Raised Paneling Made Easy

A combination of built-up moldings and layers of plywood duplicates a traditional look

by Jim Donnelly

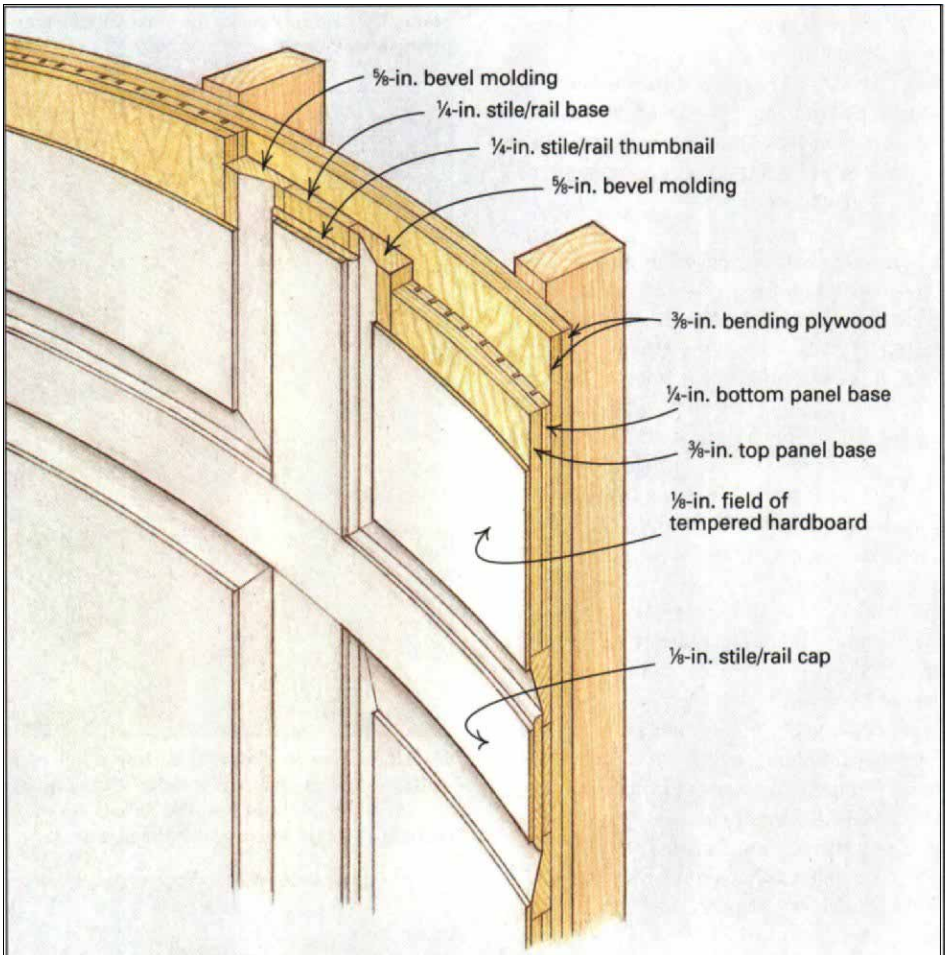
Glenn Bostock, a cabinetmaker living in Pipersville, Pennsylvania, was contracted to fabricate a frame-and-panel wall in the entryway of a house in New Hope, Pennsylvania. A formidable task, but certainly not an insurmountable one. There was, however, a challenge: The paneled wall was to be built on the inside curve of a circular staircase (photo facing page).

Traditionally, curved frame-and-panel walls were made by sawing, shaping and planing solid wood. Even with a fully equipped modern shop, the stiles, rails and panels would require elaborate jigs and extensive shaper work.

Bostock came up with a technique for duplicating the appearance of traditional frame-and-panel construction that was less expensive and quicker than traditional methods. His technique employs a series of overlapping layers, including bending plywood, tempered hardboard and kerfed pine. Each layer was nailed or glued in place, and the whole assembly then was trimmed out with moldings that hid the seams and fasteners of earlier layers.

Bostock's process was simple, and the most difficult task was making accurate cuts so the molding fit together well. Granted, the construction of the wall took a lot of time, but not nearly as much time as a solid-wood raised-panel wall would have required.

Although Bostock's project was a curved staircase wall, his techniques would work just as well for building a flat raised-panel wall. An added benefit for those with limited access to a shop is that Bostock's techniques can be accomplished almost entirely on site.



Lots of layers save lots of time. *Glenn Bostock used a combination of adhesives, nails, screws and staples to attach the different layers. The final layers—the stile/rail caps and panel fields—are held in place with contact cement to avoid exposed fasteners.*

Two layers of bending plywood provide a firm foundation—Bostock began by attaching two layers of ⅜-in. bending plywood directly to the studs. Bending plywood is made of three laminations; the middle layer is thinner than the two outside layers. Eventually, the two layers of bending plywood would be covered by other layers of panels, stiles, rails and moldings. The bending plywood provides a solid base upon which to attach subsequent layers.

Bostock attached the first layer of bending plywood with nails and construction adhesive. The construction adhesive filled any gaps between the plywood and the studs, and the nails were more than adequate for drawing the plywood up to the studs. The second layer was put on with carpenter's glue and 1¼-in. staples. The yellow glue turned the two pieces of the bending plywood into one unit. Bostock used a paint roller to apply the glue quickly. The staples were placed every 6 in. to assure a tight, even fit between the two layers.

Lay out the frames and panels—Once the bending plywood was attached, Bostock marked the stiles, rails and panels on the wall. Bostock colored in the location of the rails and stiles with pencil to make them easy to identify. Bostock drew all vertical lines with a level, and he then measured horizontal distances off a level line close to the floor (top left photo, p. 92). This horizontal line was established by marking points in several locations around the radius with a level and connecting the points using a thin piece of wood bent into the curve. Once the layout of the vertical and horizontal lines was complete,

Drawings: Vince Babak

The traditional look is made of nontraditional methods. By building up layers of different materials, including bending plywood, pine moldings and tempered hardboard, Glenn Bostock duplicated the look of a traditional frame-and-panel wall.

Bostock began the installation of the stile and rail base pieces.

The first layer of the stiles and the rails must be exact—In a traditional frame-and-panel wall, each stile and rail is made of one piece of solid wood. Each stile and rail in Bostock's wall is made of three pieces: the base; the thumbnail; and the cap (drawing facing page). The ¼-in. by 2½-in. clear, sugar pine base pieces provide the foundation to which all the components are attached. All of Bostock's other layers of paneling either butt against or lie on top of the stile/rail base pieces.

Attaching the base pieces was simply a matter of nailing or screwing them to the bending plywood. But Bostock stressed that this point was the last chance he had to make sure everything was level, plumb and square, and because subsequent layers would be easier if the corners to be mitered were 90° instead of 91° or 89½°, he took extra time to double-check everything (bottom left photo, p. 92).

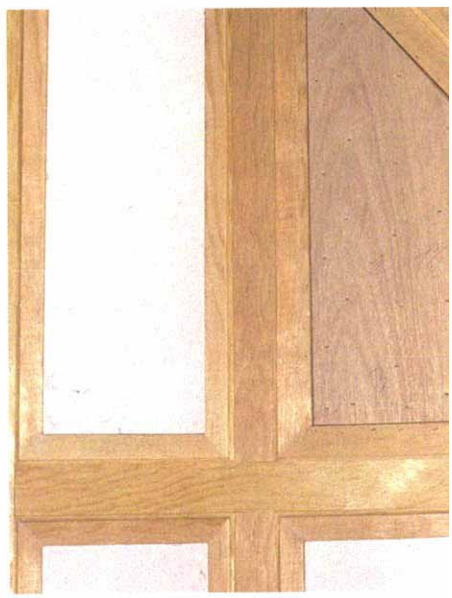
Although the layout of the stile and rail base pieces was critical, the butt joints where the pieces meet was not nearly as critical because the thumbnail pieces and the caps would cover the butt joints. For this curved-wall project, ¼-in. thick pieces of wood flexed enough to bend easily around the 8-ft. radius of the wall's curve.

Pencil in the locations of the frames. Bostock marked out the stiles and rails on the wall. All subsequent layers of the wall either will butt against or be attached to the stile/rail pieces.

Miters have to be exact. Buttjoints don't. Miterjoints where the bevel moldings meet will be visible on the finished wall. Long butt joints between the bevel moldings and the stile/rail base pieces will be covered by the layers of the panel field. Screws used to attach the bevel molding also will be covered by the field.

Accurate placement of the base pieces expedites the project. Making sure that the stiles are plumb and the rails level will ensure that the miters of the bevel moldings layers are true 45° cuts and that the panels pieces have 90° corners. Along the upward sweep of the staircase, some of the angles had to be bisected (sidebar facing page).

Fasteners are hidden by gluing on a final layer of hardboard. One-eighth-inch tempered hardboard is used for the panel fields. Rolling on contact cement to the fields and sticking them to the wall covers all the staples, screws and nails Bostock used to attach the sublayers of the panels.



Bostock glued and stapled the stile and rail pieces into place.

Bevel pieces mimic the edge of a raised panel—There are two parts to a raised panel: the field and the bevel. The field is the large, flat section in the center of the panel, and the bevel is the diagonally cut border around the field. The panels in Bostock's project are made of four pieces: two panel bases; the field; and the bevel molding (drawing p. 90).

Bostock made his bevel molding on a shaper using a panel-raising cutter. A similar profile could be cut on a router table. (For more information on using a router table, see *FHB* #90, p. 61.) A table saw also can be used to make the pieces if a shaper or a router is unavailable.

Even though the width of the bevel moldings is somewhat arbitrary, the thickness is crucial. The molding must be exactly as thick as the two layers of the panel base pieces, which in this case totaled ⅝ in. More on the panel bases later.

Bostock milled his bevel molding stock to a width about 2½ times as wide as needed. He ran the boards through the shaper twice, raising both edges. Then he ripped the moldings to their desired width. This method allowed him to run wider stock through the shaper more safely.

As with all the previous pieces in Bostock's project, the bevel moldings must bend. But the moldings are relatively thick and unyielding and had to be kerfed to ensure flexibility. Bostock laid the moldings so that the diagonal cut was face down on a power miter box. He then cut a series of kerfs into the thickest part of the back of the moldings.

Mitering the bevel moldings—The bevel moldings had to be mitered to fit within the framework created by the stile/rail base pieces. Because of the geometry involved in flexing the beveled molding into place, some gaps were inevitable between the bevel moldings and the framework made of the stile/rail pieces. These gaps would be covered by subsequent work (top right photo, facing page). The miter joints of the bevel moldings, however, had to be tight.

On Bostock's curved wall the run of the staircase creates a series of triangular panels, and fitting the bevel moldings into these frames posed greater challenges because their tight angles were not 45° miters. Rather, they were more acute and irregular. In order to fit the pieces accurately, Bostock had to bisect all the angles individually (sidebar right).

Because of the difficulty presented by their curvature, Bostock fit and installed the horizontal members of bevel molding first. He used yellow glue and 1¼-in. staples to fasten the moldings, but some pieces required screws to pull them up tight. The fasteners were kept close to the outside edge of the moldings so that subsequent layers would cover them. After installing all the horizontal pieces, Bostock installed the verticals.

Installing the panel base pieces—The panel base pieces are made of, respectively, kerfed ¼-in. plywood and ⅜-in. bending plywood. Both are used to fill the interior area created by the bevel moldings. Keep in mind that for a flat wall where the panels didn't have to bend, you would be able to use single pieces of ⅝-in. plywood to make the panel bases.

Bostock wasn't too concerned about getting a tight fit between the panel bases and the bevel moldings because the panel field pieces would cover the joint.

The stile/rail thumbnail molding must be coped—The stile/rail thumbnail moldings cover the joints between the stile/rail base pieces and the bevel moldings. Bostock made the stile/rail thumbnail moldings of ¼-in. pine. He milled a quarter round on one or both edges, depending on each piece's location in the project.

Bostock installed the perimeter pieces of the thumbnail molding first. Then the horizontal pieces, or rails, were installed. Rail ends had to be coped into the perimeter stiles.

On Bostock's curved wall, to fit the curved rails, the angle-and-cope cut was made on one end while the other end ran long over the perimeter stile. He temporarily screwed the rail into place, which allowed for a direct marking of the rail in relation to the stile. Once marked, he removed the screws and routed the cope with a ¼-in. cove bit in a router table. Then he reinstalled the rails using glue and the same screw holes.

After all the rails were in place, Bostock coped and fit the rest of the stiles. Because these pieces are coped into the rails, their length is determined by measuring the distance between rails and adding ¼ in. for each cope. Extra wood is removed during the course of coping.

Stile/rail caps were attached with contact cement—Bostock made the last piece to cover the rails and stiles—the stile/rail cap—of ⅛-in. sugar pine that was planed in his shop. If you don't have a planer, you could use ⅛-in. hardboard, which is available at some lumberyards.

Mitering odd angles

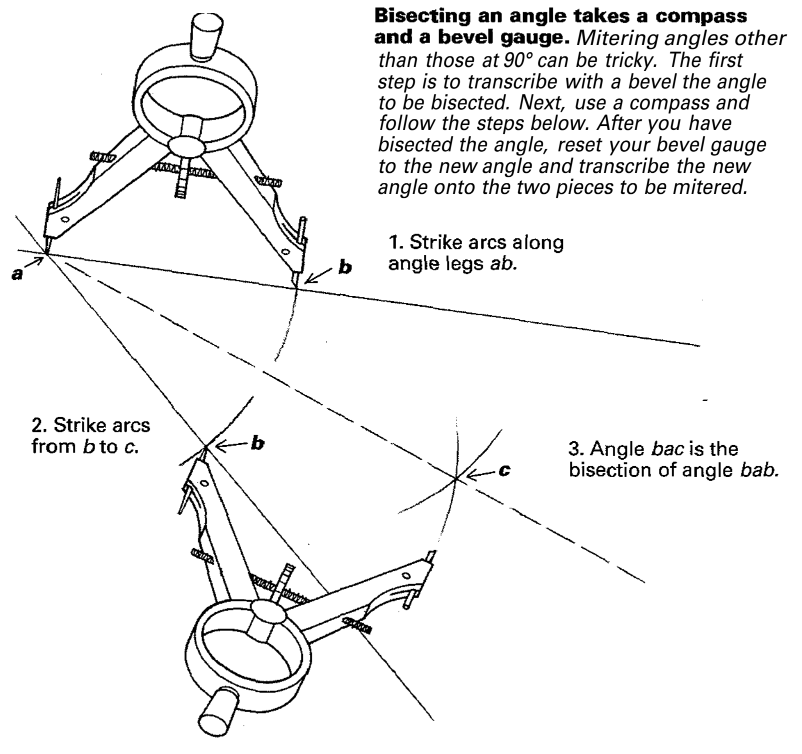
Mitering wood at an odd angle is exacting work, but it's not hard if you have a bevel gauge and a compass. The process involves bisecting the angle to be mitered.

The first step is to use your bevel to transfer the angle to be mitered onto a scrap of wood or a piece of paper. Next, stick your compass point in the apex of the angle and strike an arc equidistant from the apex along both legs of the angle (drawing below). The distance at which you strike the arc is arbitrary, but it is probably a good idea if you set your compass so that the marks you make are at least 3 in. from the apex.

The next step is to position your compass at the point where the first arc intersected the angle's leg. Draw a new arc through the approximate center of the angle. Repeat the process on the other leg. Again, the distance between the metal point and the pencil point on the compass is arbitrary, but the setting has to be at least wide enough so that the two arcs will intersect.

The intersection point of the two new arcs establishes the center of the angle. Now you can reset your bevel to measure the bisected angle from the apex to the point where the arcs intersect. Transfer the new angle to the pieces of wood that are to be mitered.

Keep in mind that there is plenty of room for error in this process and that it might behoove you to cut your pieces a little long so that you can fine-tune the miter with a block plane.—*J. D.*



Bisecting an angle takes a compass and a bevel gauge. *Mitering angles other than those at 90° can be tricky. The first step is to transcribe with a bevel the angle to be bisected. Next, use a compass and follow the steps below. After you have bisected the angle, reset your bevel gauge to the new angle and transcribe the new angle onto the two pieces to be mitered.*

Because nail holes or other mechanical fasteners would detract from finished work and because there was no easy way to clamp the pieces for a conventional glue joint, Bostock used contact cement to install the stile/rail caps.

The panel fields are made of ⅛-in. hardboard—The panel fields are the final pieces that Bostock installed on his paneled wall. These pieces cover both the fasteners he used to attach the outside panel-base layer and the joint between the panel base and the bevel moldings.

Bostock made his panel fields of ⅛-in. tempered hardboard (bottom right photo, facing page). The material bends well around the curve of the wall, and its smooth surface takes paint readily. Like the stile/rail covers, Bostock attached the panel fields with contact cement. The cement can be brushed on or rolled on; Bostock prefers the latter method. Rolling provides for an even coating of cement, critical to a good bond.

When Bostock was finished with the woodwork of the wall, he applied latex caulk and glazing compound to fill any gaps between layers that would otherwise reveal that this project was not conventional raised-panel construction. □

Jim Donnelly is a cabinetmaker and writer who lives in Bucks County, Pennsylvania. Photos by Glenn Bostock.