with a track saw.*

Make space for clamps. *Cut clearance notches in the runs (bottom legs) of these triangles to make room for clamps to hold the jig to the railing stock.*

Secure the sides. *Assemble the jig upside down, fastening the sides to the radial template with pocket screws.*



Add the base. *With the jig right-side up, add a piece of plywood to the base. Use the curve cutout on the top piece to transfer the arc to this bottom piece, then rough out the curve with a jigsaw (this will keep it out of the way of the router bit).*

Finish the assembly. *Realign the bottom piece, lay the jig face down, and face-screw the bottom piece to the sides.*

CUT THE RAILS

The curved cut is made using a pattern bit. Because of the jig's slope, there will be a varying depth of cut across the arc. You could start with a 1-in. bit, or even a ½-in. bit, then switch to a longer bit in as many increments as you want. But that's time-consuming. You could use a longer bit, but that would make too deep a cut at the edges where the router enters the workpiece. Plus, a single bearing would force you to make the whole cut in a single pass, which is aggressive. I prefer to stack a few extra bearings on a 1-in.-long top-bearing flush-cut bit and make multiple light passes, lowering the bit incrementally.

Whiteside 3020 template bit, $32;
B19 ball bearings, $13 each

Trace the arc. *Using centerlines, place the jig square on the end of the railing stock and trace where the router will cut.*

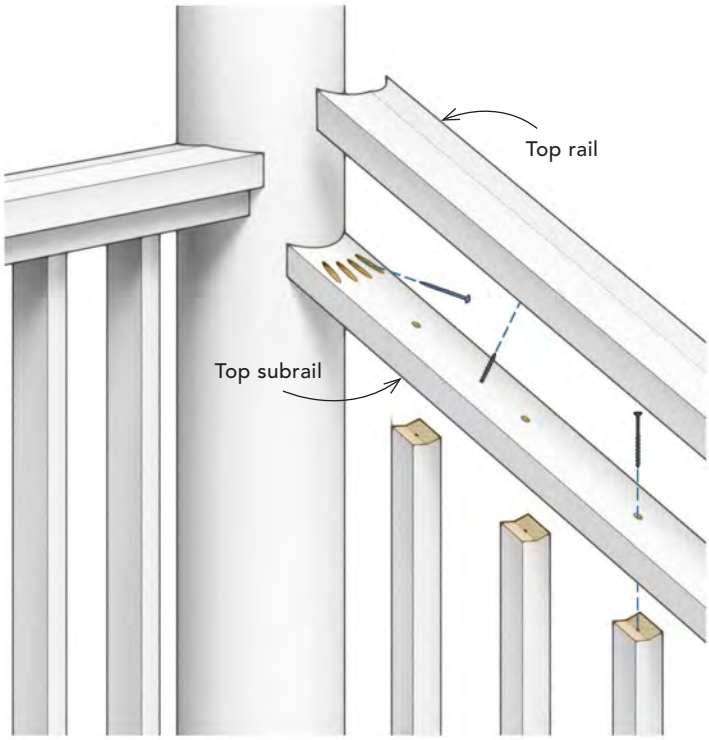
Rough-cut the rail. *Use a jigsaw to rough out the curve, then realign and clamp the jig. Even though the jigsaw cuts square to the face of the stock and the router will cut at an angle, it's helpful to get this material out of the way.*

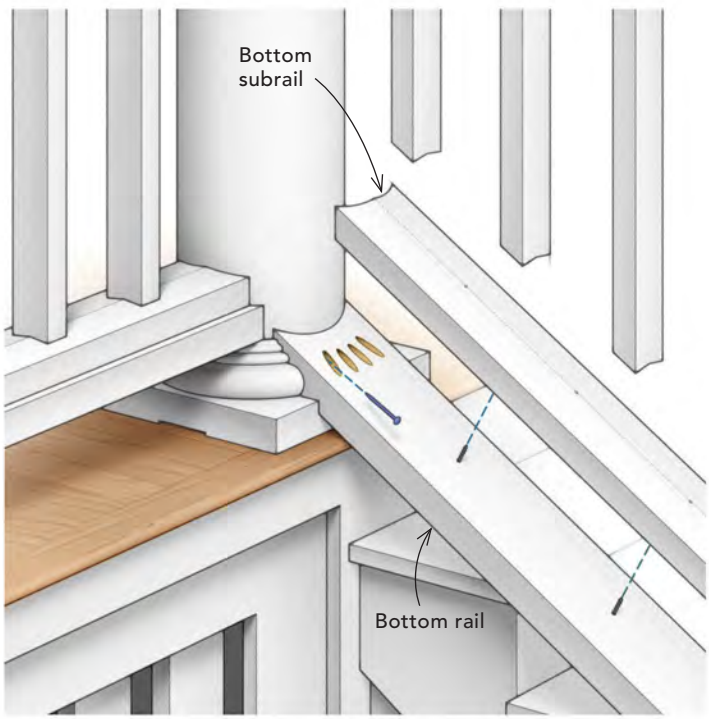
Take the plunge. *Use a plunge router to make the cut in multiple passes. The bit's bearing will ride along the jig's curve for the first few passes (photo above), but as the cut goes deeper, the router will bottom out. To finish the last few passes, slide the jig back on the railing stock a few inches so the leading corners of the cut are just below the top surface of the jig, then use the previously cut surface of the workpiece as a guide for the bearing (photo left).*

Product photo: Melinda Sonido

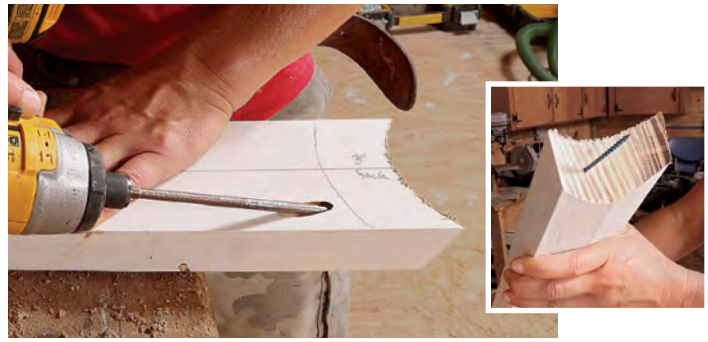
CONNECT THE RAILS TO THE COLUMN

Part of the beauty of this railing design is the hidden connections. On this project, I notched out the column base molding to receive the bottom rail, which is then pocket-screwed from the top into the column. The bottom subrail is set on top, and hides the connection. The top rail works the same way—the top subrail is pocket-screwed from above, and the top rail hides the column connection as well as the screws that connect that subrail to each baluster.





Position pocket holes. *Lay out lines where the pocket-hole jig should sit, then secure the jig to the railing stock with a quick-release clamp. The jig should be positioned so the screws will fan toward the middle of the curve (this angle can be eyeballed).*



Test a screw. *Drill a test pocket hole and drive a test screw to be sure it emerges at approximately the mipoint, thickness-wise, of the workpiece end. Then drill four pocket holes and drive four 2½-in. exterior-grade pocket screws through the top subrail and the bottom rail into the columns.*