Building a Federal-Style Mantel

Neoclassical detailing in poplar and ceramic tile

by Stephen Sewall

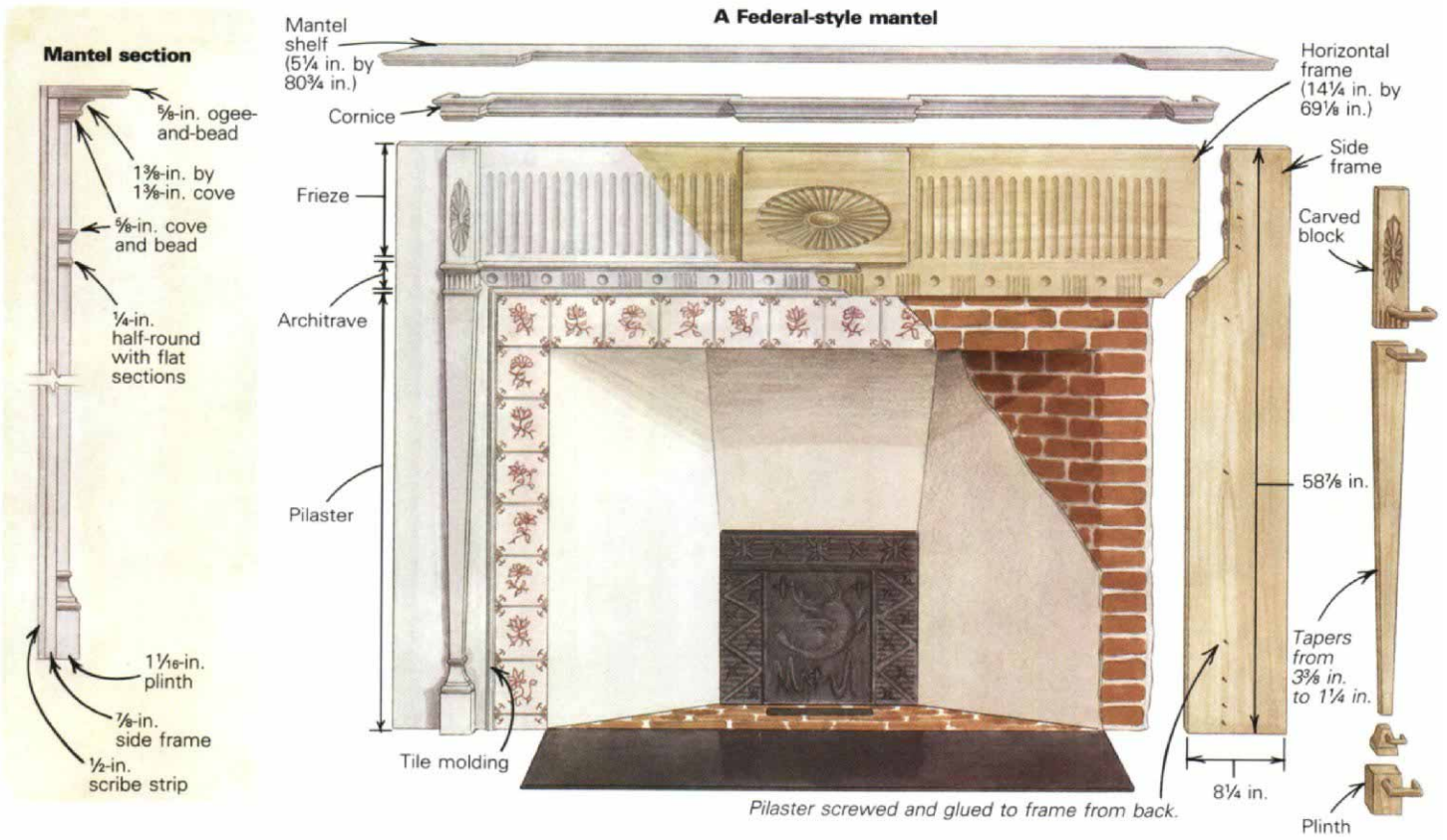
For the early European settlers in America, domestic life centered around the hearth. As the source of heat and the means of cooking food, it was a natural gathering place for the family. The earliest fireplaces simply had oak lintels supporting the masonry, but gradually the wooden framework around the firebox became a decorative element. By the Federal period (1790-1825), fireplaces were still the sole source of heat in the home, but weren't necessarily used for cooking. Formal fireplace mantels, with their elaborate carvings and moldings, became symbols of wealth and prosperity. The term mantel refers to the entire decorative framework around the fireplace opening, not just to the shelf above it.

I recently built a reproduction of a Federal-style mantel (photo facing page) from a house in Croton-on-Hudson, New York. My clients had spotted the mantel in a magazine article about Dutch tile and wanted to incorporate a reproduction of it in a new house they were building. Working from a photograph in the magazine, a friend of mine, David Stenstrom, made a measured drawing of the mantel, and that gave me a starting point.

My clients wanted to reproduce the entire fireplace, including a tile surround, a slate hearth and a cast-iron fireback. Therefore, the size of the firebox and the exact dimensions of the mantel were determined by the tiles we selected (Delft tiles, manufactured in Holland by Royal Makkum and imported by Country Floors, 15 E. 16th St., New York, N. Y. 10003-3104). The opening of the mantel is 12 tiles wide and 8½ tiles high. Once these dimensions were established, the slate hearth was ordered through the Bangor Slate Co. in Bangor, Me. The hearth is 16 in. wide, 72½ in. long and 2½ in. thick.

The basic frame—I built the mantel out of poplar. White pine might have been a more traditional choice, but it's more difficult to carve and dents more easily. The basic frame, or field, was 5/4 stock that I dressed to ⅞ in. (I added scribe strips later). There are two vertical pieces (side frames), each 8¼ in. wide by 58⅞ in. long, which form the base for the tapered pilasters, and a horizontal piece 14¼ in. wide by 69⅛ in. long (drawing below). I had to glue up two boards to make the horizontal piece, and when I did I oriented the growth rings the same way. When boards are glued up with the growth rings oriented in opposite directions, the resulting piece has a tendency to be wavy if it does cup.

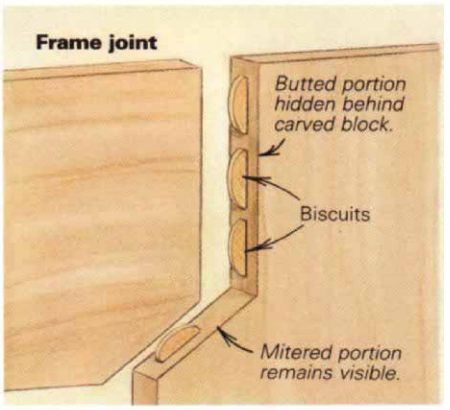
The horizontal piece had to be as smooth as possible because I was going to rout flutes in it, and a wavy surface would mean that the flutes would be uneven. After face- and edge-

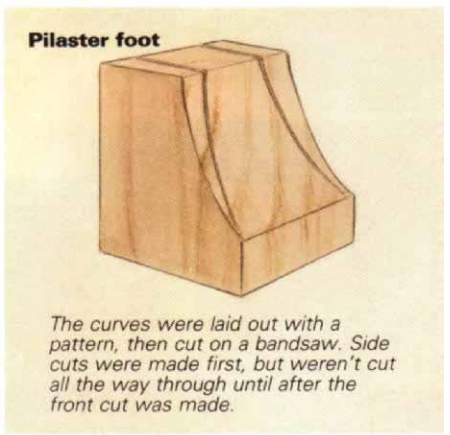


jointing the pieces, I glued the boards together, using biscuit joinery to align the pieces. Then I made one more pass to joint the entire width before planing and sanding to the final ⅞-in. thickness.

I joined the horizontal piece to the sides of the frame with a miter at the inside corner where the joint would show, then switched to a butt joint where it would be hidden behind the pilaster. I cut slots for biscuits along this joint as well, but did not glue the frame together yet because it's easier to do the routing and carving first, before gluing up.

Routing and carving flutes—The anatomy of a mantel relates directly to the elements of a classical entablature and is typically composed of two pilasters supporting the architrave, frieze and cornice, the top of which serves as the mantel shelf. I cut ⅝-in. vertical flutes down the middle of the horizontal section of the frame, which corresponds to the frieze in the entablature. Just below these larger flutes, I carved sets of smaller, 5/16-in. flutes, alternating with ⅞-in. dia., ¼-in deep holes. These smaller flutes and holes make up the architrave. I laid out all the details in pencil, drawing both sides of the smaller flutes (rather than just center lines) because they were to be carved entirely by hand. These flutes were so narrow and short that I could carve them faster than I could rout them. The bottoms of these smaller flutes run right off the edge of the board; the tile molding I applied later creates the stop.





I marked the holes between the flutes with a compass—drawing the entire circumference rather than simply marking the center point—because I was cutting them on a drill press with a Forstner bit, which has no center spur. These bits cut flat, clean-bottomed holes. The molding separating the architrave from the frieze was also penciled in, and I drew in the location of the carving block in the center of the mantel, along with the cornice molding. I laid out the ⅝-in. flutes last, keeping the area between them—known as the land—as close to ⅝ in. as spacing would permit. I marked these flutes by their centers because they would be cut with a router.

The jig for cutting the ⅝-in. flutes was made of ½-in. Baltic birch plywood with cleats screwed underneath to position the jig along the width of the board (top photo next page). The width of the hole cut in the jig is the same as the base plate of the router I used—a 3-hp Makita plunge router fitted with a ⅝-in. core box bit. The length of the hole creates the stop for the machined portion of the flute. I marked center line, top and bottom on the jig and aligned these marks with the center lines for the flutes. Because the force of the routing was resisted by the cleats underneath, I needed only one clamp to hold the jig in place. I made two passes with the router: one to remove most of the stock and a second light pass to give a clean, smooth cut.

The ends of the flutes had to be carved to make them look better. I chopped the bottom end of each flute into a convex shape with a ⅝-in. gouge. With the same gouge, I tapered

After seeing a magazine photograph of an 18th-century mantel, the owners of this house commissioned the replica shown below, including everything from the carvings to the Delft tiles, slate hearth and parged firebox.

Photo by David Stenstrom

With a shop-built jig and a ⅝-in. core box bit in a plunge router, the author cut the vertical flutes that create the frieze under the mantel shelf (photo above). Where the joint would show between the horizontal and vertical members of the frame, the pieces are mitered (photo below). The butted portion will be hidden behind the pilaster. Notice how the ends of the flutes are carved so that they appear to point upward. ***(Photo below by author).***

the top of the flute to a slight point. As modified, the flutes look to be pointing upward (bottom photo).

The pilasters—Made up of four sections, the pilasters are 58⅞ in. long overall. The top piece (1 in. by 3⅜ in. by 14¼ in.) is carved in a sunburst motif—a vertical ellipse with an oval applied to the center (more about this later). The flutes radiate out and stop in a convex chopped end. I also carved another set of 5⁄16-in. flutes across the bottom of the carved blocks.

The second section of the pilaster is 1 in. thick by 35¾ in. long, and it tapers from 3⅜ in. down to 1¼ in. at the foot. I cut the tapers with a tapering jig on the table saw—the same way you would cut a table leg. I started by drawing the tapered cut lines on the stock. For a jig, I found a scrap of plywood slightly longer and wider than the stock and ripped it on the table saw once, leaving the rip fence set. I lined up the cut line of the stock with the ripped edge of the plywood jig and screwed small notched blocks into the jig at either end of the stock to hold it in place. Then I ran the jig through the table saw again and had my first tapered cut. I cut one side of both pilasters, then repositioned the blocks on the jig for the last two cuts.

The foot of the pilaster was cut from a block 1 13⁄16 in. thick by 3⅜ in. high by 2⅞ in. wide. I made a paper pattern to lay on the block and marked the three sweeping curves. Then, on the bandsaw, I cut most of the way through two of the lines (pilaster drawing previous page). I stopped short, though, so as not to lose the third line. I cut the third line all the way through, then finished off the other cuts by eye. The plinth block at the base of the pilaster projects ¼ in. put from the foot on three sides. The block is 1 1⁄16 in. thick by 3⅜ in. wide by 4¾ in. high.

Assembling for humidity—When all the carving of the frame was done, I glued it up. Later, I sanded it carefully, then attached the four sections of each pilaster with glue and screws run in from the backside. At the top, where the carved sections of the pilasters covered the joint between the vertical and horizontal portions of the frame, I attached only the carved sections to the vertical boards. Their grain ran in the same direction, and the boards would therefore expand and contract in the same way. If I had attached them to the horizontal portion of the frame (the frieze) as well, the boards might have split because the grain would be running perpendicular.

By not attaching the small carving, the frieze is allowed to move freely with the seasonal changes of humidity. The mantel has been in place through two winters now, and the miter on the inside of the frame has opened up slightly, indicating that the frieze board has shrunk in width.

The sunburst carving in the center of the entablature was done on a board ½ in. thick by 11⅞ in. high by 16 in. long. I mounted this

Drawings: Bob LaPointe

temporarily onto a piece of ¾-in. plywood and screwed a small block on the back of the plywood so I could hold the Whole setup in a vise for carving. I clamped a Universal pattern-makers woodworking vise onto my regular bench vise to give me the extra height to work comfortably and prevent back strain (photo below).

To lay out the carving, I calculated the lengths of the major and minor axes (14 in. and 8 in., respectively) appropriate to the size of the block. I made up a trammel using a scrap of wood, drilling a hole in one end to hold a pencil. Two nails driven through the trammel guide it in making an ellipse. The first nail is half the length of the minor axis from the pencil, and the second nail is half the length of the major axis from the pencil. I drew intersecting lines on the block along the two axes and placed a steel square over one of the quadrants created by the intersecting lines. Using the trammel, I drew one quarter of an ellipse, keeping the nails against the square (drawing below). I repeated the procedure with each quadrant and had ellipses drawn on the block.

I penciled in the center oval by eye. Then, with dividers I laid out equal segments on the ellipse. I drew lines from these outside points to the center to represent the land between the rays. I used three sizes of gouge, each with the same sweep, to carve the rays. I had to work carefully to avoid tearing out grain. I turned an ellipsoid on the lathe, cut it in half and sanded down the section to about ⅝ in. thick. The oval was glued to the center of the carved block. The smaller carvings at the top of the pilasters were laid out the same way as the large carving in the center of the entablature. The primary difference in the carvings is that the flutes on the large carving ended with a reverse bevel, creating a flat surface to catch the light. I mounted the large carving to the frieze with glue and screws because the grain was running in the same direction.

Applied moldings—The mantel shelf is a 1-in. thick piece of poplar 80¾ in. long (the same length as the frame). It is 5¼ in. wide, allowing a ½-in. scribing space to account for an uneven wall. The front edge of the shelf jogs out 1 in. over the pilasters. I created these jogs by sawing out the center portion of the mantel on the table saw. I finished off the cut by hand and smoothed it up with a chisel.

A ⅝-in. ogee-and-bead molding was glued to the front edge of the shelf, and the shelf was set aside to be installed last. I ran a ¼-in. half-round molding around the tops of the pilasters to cover the joint between the tapered section and the carved block. This also forms a stop to the flutes on the carved blocks. I applied a ⅜-in. half-round molding to the junction of the tapered leg and the foot, then added a ½-in. half-round at the base of each foot, resting on the plinth block.

A ⅝-in. wide cove-and-bead molding that projects ⅝ in. is just under the main carving block separating the architrave from the frieze. It continues around the pilasters and dies into the frame. The same molding is used in conjunction with a large 1⅜-in. by 1⅜-in. cove to form the cornice under the mantel shelf.

All of these applied moldings were custom-made in the shop. They were glued in place where the grain direction matched that of the piece on which they were mounted. Otherwise, I just nailed the moldings, but I did glue all the miters.

I glued ½-in. scribe strips on the back of the two outside edges of the frame (no nails because I might have hit them when scribing). The strips were 1 in. wide to allow good nailing to the wall. Before the installation, I took time to sand the carvings just enough to smooth any rough edges and didn't try to remove the tool marks. I broke all of the sharp edges of the wood so that the paint would adhere well. It was much easier to do all of the finish sanding with the mantel flat on a work bench.

The installation was easier that I had expected because the slate hearth was installed level. I only had to scribe the mantel to make it plumb to the wall, which was out some. After I nailed through the frame at the scribe strips, I slid cedar shingles behind the frieze at framing points and nailed off the mantel. There was a bow in the wall, so I did have to scribe the mantel shelf before nailing it to the cornice.

When the tile was installed—a blue and white Delft pattern called "Little Flowers"—we were careful to leave an even space between the tile and the frame. This would allow for a tile molding that would come to the edge of the tile, yet not overlap it too much. In this case the space varied from ¾ in. to ⅞ in. I made up a ⅞-in. half-round and scribed it to the tile so that it projected out from the face of the mantel by ¼ in. and nailed it to the edge of the frame.

After the tile was installed, the sides of the firebox were parged. This left a clear transition between firebox and tile and also set off the cast-iron fireback. The mantel was then painted with a traditional grey paint from Pratt & Lambert (1234 Saline, North Kansas City, Mo. 64116) called Gossamer II. The mantel required one primer coat and two finish coats. Poplar doesn't seem to cover as well as pine. □

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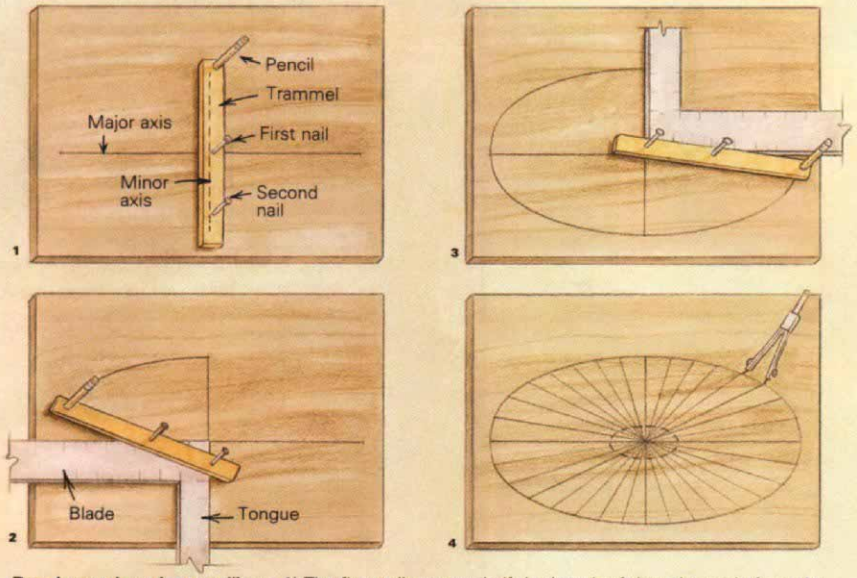

Drawing and carving an ellipse. *1) The first nail was set half the length of the minor axis from the pencil, the second nail half the length of the major axis from the pencil. 2) With a framing square over one of the quadrants, the trammel was moved so that the nails rode along the blade and tongue of the square. 3) The square was moved to each of the other three quadrants and the procedure repeated. 4) Dividers were used to step off the segments around the outside of the ellipse. The last step (photo right) was to carve the sunburst rays.*

Photo by David Stenstrom