PART ONE

Installing an Over-the-Post Handrail

Simple-to-make railing stands allow accurate assembly right in position

by Jed Dixon

To allow plenty of room for step-by-step photographs, we are running this article in two parts; the second part will appear next month. In this installment, the author shows how he lays out balusters, installs the landing newel, and accurately positions the railing and volute. In Part Two, he will explain how to make a gooseneck from stock fittings when the manufactured gooseneck doesn't fit, and how to fit and install the volute newel and balusters. — The Editors

Over-the-post railings run continuously, starting at the bottom tread and stopping at the wall at the end of the landing on the floor above. The rail passes over pin-top newels so that your hand can run the full length without hitting a newel post.

For this article, I built a full-dimension model staircase to explain a time-tested technique for building a traditional over-the-post balustrade using high-end manufactured parts. The rail system is assembled from straight rails and various fittings — such as volutes, easings, and goosenecks — that are generally obtainable through your local lumberyard. I recommend that you buy the best parts available, and then inspect them carefully before you start cutting. Reject parts with knots or checks, and don't accept sapwood, mismatched grain, or obvious finger joints.

Laying Out the Landing Newel

A

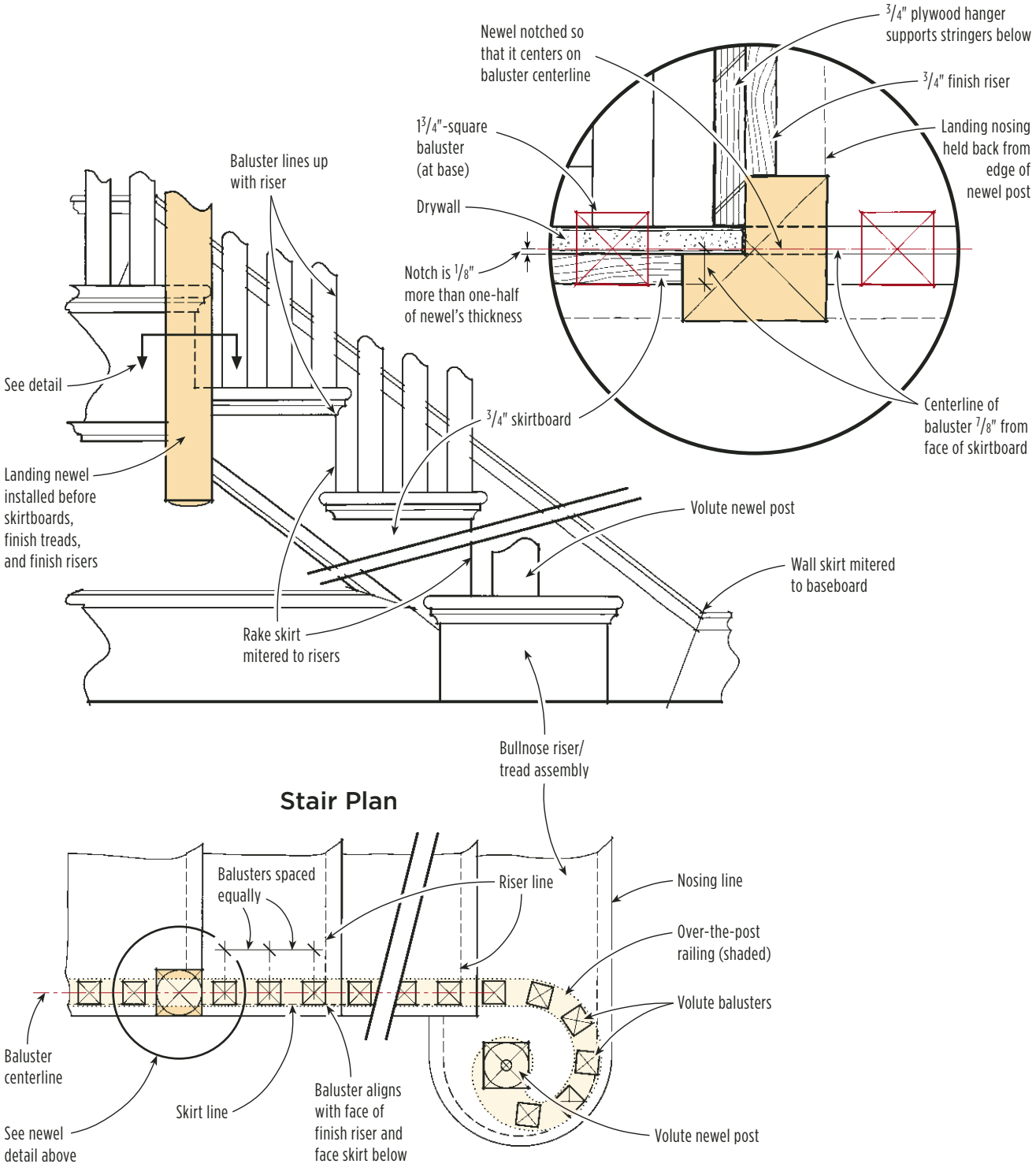


Figure 1. Handrail layout begins with a detailed drawing showing the locations of and relationships between posts, balusters, and treads **(A)**, previous page. The surest way to mark the landing newel for notching is to hold it up in place and refer to full-size drawings made at the planning stage **(B)**. The author marks the finish and subfloor locations on the newel base as the first step in notching the post for installation **(C)**.

Rail Centerline Layout

There's a classical, time-honored way to lay out balustrade parts, which I believe should always be the starting point for stair design: The front face of the first baluster on a tread should align with the face of the finished riser below, and the outside face of the baluster should line up flush with the face skirt below (see Figure 1).

The centerline of the handrail is one-half the baluster width in from the face skirt. This maximizes the usable width of the stair and looks right because the corner of the baluster base appears to be an extension of the corner formed by the miter joint between the riser and the skirtboard.

To lay out the balusters, I mark the centerline at half the baluster thickness in from the face of the skirtboard and riser. You need to keep the centerline in mind when taking the first step in installing the balustrade — installing the upper-level landing newel. Contrary to many depictions of installed newels, which show the post installed entirely on the tread surface, half the landing newel's thickness will stand proud of the face skirt and extend below its lower edge.

Landing Newel Post First

I install the landing newel before the skirtboards, finish treads, and risers go in. The landing newel must be notched over the rough stringer; installing it first leaves more meat on the post. The treads, risers, skirtboards, and molding then butt against the newel and help stiffen it.

Notching the newel. The square base of the landing newel has to accommodate the height of two stair risers plus the drop of the face skirt. I figure 36 inches for the post height above the tread nosing, and add 18 inches for the risers and skirt drop, so the minimum post length to order is 54 inches. The newel bottom can be trimmed later for best appearance, typically about 1 inch below the bottom edge of the face-skirt molding. The end cut is typically capped with a drop finial, or pendant.

I start by locating the elevation of the finish landing on the newel. By code, the landing rail has to be at least 36 inches above the finish floor in residential construction (42 inches in commercial). Including the thickness of my handrail at the top shoulder of the pin-top newel, I square a line across the post base at 36 inches, then make another mark below it that represents the thickness of the finish floor. I label this line "subfloor."

Then I measure the distance from the landing subfloor down one riser to the top of the subtread below and mark this on the newel. It's important to remember that unless the finish treads are the same thickness as the finish landing floor, this distance will not be the same as one net rise — the distance between the tops of two consecutive treads, which must be the same on every rise from floor to floor.

Take a good look at the post, decide which side has the best appearance, and rotate the newel so that this side is most visible when the post is installed. I mark this face "F" for reference. The newel's centerline

Figure 2. A circular saw set to depth is fine for making the vertical cuts; a sliding compound saw handles crosscuts **(A)**. The pocket cut that will cover the landing corner is completed with a sharp chisel **(B)**. The author uses high-strength steel lag screws to fasten the newel post to the rough stair carriage **(C)**. A shim corrects the newel for plumb and is later concealed by the skirtboard and trim. The function of the pocket cut can be clearly seen here **(D)**.

must match that of the balusters, which on this stair measure 1 3/4 inches square at the base. Therefore, the centerline needs to be 7/8 inch in from the face of the 3/4-inch-thick skirtboard (in this case, that puts the centerline 1/8 inch behind the face of the drywall).

When the rail continues straight along the landing, there'll be a pocket cut to receive the corner of the landing. I'm careful to set the pocket depth so that the landing nosing dies fully onto the newel. (When I install the landing nosing, I rip it to width so that its back edge aligns with the back of the newel, which saves the flooring installer a notch cut and looks much better.) I shade the waste area to remind me which side of the line gets cut, and hold the newel up against the stair one last time to check my marks — this is an expensive piece of wood to ruin.

Cutting the notches. To make the vertical cuts, I use a circular saw. Clamp the newel to sawhorses so you can keep both hands on the saw. I make the crosscuts with my sliding miter saw, cutting as far as I can without running past the vertical lines, and finish the pocket cut with a sharp chisel (Figure 2).

I mount the newel to the stair with 3 1/2-inch-long high-strength GRK or TimberLok screws in countersunk holes. (Later, I bung the holes with plugs cut from the waste piece so the grain will match.) I shim the newel square to the stair and set it dead-plumb, which makes it much easier to install the skirtboards, risers, and finish treads.

That's the next step, but we'll skip over it here for space considerations. For now, let's assume that the treads, risers, and skirtboards are installed.

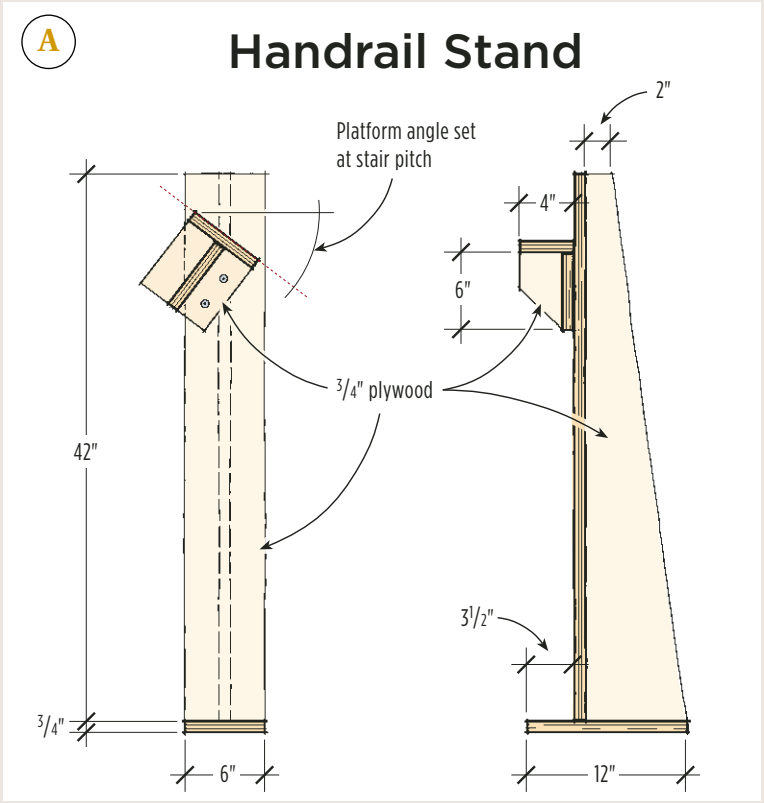


Figure 3. Shopmade handrail stands are the key to the author's assembly system (A). Screwed to the stairs near the top and bottom, the stands provide support for accurately locating and assembling the hand-railing system in its final position on the finished stair (B). At the base, the author locates the handrail centerline over the starting baluster center (C, D), drills through this point, and screws the base to the tread at the first baluster location (E).

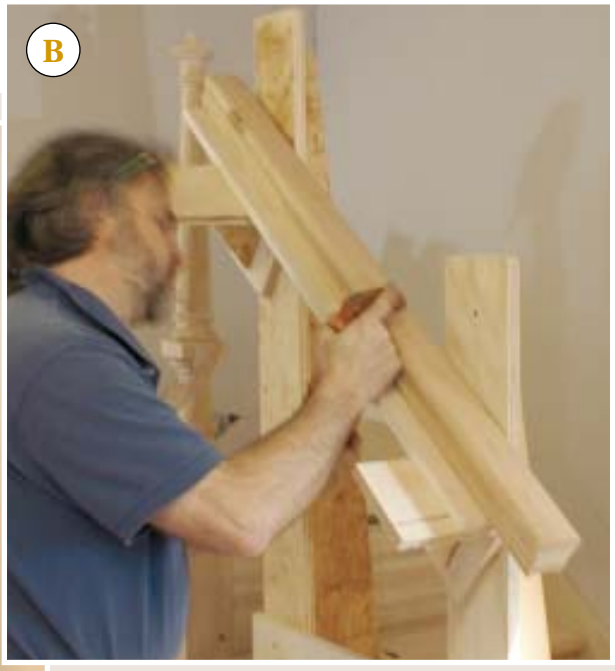


Figure 4. The author sets the handrail platform angle by putting a torpedo level on his pitch block, made on site for each stair. The triangular pitch block is cut from a piece of 1-by lumber, with the tread rise on one leg and the tread depth on the other; the hypotenuse thus produced describes the pitch of the stair **(A)**. A rough length of rake railing is clamped to the platform **(B)** and checked for regulation height **(C)**. The author centers the railing on the baluster line using a laser plumb bob for reference **(D)**.

Handrail Stands

Most instruction books suggest cutting and assembling the rail pieces with the rail set directly on the tread nosings to find the correct angles. I find it much easier to start with the rail set in its actual position and height. I have a set of homemade 3/4-inch plywood handrail stands that help me do just that (Figure 3, previous page). Four stands are enough for most straight stairs.

I begin by marking the front baluster centers on the finish treads, which in this case are 2 1/16 inches (overhang plus half the baluster thickness) in from the nosing in both directions. I set my combination square and draw crossing lines, then drill through the center with a 3/32-inch bit. On the handrail stand, I drill a hole 2 1/16 inches back from the front edge of the base, and one-half the rail thickness out from its vertical face. I screw the rail stand to the stair through this hole into the baluster center hole.

Then I set one stand on the second tread up from the bottom, and one on the top tread, with one or two intermediate stands on a long stair. I screw a 1x4 platform across the stand brackets

Figure 5. With the volute section laid flat and the easing rising, the pitch block is slid into place and its exact point of contact — the tangent point — marked on the easing (A). Then the pitch block is turned to its complementary angle and scribed across the easing at the tangent point to show the cut line (B). The author screws an auxiliary fence and table to his saw to create a more stable base and a higher continuous fence. A kerf in the base makes it easy to line up the tangent point with the blade. Hot-melt glue secures the pitch block to the volute for support during cutting (C).

and adjust them so that the railing, when sitting on the 1x4, will be 34 inches above the nosings, per code, and at the same pitch as the stair. To set the pitch, I use either a digital level or place a torpedo level on my pitch block (Figure 4, previous page).

I clamp a rough length of straight rail onto the 1x4 and check its location with a laser plumb bob, making sure the centerline of the rail bottom is plumb over the baluster centers. If an adjustment is necessary, I shim the stands to correct the alignment. The handrail must remain snug against the vertical face of the stand. Finally, I connect the rail stands with horizontal braces for stability.

Fitting the Volute

The up-easing on a manufactured flat volute has to be cut to the pitch angle of the stair. To do so, I set the volute on a flat surface and slide the pitch block under the easing, with the run edge of the pitch block horizontal, then make a mark on its bottom exactly where the pitch block touches it. This is the tangent

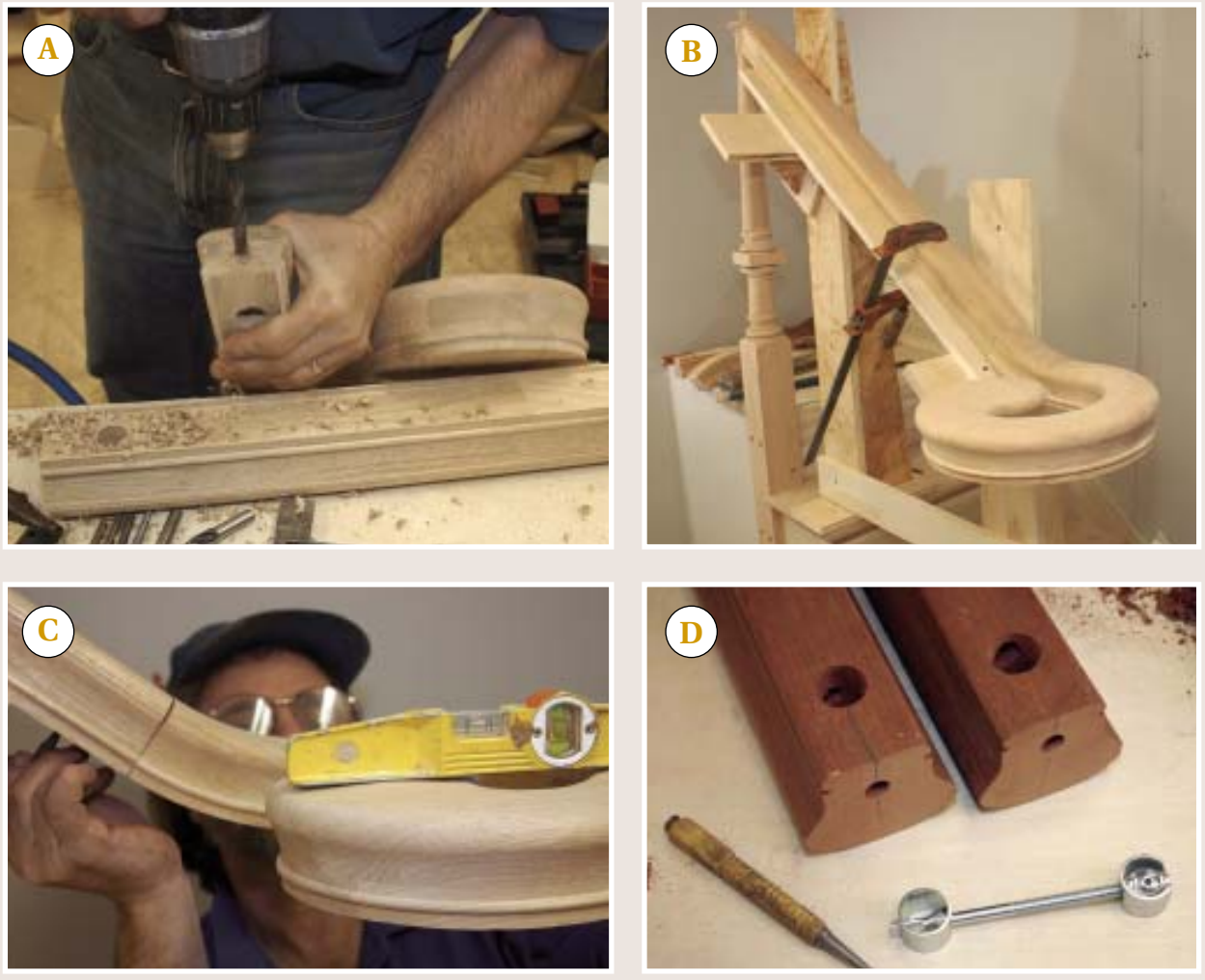


Figure 6. The volute is drilled for rail bolts and fitted to the rake rail section (A). The assembly is then clamped on the rail platform for positioning (B). To correct for level, the author loosens the rail bolts enough to allow the volute to drop. The reveal at the connection can then be marked for recutting, which is easiest on the straight rake railing (C). The author's preferred rail bolt can be tensioned with a nail set. Bottom holes are later plugged with matching stock (D).

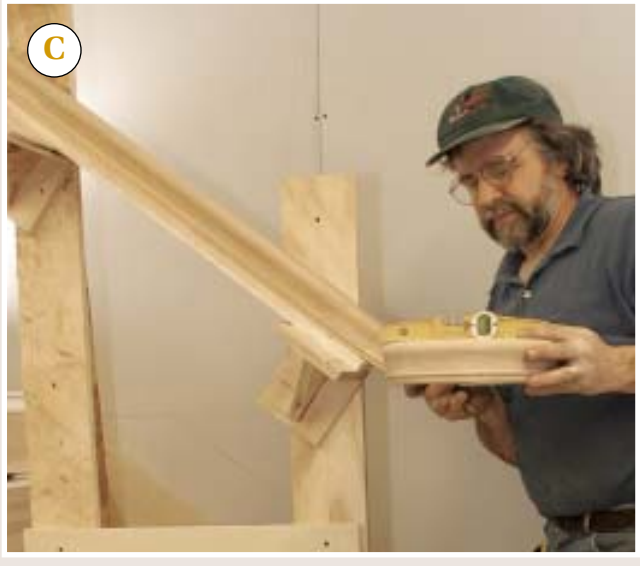
point, where the line of rise intersects the easing's radial curve (Figure 5, previous page). Use a strong backlight to make it easier to see the exact point of contact.

Next, I flip the pitch block 90 degrees to mark the cut line across the up-ease through the tangent point. To make the cut, I temporarily hot-glue the pitch block to the bottom of the volute for support and make the cut with the blade set plumb and square on the chop saw.

After cutting, I connect the volute to the straight rail section, clamp it to the stands, and check it for level (Figure 6). If the cut needs correcting, it's a lot easier and safer to do it on the straight rail section. I just loosen the rail bolt enough to raise or lower the volute to level, then mark the correction on the straight rail. But I never glue the connections until I've totally dry-fit the entire railing assembly.

Locating the Volute Newel

Typically, there's a paper pattern in the box the volute comes in (Figure 7, next page). I scissor a notch in the pattern so that it fits on the bottom bullnose tread. The notch wraps the corner



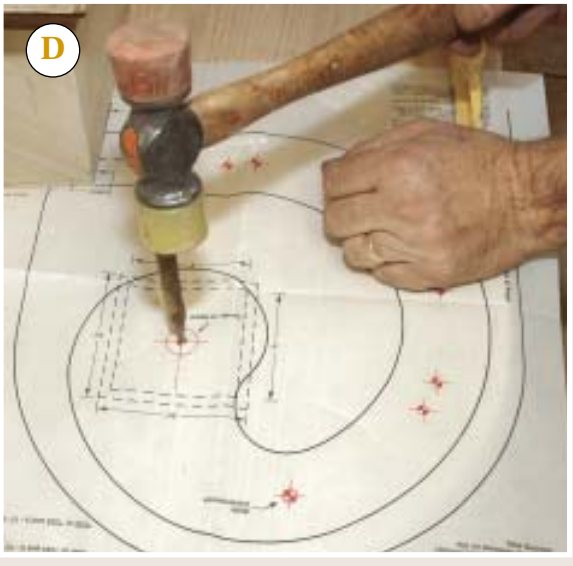


Figure 7. The paper pattern shipped with the volute is fitted to the bullnose tread. The newel center point is targeted with a laser plumb bob (A) and the volute is slid up or down the support platform until its dowel hole is directly centered above the pattern (B). The railing assembly is clamped and marked on the platform for future reference (C). The author punches the newel center mark through the pattern into the finish tread (D).

where the second tread's riser and face skirt miter; the volute's centerline aligns with the baluster layout line. I move the pattern forward and back until I like the way the volute falls on the bullnose tread, at which point I punch a reference hole through the newel-post center mark into the tread.

I remove the template and set my laser plumb bob over the mark, then move the rail assembly up or down until the laser dot hits the center of the volute's dowel hole. Then I clamp the railing tight to the stand. Now I've got my volute and straight rail exactly where they'll be permanently fixed — both in plan and elevation — on the finished stair.

Before removing them to fit the gooseneck at the upper landing, I measure between the bottom of the volute and the bullnose tread to find the length of the volute newel. I pencil witness marks between the rail-stand platform and the railing so that I can later return the assembly to the exact same spot to fit the gooseneck.

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