Building a Custom Box Newel

A hollow post made of mitered panels is easily detailed with stock moldings

BY LON SCHLEINING

One basic shape provides a strong anchor for the balustrade and a variety of design options. The telescoping shape of this newel can be adapted to a range of styles that include flat recessed panels (inset photo) and more detailed raised panels, flutes and moldings.

On my work as a stairbuilder, I've always liked to build box newels: Their design is flexible enough to accommodate a range of styles, they're strong, and they are relatively simple to build. Unlike solid 4x4 posts that are clad with trim, these hollow boxes won't split their seams when humidity changes, and they're easier to install plumb. In the following pages, I'll demonstrate a straightforward way to cut, assemble and decorate these functional boxes. I'll concentrate on the starting newel because it embodies all the qualities of a box newel and none of the complications that arise as the balustrade ascends the stairs.

A drawing helps you and the client

No matter what style you're after, you should put your thoughts on paper, or as I did in this case, a piece of scrap melamine. A full-scale drawing (photo top right) makes a great way to communicate the final look of a newel's flute sizes or molding details to the client, and more important, it allows you to organize your work.

In terms of a particular style, I like to start with a newel post that's built like a tree, larger at the base and more slender at the top. The post looks substantial. It's easy to attain this look by building a box within a box that telescopes upward.

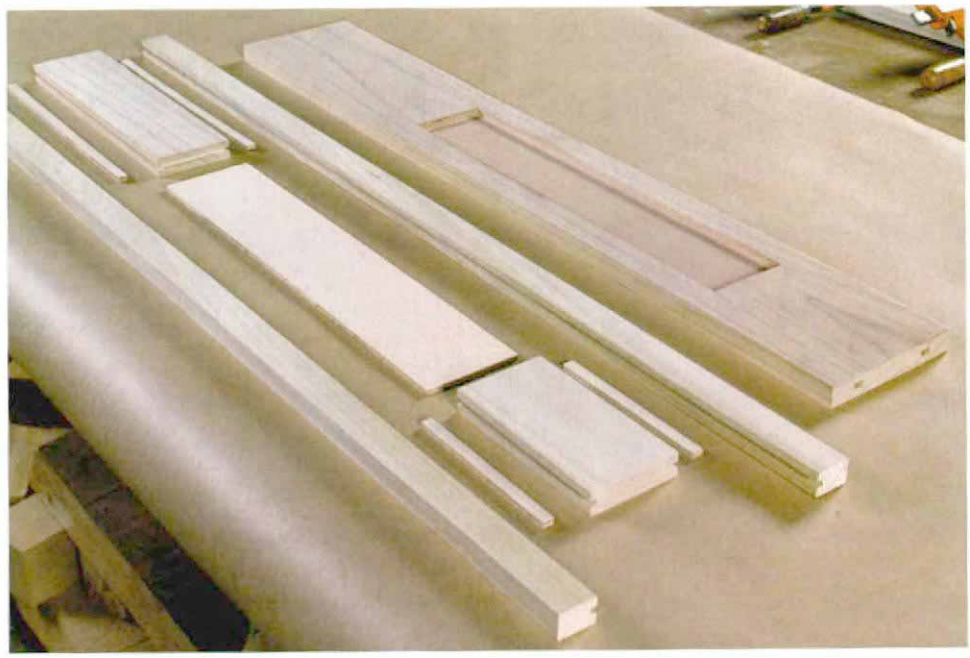
The applied details depend on the situation. Plain flat-sided newels are handsome, but your client's house might need something a bit more ornate. Recessed flat panels, raised panels, carvings, flutes, applied moldings and different caps all offer a way to express different styles.

Just about any solid wood works great for a box newel post; I use poplar for paint-grade stock and any number of other woods for stain grade. Construction is the same regardless of species, but when choosing materials for the newel, a chief consideration is wood movement. Keep all the grain running the same direction, lengthwise on the post.

I use medium-density fiberboard occasionally, but only for painted raised panels; it's harder to glue without resorting to biscuits. Plywood works well for paint-grade applications, but there are two things to consider. One, the lengthwise miter joints that I use to assemble the newels are not as strong as those with solid lumber. (This problem can be solved to some degree with splines.) Two, any exposed edges have to be covered, which always adds an extra step or two. For those reasons, I usually opt for solid wood.

Once I've chosen the wood, I plan the box. A newel of unadorned flat sides needs no

Full-size drawing makes design an easier process. On a piece of scrap melamine, the author draws a detailed elevation and cross section of the newel, which allows him to plan carefully and to give the client a good indication of the newel's proportions.

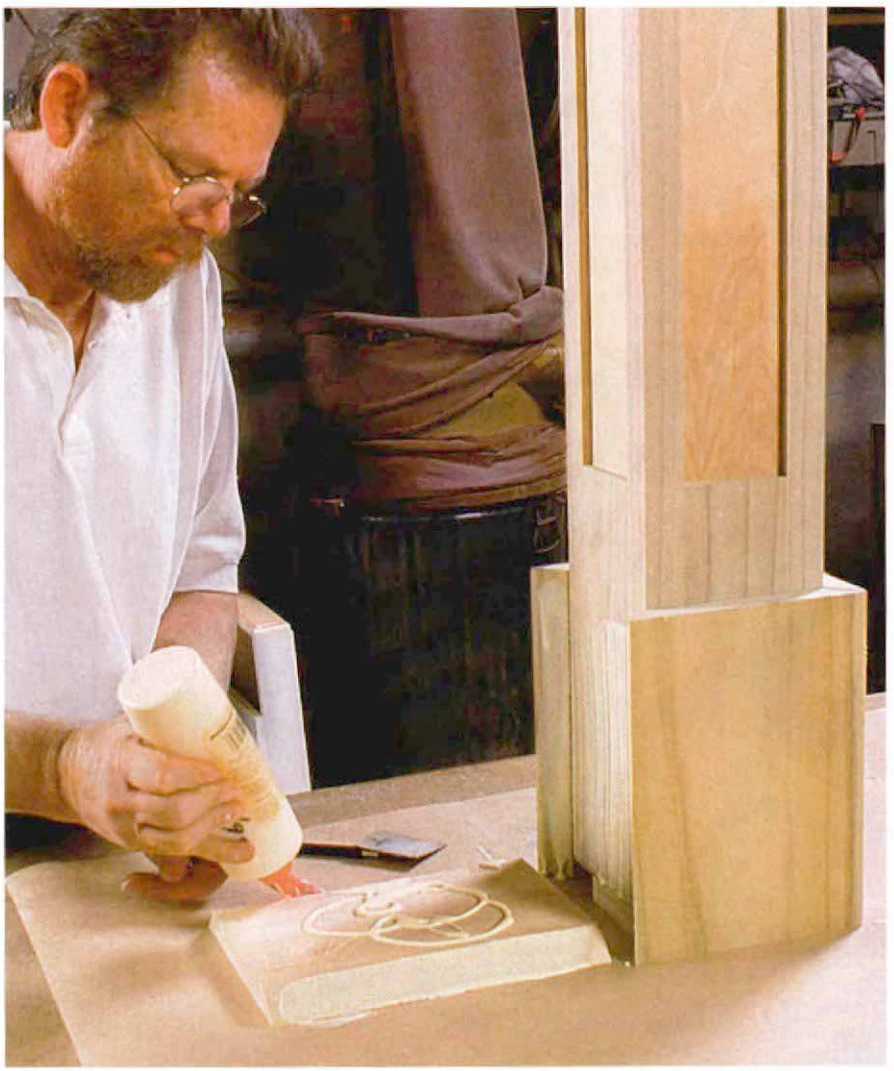


Frame assembly is first. Prior to mitering, each side must be glued up. Splines of ¼-in. plywood secure the rails to the stiles. Flat or raised panels that fit into ¼-in. wide grooves must not be glued to the frame to allow the wood to react to climatic change.

MAKING A BOX WITH TAPE AND GLUE

1 **Aligning the rails.** Before the author assembles the mitered sides, the panels for the box newel must be aligned. A framing square along the bottom rails does the trick.

2 **Applying tape.** With adjacent miters' outer edges touching, stranded packing tape is applied at regular intervals across the fronts of all four sides.



Undercut miters for a tight joint. Cut at 45½°, the assembled miters are open at the back but closed at the outside edge. The relieved miter takes less pressure to close, making it ideal to use with the tape method.

Assembling a box over a box to make the newel base. The second level of the box is built over the first; glue is applied to miters and to the interior faces of the sides. It's important to keep the grain direction running the length of the post to avoid split or cracked joints later.

3 **Gluing the miters.** After the panels are flipped over as a single unit onto their faces, glue is applied evenly across the miters.

4 **Creating a box.** With the rails aligned and the glue spread, the sides are rolled up tightly. Long strips of tape wrap around the assembly and secure it.

5 **Clamps and corner blocks square the box.** While the glue is wet, the author makes sure the box is square. Squeezing the corners with a bar clamp allows fine adjustments.

further preparation now, but a frame of rails and stiles that captures a panel (flat or raised) (photo p. 108) needs to be assembled (bottom photo, p. 109) before you can cut the miters.

There are lots of ways to join wood, but I like miters

You can use one of three basic methods of joinery to put these boxes together: miters, rabbets or butt joints. Each method has advantages and drawbacks. Butt and rabbet joints offer a quick way to make boxes, but sometimes, the joint on the face of the newel will eventually show through the paint. If the newels are clear-finished, there can be an obvious change in color and grain pattern at the joint. Butt joints can also be tricky to glue up without a jig of some kind, so I don't recommend them. Rabbet joints go together a little more easily than butt joints and are quite strong. Like butt joints, rabbets are usually glued and nailed, but their interlocking joints make assembly a bit easier.

Miters offer a quick way to build up a box without nails and to eliminate the unsightly difference in pattern and color between face and edge grain. If I use splines, I can also use plywood as a stain-grade option. With any material, the trick is to cut just beyond 45°, undercutting the inner portion of the miter so that when the box goes together, the outside corners are tight (photo bottom right, facing page).

On a table saw, especially one that tilts left away from the fence, cutting miters such as this one is not much different from any other rip cut. If your saw tilts to the right, you can move the fence to the left of the blade. This position may feel awkward, but as with any new saw setup, I recommend a couple of dry runs with the saw turned off to get the feel for hand positions and stock movement. If a sequence doesn't feel right, find another way that feels safer. Having a tuned-up saw, a sharp blade that runs dead parallel to the rip fence and an outfeed table will make any of these cuts infinitely safer. Cutting miters with a circular saw that's registered against a straightedge is a bit trickier, but the results can be nearly as good if you're careful.

To avoid grain or veneer tearout, I make sure that the sawblade cuts through the exposed miter edge first. Table-saw blades rotate down through the stock, so a left-tilting saw automatically cuts the outside edge of the miter on the top; if you have a right-tilt saw, moving the fence to the left of the blade does the same. A circular saw cuts up through the stock, so you need to keep the miters face down.

Assembling the boxes with tape and glue

To glue up a two-tiered box, I first lay the longest set of mitered pieces face up along the bench (photos facing page). I stick stranded packing tape across the faces every few inches and leave enough excess to close the box. After flipping the assembly over, I spread glue onto the mitered surfaces and roll up the assembly. Ordinarily, the tape provides plenty of pressure for a good joint with no additional clamping; I'll check the box to make sure that it's square and set it aside to dry.

Sometimes, it takes more pressure than tape can supply to close the joints, especially if the pieces are not exactly straight, so I use a couple of bar clamps and mitered corner blocks that keep the sharp corners from becoming dented. As I check the box with my combination square, I can tighten the clamp to adjust one way or another.

I take off the clamps and tape after an hour or so. When the glue has set, I scrape the excess from the corners and sand any excess flat with a belt sander.

Using the narrower box as a guide, I then cut the pieces for the larger box and dry-fit them around the base, making sure that the miters are tight and that the grain orientation of the two boxes is similar. I apply liberal amounts of glue to the miters and inside surfaces of the pieces (photo bottom left, facing page) and wrap them around the assembled box. I then tape the pieces together, using clamps if necessary.

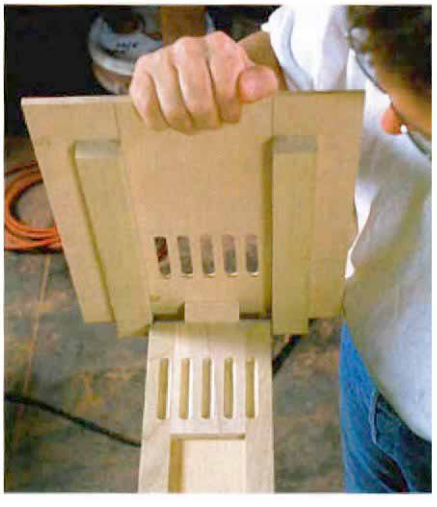
Stock moldings provide the details

I incorporate moldings of all kinds into my box newels, making different combinations to produce almost endless variations. For instance, narrow band or base-cap moldings nailed onto the inside perimeter of a flat recessed panel can mimic the look of a raised panel. I also like moldings along the transi-

A router jig for cutting flawless flutes

Spacers keep the router bit on track. The first plunge-router cut is made with the loose spacer blocks all to one side of the jig.

Move a block, make another cut. For each successive cut, one spacer block is moved to the other side of the jig. A vacuum keeps the jig clear of chips.



Stop blocks keep the jig in place. Glued and nailed to the back of the jig, these blocks register the jig in the same location for each newel face.

Flutes on a newel post can add a nice detail to an otherwise flat panel. On this post, I wanted five flutes that were evenly spaced across the newel faces. I had to cut 20 flutes per post for three or four posts, so I needed a jig.

Made from a piece of 3/8-in. plywood, the jig is registered on the face of the newel by blocks (photo bottom left) nailed to the back of the plywood. Stop blocks contain the router's travel; spacer blocks, cut as wide as the distance between the flute centerlines, determine the location of the flutes. By moving the spacer blocks from one side of the jig to the other as I plunge-cut (photos top, center left), I have equal spacing.

To design the jig, I first drew the width of the newel face on the plywood and then located the flutes equidistant across the face, drawing them to length as well. Next, I measured from the cutting edge of the router bit to the outside of the router's base plate and used that measurement to determine the perimeter of the stop blocks. Once the lines were drawn on the plywood, I glued and nailed the stop blocks in place. The glue ensured that they wouldn't get knocked out of alignment when I was using the jig.

Before I get to work, I check the fit of the blocks and the router base. There should be about a 1/16-in. space between the router base and the jig so that there's no chance of the router binding. I always try out this kind of jig on a piece of scrap first, just to get warmed up and to make sure the result is what I want. I also try to buy a new fluting bit when I have a fairly large job; the bit is only $20 or so, a small price to pay for a nice cut. If you can avoid having to sand out burn marks left by a dull bit, the new one soon pays for itself.

I clamp the jig securely to the workpiece. A vacuum hooked up to the router's dust port will help to keep the jig's interior clean and to avoid chip buildup. With the spacer blocks all to one side, I plunge the router into the cut. (The first time you use the jig, you'll be cutting through the plywood jig and into the actual material below at the same time.) I move one of the spacer blocks over to the other side of the cut, one at a time, making sure to clean out any stray shavings that might move the block out of position.

—L.S.

Dressing up a newel. Incorporated into a relatively simple design, flutes add a level of detail and can be produced precisely with a router and dedicated jig.

MAKING A CAP FOR FOR YOUR NEWEL

1 Beveling the cap safely. To make precise bevels, the author first clamped a 4x4 to the fence of the crosscut sled and then clamped the cap stock to the 4x4.

2 A belt sander makes the final shaping quick. After the cap's shape is cut, the contours are sanded. The cap gets a lot of hand traffic, so the surface must be smooth.

3 Pin the cap molding. The author preassembles the ring of cove molding and nails it without glue to the cap, which allows the cap to expand and contract.

tions of the posts; one favorite is a combination of 1/4-in. by 1/2-in. bullnose parting bead and a cove molding (photo bottom right). These applied moldings also work to hide the exposed veneers of plywood, which must be covered even if the newel will be painted.

An elegant post cap of solid wood

The cap style that I prefer is shaped like the hip roof on a house. I start with a square piece of 8/4 stock and cut the initial bevels on a table saw (photo above left). I clamp a short piece of 4x4 upright against the fence of a crosscut sled and clamp the cap stock to the 4x4. A bevel of 15° seems to work well here. Then I finish it off with a belt sander (photo above center), paying close attention to the contour as I sand.

To dress the cap and hide the junction of cap and post, I miter and glue together a square of molding, often 3/4-in. wide cove. After I make sure that this ring will slip over the top of the post, I center it on the underside of the cap and pin it in place (photo above right).

Hidden bolts secure the newel

To attach the newel, I typically use four 6-in. long hanger bolts that attach inside each post (a hanger bolt has wood-screw threads on one end and machine threads on the other); the hanger bolts offer a way to anchor a hollow post in just about any spot you'll need. A bolt platform glued inside the base of the finished post (photo bottom right) gives me a bearing surface for the nuts and washers. After I've driven the bolts into the framing, I transfer their locations to the platform and drill holes slightly larger than the bolts to assist in adjustment. When the post is in place, I take my long custom wrench, tape the washer and nut into the socket (photo bottom left) and bolt down the post, plumbing it as I go. After I attach the cap, I'm ready to start on the next post. □

Lon Schleining builds custom stairs in Long Beach, California. Photos by Charles Bickford.

Bolting the newel from the interior makes a clean installation. Hanger bolts driven into the landing come up through a platform that's glued into the bottom of the post. A universal-drive socket wrench attached to a 4-ft. long pipe seats the nuts and washers. A piece of masking tape around the end of the socket (photo above) keeps the nut and washer from falling out.