Making a Bullnose Starting Step

You don't have to buy this classic detail; kerf-bending oak is easier than it looks

by Stephen Winchester

Most trim carpenters are comfortable hanging doors and casing windows, but when it comes to stairs, they call in a specialist. Stairs really aren't that difficult to construct and install if you take a bit of care, don't rush and make your joints as if the President himself were going to inspect your work.

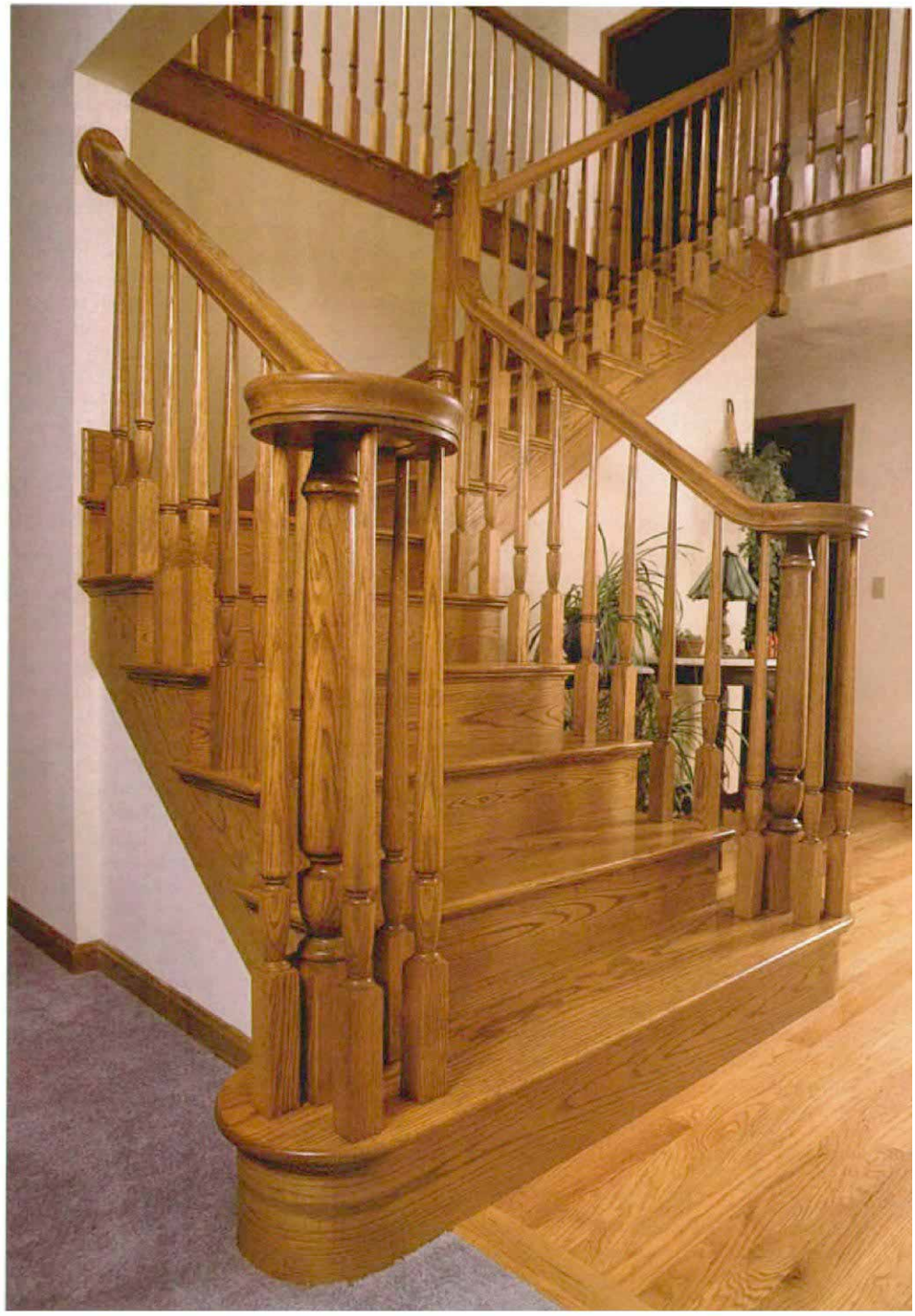
On a recent job, I built a staircase with a double-bullnose starting step (photo right). The starting step is the first riser and tread on a stair. It's wider than the rest of the staircase and has curved ends, called bullnoses, that anchor the newel posts. In this article I'll explain how I made the starting step pictured here. Each staircase is different, so the dimensions I use here won't work for every stair, but the technique applies to any starting step.

Start with the tread—I have a small shop where I make treads, risers and moldings, but these components could also be made on site. I don't have a lathe, however, so I buy manufactured newels and balusters rather than make them. I also buy handrails and fittings. The stairs themselves, on the other hand, I usually frame on site, which is what I did on this project.

After installing the mitered finish stringers (the trim boards on the sides of the stairs) over the rough stringers and drywall, I measured the finished width of the staircase at the bottom step. On the starting step this is the dimension between the curved ends of the riser. The width of this stair is 42½ in. The bullnoses extend about 14 in. beyond the finished stringers, so the overall length of the starting tread blank is 70½ in. But I don't cut the tread to the exact length yet.

If I have a wide enough piece, I make my tread blank from solid stock. Otherwise, I glue it up from narrower stock and match the grain so that the tread doesn't look like a zebra. Manufactured tread blanks will work, but they're often glued up from narrower stock, and the grain doesn't always match. For this stair the run, or tread depth, is 10½ in. I added 1⅛ in. for nosing on the front and another 1⅛ in. for nosing on the back of the tread where the bullnose ends curve around. So I needed 12¾-in. wide stock. I use 1-in. thick stock for treads; ¾-in. stock is okay but looks a little flimsy.

To get 1⅛-in. nosing all around the starting tread, it's necessary to notch the back of the tread so that it fits over the second riser. The length of this notch equals the finished width of the stairs—42½ in—and its depth equals the size



The first step. **An open stair—where the finished stringers aren't boxed in by walls—makes it possible to have a double bullnose starting step. The riser is kerf-bent around forms that fit over the mitered stringers, and the tread is notched to fit in front of the second riser.**

Photo this page: Rich Ziegner

of the nosing: 1⅛ in. When notched, the tread is 11⅝ in. deep where it hits the second riser and 12¾ in. deep only on the bullnose ends.

Cutting the bullnose—On this staircase the newel posts are capped by a spiraling section of handrail called a volute. The manufacturer of the stair parts (L. J. Smith, Inc., 35280 Scio-Bowerston Road, Bowerston, Ohio 44695; 614-269-2221) includes a paper template with the volute. The template helps you drill the starting step for the installation of the newel post and the balusters; I also used it to determine the radius of the bullnose ends on my starting step.

I cut out the corner of the template for the second-riser notch so that I could position the template on the starting tread (top photo, right). Using the outline of the volute as a guide, I added ⅞ in. to the radius of the volute, then used a compass to trace a half-circle on the template to shape the bullnose. Then I cut the template along the half-circle I drew and traced the bullnose on each end of the tread blank.

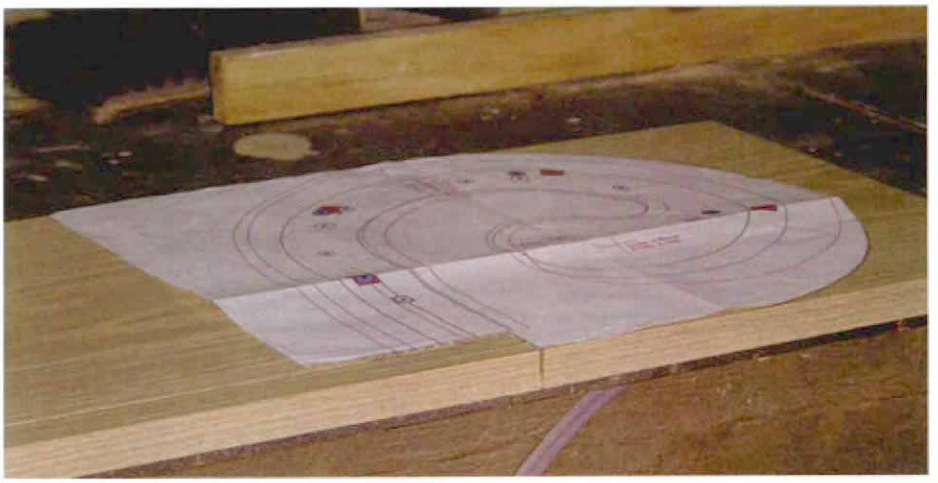
To cut the bullnose ends, I used my bandsaw, but a jigsaw will work on site. I clamped the tread to the bench and belt-sanded the saw marks. Then I used a ⅜-in. roundover bit in the router on the top and bottom of the tread to shape the nosing. After sanding, the tread was complete.

Making a bending form—Because I draw the shape of the riser on the tread, the tread becomes the pattern for the curved riser. I put the tread upside down on my workbench, set my compass to 1⅛ in. (the nosing dimension) and scribed around the edge of the tread. This mark created the shape of the riser that would support the tread. Because the riser stock is 13/16 in., I scribed a second mark on the tread 13/16 in. inside the first to create the inside dimension of the riser. I drew a line across the tread at each end of the second-riser notch to show where the mitered stringers butt against the tread.

Using the innermost mark, I measured the diameter and halved it to get the radius. Knowing the radius, I then made D-shaped bending forms for the curved riser out of kiln-dried framing lumber. Again, a bandsaw comes in handy for cutting the curved forms, but they could be cut with a jigsaw and belt-sanded smooth. I cut eight D-shaped blocks on the bandsaw and glued them together so that I had two stacks of four, each stack being 6 in. high. When the glue was dry, I trued up the curved edges on the bandsaw.

Next I set the glued-up blocks in place on the underside of the tread and screwed a plywood spacer to the blocks (middle photo, right). I turned the form over and screwed a second piece of plywood to the other side.

Kerfing the riser—After selecting a piece of stock from the pile of stair lumber, I made some sample kerfs—crosscuts that don't go completely through the wood—on the radial-arm saw (bottom left photo, right). When the kerfs are right, a riser will bend easily around a form, and the kerfs should just about close up on the inside of the bend. No heat or steam is necessary. My riser bend required that the ⅛-in. wide kerfs be cut



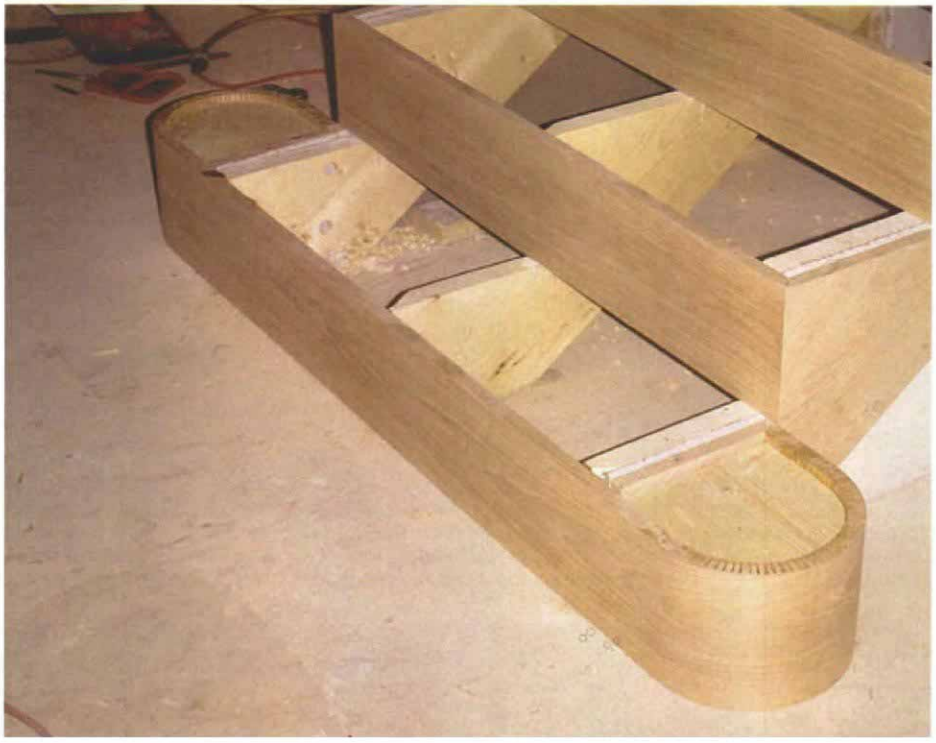
Forming the tread. **A template is used as a pattern for cutting the bullnose ends on the tread. The cutout corner of the template aligns with the riser-skirt notch cut out of the tread.**

Building the bending form. **By scribing around the bullnose ends of the tread with a compass, the author determines the size and shape of the bending form. Each block is made from glued-up framing lumber; the blocks are placed on the tread and are held in place with a plywood spacer.**

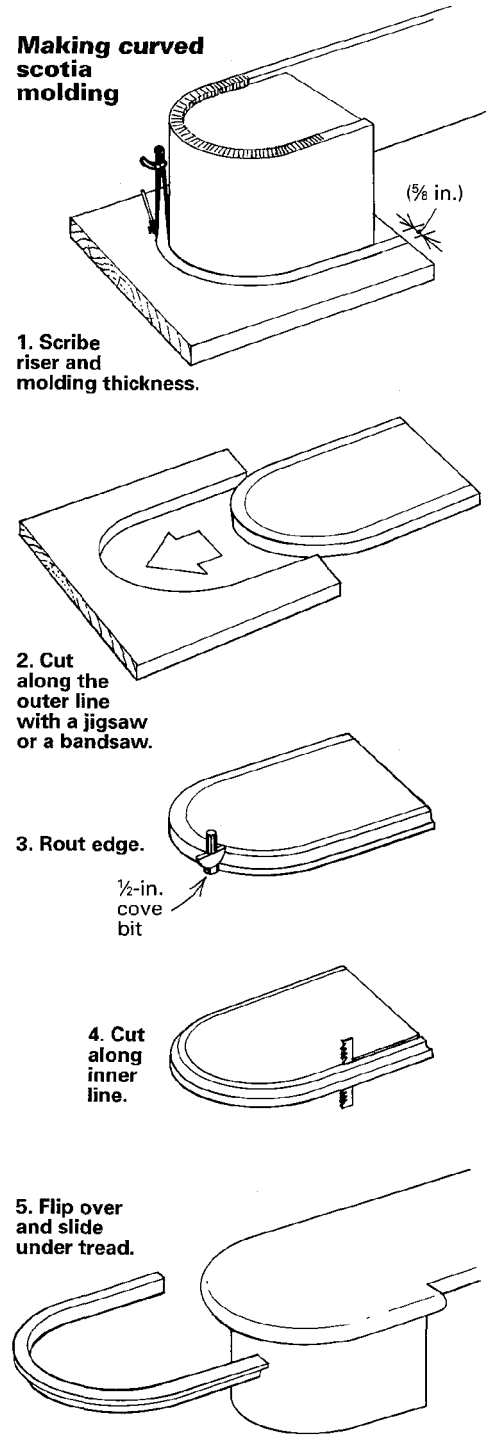
Kerfing with a radial-arm saw. **Kerfs are crosscuts that don't cut completely through the stock. Here the kerfs are ⅜ in. o. c., and the face is 1/16 in. thick. Although the author used a radial-arm saw, a circular saw, a straightedge and elbow grease will yield the same results.**

Perfectly kerfed. **Kerfing begins before the form bends to eliminate tension in the riser stock; well-kerfed wood wraps around the form like a piece of paper. Here the kerfed stock is temporarily clamped so that the other bullnose end can be marked for kerfing.**

Hugging the curves. The riser is glued and clamped to the forms. Because the kerfed riser bends easily around the forms, the clamps are just snug enough to keep the stock in contact with the forms. Once the glue dries, the ends of the riser are trimmed to butt into the mitered stringers.



It fits. **Careful measuring and cutting pay off when the completed riser slips over the mitered stringers. Construction adhesive and nails fasten the curved riser to the stringers; the tread is installed once the front of the riser is perfectly straight.**



⅜ in. o. c. and ¾ in. deep. The uncut face of the riser ended up about 1/16 in. thick.

I tried a couple of different spacings before I got it right. I usually start with kerfs ½ in. o. c., then check to see if the wood bends smoothly around the form. You know you've got the proper spacing when the stock bends around the form easily. Remember, different species will not bend the same way. In other words, don't make trial cuts in pine when bending a piece of oak.

To measure the length of the piece I needed, I wrapped my tape measure around the forms and added about a foot for safety. This riser stock was almost 10 ft. long. I kerfed one end of the riser, beginning about 1½ in. before the start of the curve so that the riser wouldn't kink as I bent it around the form. After clamping the kerfed end temporarily on the form (bottom right photo, p. 61), I marked the start of the second bend (plus 1½ in.) and cut those kerfs. A kerfed piece is pretty delicate and must be carefully handled.

Gluing and clamping—I set the form on the upside-down tread and held them together temporarily with a few spring clamps. The glued-up blocks are part of the installed riser, so I coated them heavily with yellow glue and drizzled some into the riser kerfs, too. Clamping one end with a pair of bar clamps, I quickly but carefully bent the riser around the form and clamped the other end (top photo, this page). You don't need much pressure to hold the riser in place; that's why I didn't bother with clamping blocks.

I nailed the riser to the forms on what would be the back of the step. As soon as the riser was nailed to the forms, I took the riser off the tread. Otherwise, excess glue would have bonded the riser to the tread, and it wasn't time to put these two together yet. The next day, after the glue had set, I cranked my radial-arm saw way up to cut the extra length off the back of the riser. If you're doing it on site, use a circular saw and a square for this job. A 2° bevel on the cut ensures a tight fit to the finished stringers. The plywood spacers stay on until I am ready to install the riser.

Drawings: Bob Goodfellow

Making curved scotia molding—Scotia molding (or cove molding) is traditionally installed under the nosing of each tread on a stair. This molding hides the joint between tread and riser. To make the curved scotia for underneath the bullnose starting tread, I began by setting the riser upside down on a scrap of oak that was wide and long enough to make a U-shaped piece (drawing facing page). First I traced around the riser and then set my compass to ⅝ in. and traced around again. This second line is the outside edge of the molding. I marked a piece for each end of the riser, cut the outside curve on the bandsaw and then ran a router around each piece. The scotia profile is shaped with a ½-in. cove bit in the router. Then I went back to the bandsaw and cut the inside line. An identification letter or number helps me remember on which end of the riser each piece of molding fits.

Installing the step—After removing the plywood spacers from the riser, I set it in place to check that it fit against the finished stringers. I squeezed construction adhesive on the finished stringers and set the riser back in place (bottom photo, facing page). Then I drilled pilot holes and nailed the riser tight to the front of each rough stringer. I then held a straightedge to the face of the riser to make sure the riser was straight. (If it's not, a tap behind the low spot will make it straight. When the construction adhesive hardens, it fills the gap between the center stringer and the riser.) To pull the ends of the riser tight to the finished stringers, I ran a couple of screws through the inner faces of the rough stringers into the curved bending forms.

Next, I set the tread into beads of construction adhesive squeezed onto the tops of the rough stringers, the top edge of the curved riser and the bottom face of the second riser. I predrilled and nailed through the tread into the stringers with 10d finishing nails. Then I nailed the tread to the curved riser with 8d finishers. A couple of 6d box nails through the back of the second riser into the starting tread, along with plenty of construction adhesive, prevents a squeaky starting step. I don't use a nail gun to assemble the skirts, the risers and the treads because I could miss what I'm trying to nail into, or a nail could veer off and shoot through the face of the work.

The scotia molding goes on next. The two U-shaped pieces go first, followed by a straight piece (which I also make) under the front of the tread connecting the two U-shaped pieces. I use a small brad gun to shoot the molding on. It's easier than handling small nails.

To anchor the newel posts, I drilled a 1½-in. dia. hole in each end of the starting step, using the volute template to locate the holes. I drilled through the tread and the 2x bending forms. Then I cut the dowel tenons on the ends of the newel posts to length, coated them with construction adhesive and drove them into the holes until the base of the newels seated against the tread (see the sidebar on this page). □

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Installing a starting newel

by Bob Goodfellow

A starting newel provides most of the support for a handrail at the bottom of a stairway. A 1½-in. dowel tenon, turned on the end of the newel post, anchors the starting newel to a starting step. Wedging this dowel below the subfloor is the best way I know to install a starting newel so that it won't loosen up.

When you order your starting newel, get one with a dowel about 14 in. long so that it will extend clear through the starting step and the subfloor with length to spare. But before you bore a 1½-in. hole through the starting step and the subfloor, go downstairs and make sure there are no pipes, heating ducts or electrical wires in your path. Then begin work on the starting step. Establish the location of the 1½ in. hole on the starting tread by using the stair manufacturer's template. Pay careful attention to where you mark the hole because the starting newel's location directly influences the alignment of the handrail components.

If you drill carefully, the starting newel will sit plumb in the bore. If not, a little judicious reaming should rectify the situation. Make sure the tread is clean so that when you stick the dowel in the hole, the bottom of the newel is completely seated against the tread. Then go downstairs and mark the dowel where it penetrates the subfloor. Mark all the way around the dowel, then make a second mark to indicate the direction that the floor joists run.

The marks you made show you where to drill out a slot in the dowel for a wedge. The mark around the dowel locates the top of the slot, and the second mark shows you in which direction the slot should face (parallel to the joists). Make the slot by drilling a series of ⅜-in. holes. Drill the top hole a little above the subfloor mark on the dowel and then drill the others below until you've made a slot about 1½ in. long. Clean out the burrs of wood with a chisel and a rasp. Then mark the base of the newel to show which way the slot faces.

I make the wedge that anchors the newel from a piece of ⅜-in. oak stock. The wedge, which is about 6 in. long, has a taper on one side only; the other side I leave square. The back end of the wedge should be about 1⅝ in. high, the front end about ⅞ in. high.

I also round over all the square edges; this way the wedge will have more contact with the slot in the dowel. Rounding over is done quickly with a block plane.

With the newel rotated according to the mark you made on its base, insert the dowel into the starting step. Then go downstairs with the wedge and your glue. Smear the wedge and the slot in the dowel with glue, then gently drive the wedge into the slot. It's a very good idea to have someone upstairs to yell, "OK!" when the newel is plumb and level. Don't bash the wedge in; you'll know when it's tight because it'll have a certain ring—dong, dong, ding—ah, that's it. Finally, drill a pilot hole and use a resin-coated nail to pin the wedge in place.

***—Bob Goodfellow is a former stairbuilder and is now associate art director at* Fine Homebuilding.**