



## Master Carpenter

Richard and Ed Walston are a father-and-son carpentry team. Also the son of a carpenter, Richard Walston started his career in stair building in 1972. After a few semesters of college, Richard returned home to Guilford, Conn., to help his ailing father with his carpentry business, and struck out on his own a couple of years later. Since then, Richard has become one of the most sought-after builders of high-end stairs in New England and New York.

Richard's son Ed has been working alongside his father since he was 15. After graduating from high school, Ed started building stairs full-time and has never looked back. We watched them with their fellow stairbuilder, Ray Becker, at work in their shop and on the job site.



Online members can watch this *Master Carpenter* video at [FineHomebuilding.com/extras](http://FineHomebuilding.com/extras).

# How to Make a Stair-Rail Easement

The part is small and complex, and must be carved by hand

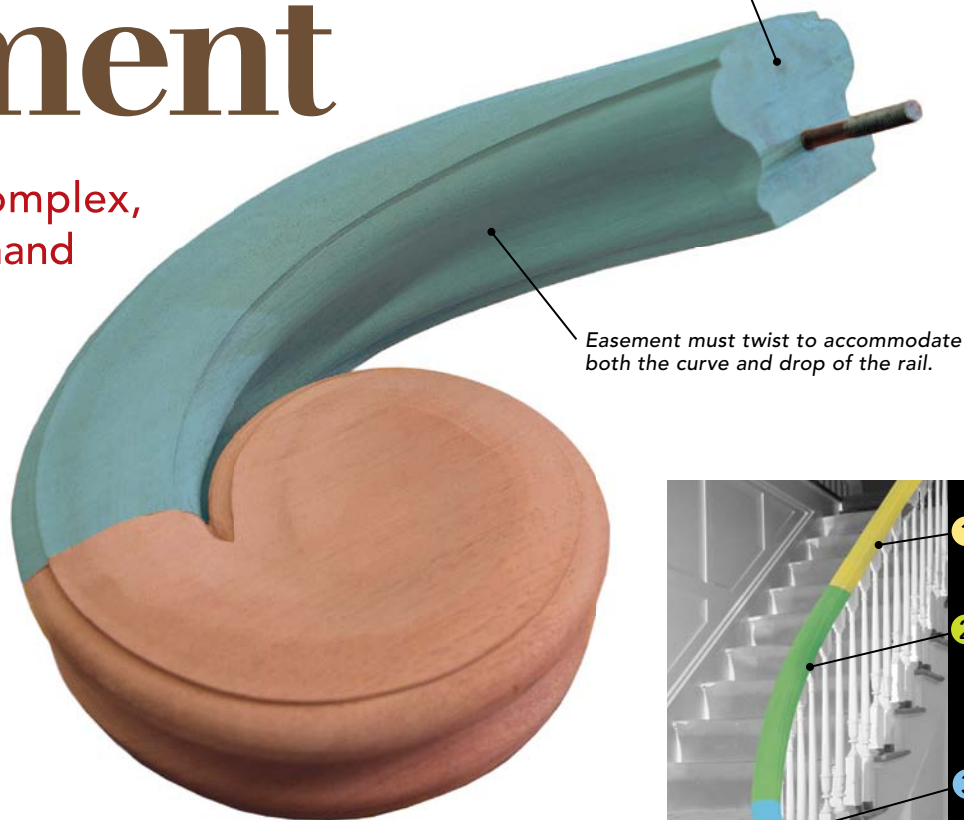
BY CHARLES BICKFORD

Of all the components of a house, stairs can be one of the most complicated to design and build. Add curves, and the usual rectilinear procession of a stair carriage becomes difficult, especially when it comes to the railing. Building codes specify that the balusters supporting the rail must maintain regular intervals and be at a consistent height. Following that example, the railing must be centered over the balusters and must descend at a rate equal to that of the treads, dropping into a curve known as an easement to meet the top of the newel (the volute). If the stair landing sweeps out over the last few treads, however, the easement has to drop and curve over a short span. This shape is hard to make because it doesn't have a straight stretch long enough to support a router or a shaper.

Builder Richard Walston told me that a five-axis CNC machine can carve almost anything that can be drawn. "But they can't do these easily," he says. "Small parts are harder to cut, and it's not cost-effective to make one or two." The only way to make this part is by hand.

## Build a cradle for the blank

Here's a basic procedure for making an easement: Glue up a blank, cut a rough shape with a bandsaw, and carve. The

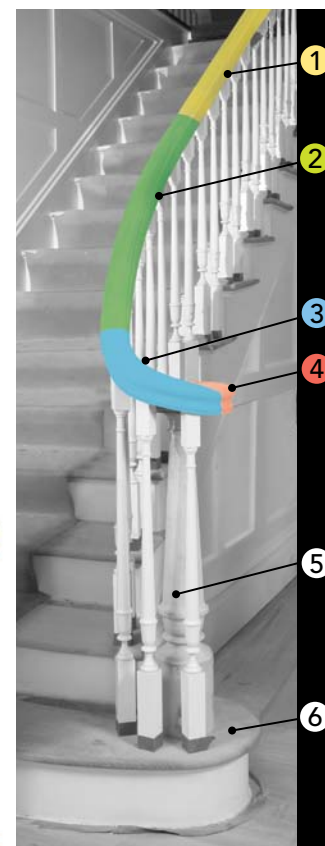
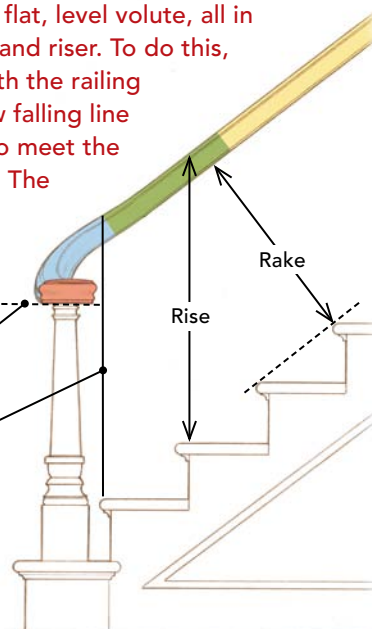


## SLOW DOWN AT THE CURVES

The function of the easement is to unite the railing's 37° rake with a flat, level volute, all in the space of one tread and riser. To do this, it must mate exactly with the railing profile, then start a new falling line while twisting sharply to meet the level face of the volute. The completed railing also must look and feel natural.

Volute must be level on top of the newel.

Easement begins directly above the second-tread nosing.



## PARTS AND PIECES

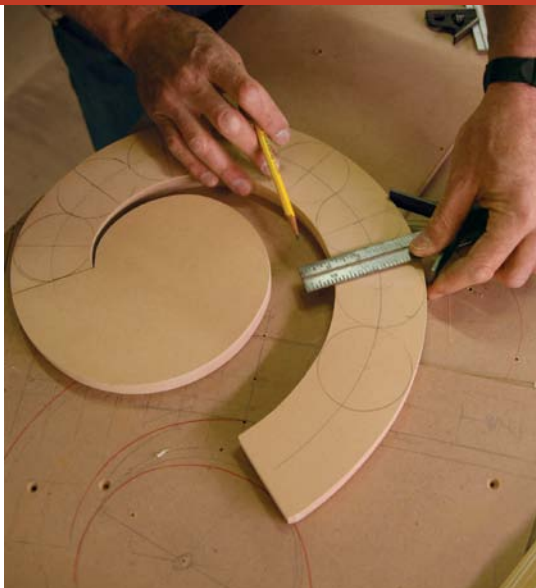
- 1 Straight rail section
- 2 Curved rail section
- 3 Curved easement
- 4 Volute
- 5 Newel post
- 6 Starting step



## GET FROM PLAN VIEW TO 3D PATTERN

The easement blank must be held and rough-cut at a precise angle so that it will mate with the other railing components. Because of its position, the rake, or falling line, of the easement is slightly different from that of the railing. Using a form, the Walstons can plot out the falling line and transfer it to the blank.

**Start with a plan view.** After drawing or tracing the outline of the easement and the volute, draw a centerline and then a series of circles that define the width of the railing. Next, draw a line that bisects each circle.



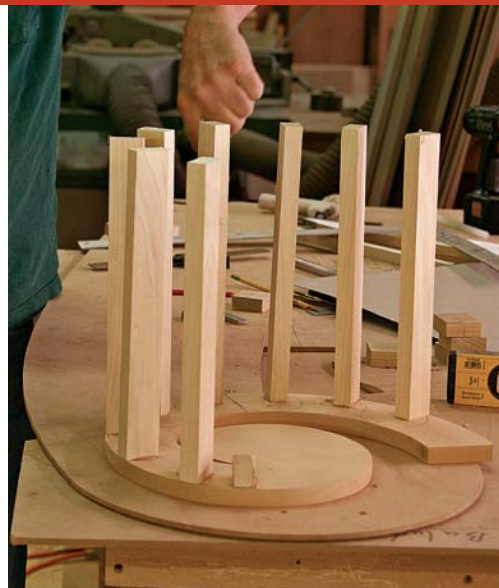
**Find the beginning and end.** With a piece of cardboard clamped onto the form, use a square to transfer the end points of the easement from the plan view to the cardboard.



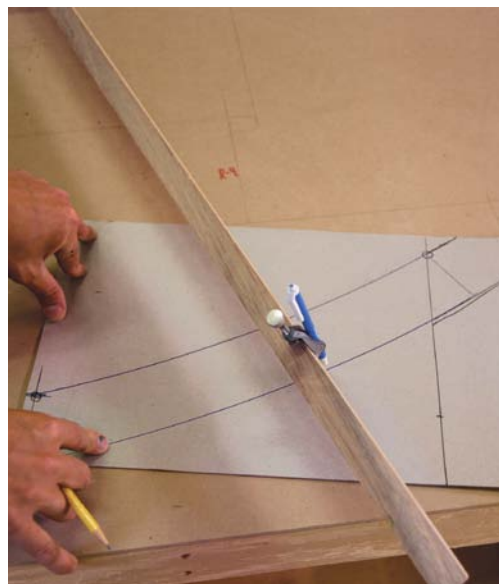
trick to cutting the rough shape of the easement is to fix the blank at the final angle of the railing, which Richard explained as he pulled out a squiggle of 1/4-in. MDF that had been cut into the plan view of the volute and the easement. He drew the rail's centerline, then used a compass to draw along that line a series of circles whose diameters equal the rail's width. After marking a line to bisect each circle, he hot-glued a 12-in. piece of 1x to each line. The inside edges of the 1xs represented the rail's centerline.

To determine the descent of the easement, Richard clamped a piece of cardboard onto the sticks, then marked the upper end of the easement by lining up the location with a square. After marking the easement's junction with the volute, he removed the cardboard and laid it flat. With a trammel set to a radius that would intersect the end

**Working in 3D.** Hot-glue a 12-in. piece of 1x stock to the intersection of the centerline and each circle's bisecting line. The inside edges of the 1xs now represent the midline of the rail.



**Connect the dots.** Lay the cardboard flat, and with a trammel set to a radius that will intersect both end points of the easement, draw a curved line on the cardboard to represent the upper edge of the easement. Working with a normal rise and run, the Walstons start with a radius of about 24 in. and adjust until the trammel hits both points.



points of the easement, he drew a curved line on the cardboard to represent the upper edge of the easement.

Richard's son Ed had glued up two pieces of 8/4 mahogany to make the easement blank. Next, they drew the volute and easement shape on a piece of MDF. Using a 37° pitch block, they supported the blank so that it covered the pattern on the MDF. With the blank at the correct rake angle, they were ready to cut out the rough shape on the bandsaw by following the lines on the MDF.

### Rough out the shape on the bandsaw

A big bandsaw sits by itself in one corner of the shop. Made in Germany by Hema, the saw has a 31-in. vertical capacity; for this job, it was fitted with a 1/4-in. blade on high tension. With Ed guiding

## ROUGH OUT THE BLANK AT THE RAKE ANGLE

The Walstons stacked and glued together two pieces of 8/4 mahogany to form the blank. The blank is mounted over another plan view of the easement and is supported at the angle of the rake so that the first cuts will be plumb and will match the rest of the railing.

### INSIDE AND OUTSIDE CUTS



**Mount the blank.** After drawing a plan view of the easement and volute onto a square of 1/4-in. MDF, make a rise block equal to the rake of the stairs, and hot-glue it to the square. Also, use hot glue to attach small blocks to support the easement blank.

**Start the cuts.** Using the support blocking as a handle, guide the sawblade through the inside radius, followed by the outside radius. Have a glue gun ready to attach more support blocks if necessary.

### TOP AND BOTTOM CUTS



**Bring back the cardboard.** Although the blank was cut at the rake angle of the railing, it needs to be sawn to the line that was generated by the cardboard pattern. Trim the pattern, and transfer the line onto the blank.



### TRICK OF THE TRADE

The glued-up blank is mounted directly over the plan-view outline of the easement and the volute. When Ed starts to cut out the blank on the bandsaw, he's guiding the cut by peering beneath the blank and following the outline that's drawn on the base. Because the bandsaw blade is adjusted to a high tension, he doesn't have to worry too much about it drifting away from the cut, so he can focus attention on keeping the blade on the line below.

**Slice away the top.** While the rough shape is still attached to the base, turn it on its side and cut along the pencil line. It's a good idea to leave a generous margin beyond the line so that you have room to carve.



## STOP AND CHECK THE FIT



Once the easement blank is roughed out and the ends are trimmed to fit, the blank should be checked for accuracy. Bolted to the next railing section and to the volute, it's usually checked on the staircase at the job site to make sure that it brings the volute level, flat, and directly over the center of the newel.

Curved rail section

Curved easement

Volute

Starting-step template

## In a perfect world, the site and the shop are one

To avoid the chaos that is part of working on the job site, Richard and Ed fabricate many of the stair parts in their shop. Because they need to perform periodic checks to make sure everything will fit at the proper angle and position, they build

a mock-up wall that replicates the curvature of the stair rail rather than go back and forth to the job site. (They use LVL studs that stay perfectly straight.) They also cut out a replica of the starting tread from ¼-in. MDF that has been marked out

with the newel and volute locations. When the lower curve of the rail is roughed out, they can clamp it onto the wall and then check its height and position with a laser plumb bob that is placed on the newel's outline.



## CARVING IS A CAREFUL PROCESS

Ed starts the carving process by transferring layout lines to the blank and then removing material with an electric carving tool, a rotary tool, coarse sandpaper, and an angle grinder fitted with a sandpaper disk. The various angles of the workpiece require that he frequently change either his position or the position of the workpiece while keeping it from moving around.



TOOL OF THE TRADE

### THE AUTOMACH

In addition to the grinder and the Proxxon rotary tool, Ed used an Automach electric carving tool. It has a reciprocating head that rapidly indexes one of several profiles of steel blades when it's pushed into the work. The operator controls the depth and angle that the tool cuts. On this project, Ed used the Automach to relieve the edges of the top and the hollow sides of the railing. He was able to excavate a fair amount of stock quickly with a wide-profile gouge, changing direction from time to time to avoid tearout. The Automach Power Carver, sold with five different blades and wrenches, is available online for just over \$300.



the piece and associate Ray Becker acting as the spotter, they cut the inner radius and then the outer radius. They turned the blank (which was still attached to the base) on its side, traced the top descent line onto the inner surface, and cut. Ed used a square to draw a line below that was parallel to the first, and then cut that to complete the helical blank.

Before starting to carve the profile, Ed bolted the easement blank onto the volute and the upper part of the rail. Next, he clamped the assembly onto a shop mock-up of the actual staircase and checked the location and height of the volute with a laser.

After making sure that everything looked as it should, he brought the three pieces to the job site for a final check. In this assembly, if the volute's height and position are on the money, then the angle and length of the easement are correct. Before disassembling the rail, Ed transferred reference marks from the straight rails to the curved section to make sure they mated cleanly.

### Carve away everything that's not the easement

When the Walstons make straight rail sections, they use a combination of a shaper and handheld routers to make the profile. None of that process works for this little curved section, so the profile must be carved by hand.

Ed brought a portion of straight rail and the easement blank that was still bolted to the volute back to the shop. After wrangling the blank into a comfortable position on the workbench, he used a pencil to transfer the lines of the railing profile onto both ends of the blank.

He lined up his tools: a DeWalt grinder, a Proxxon rotary tool, an electric carving tool, and sandpaper. He used the carving tool to relieve the upper notch that defines both sides of the railing crown. He switched to light passes with the grinder and the rotary tool as he moved down the curve, where the grain starts to change direction.

Using this first cut as a reference, Ed marked the midpoint on the side and used the grinder to take an even  $\frac{1}{4}$  in. away from the lower half up to the midline in an even pass. He continued to rough out the profile, switching between tools as the work required and sanding by hand with 40-grit paper to get the surface close. He also hand-carved the transition between the volute and the easement, using a thin chisel to cut the line that coils into itself at the top of the volute.

Once the major elements were complete, he brought the combined easement and volute back to the site, where it was bolted into place. A final sanding with 120-grit paper smoothed out the transitions and left the railing ready for the finishing crew. □

Charles Bickford is a senior editor. Photos by the author.