Building a Frame-and-Panel Fireplace Surround

Pocket-screw joinery and specialty moldings transform a site-built mantel into high-end millwork

by Gary Striegler

Building an elaborate mantelpiece can be an intimidating task. That's why I like to think of it as a series of smaller projects — the upper and lower pilasters, the undermantel frieze, the mantelshelf, and the overmantel — that can be built separately. The trick is to figure out how all the parts fit together and then build them accurately and efficiently.

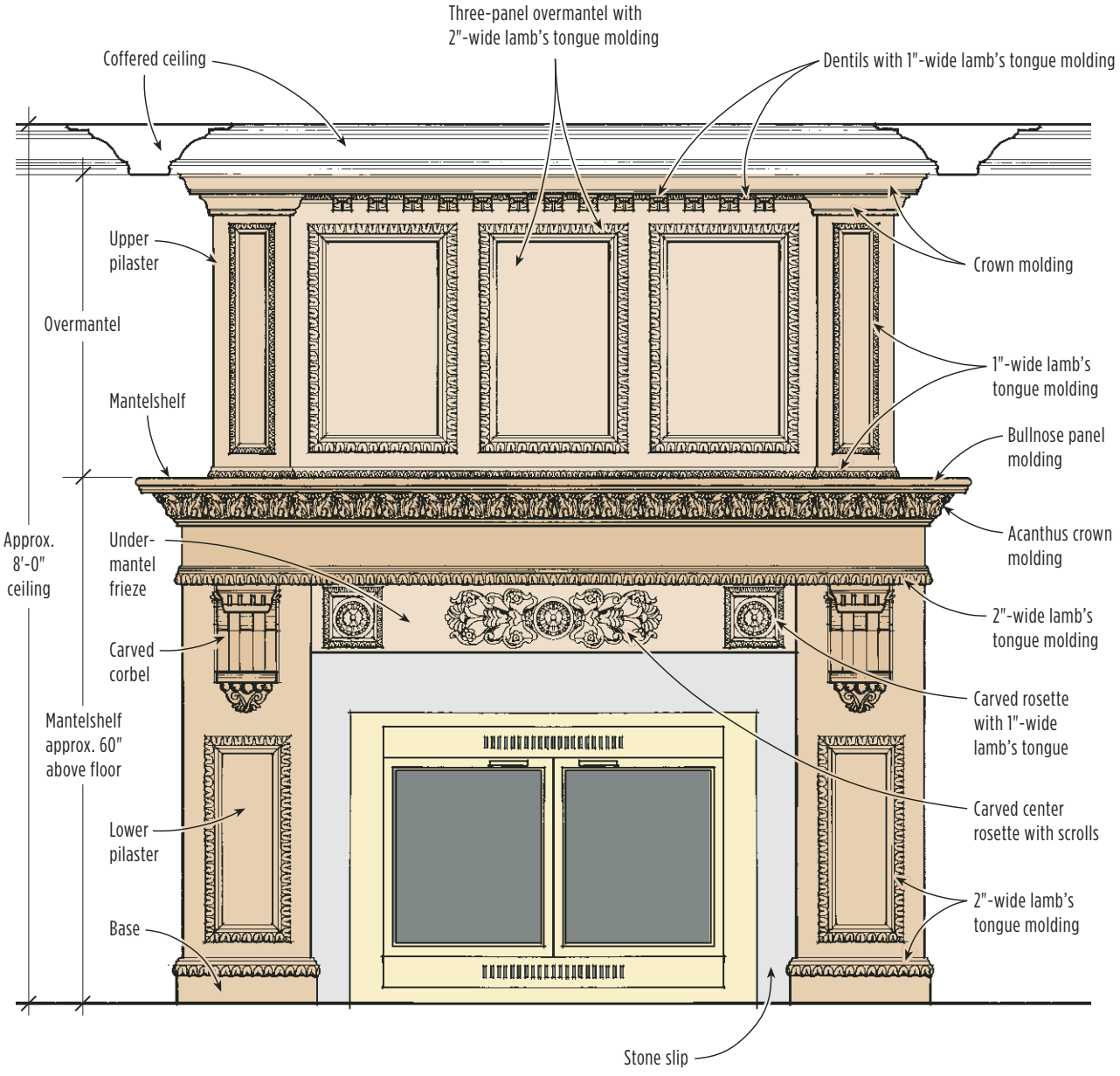
With the materials already on hand, the mantel shown in this article took me and a helper about a day and a half to build. I used a story pole to work out its many details in full scale; pocket-screw construction allowed me to assemble the parts on site with a trim carpenter's basic repertoire of tools. The expressive details that give the mantel its unique look come from different combinations of stock moldings and carvings from White River Hardwoods (800/558-0119, www.mouldings.com.)

Planning and Layout

Like scores of other mantels I've built over the years, this one is based on frame-and-panel construction. By changing such elements as the overmantel style, the undermantel frieze detail, the upper pilaster detail, and the type of moldings used for the mantelshelf, I can build the same general style of mantel for a dozen different clients while making each an original.

In this project, the basic mantel dimensions were dictated by the existing brick fireplace, which my clients planned to reface with stone. Inspired by other fireplaces I'd built that the clients had seen, the new mantelpiece was designed to complement the makeover of the entire

Anatomy of a Formal Mantel



Proportion and layout are crucial to a nice-looking fireplace surround. The author always starts by measuring the width and height of the available wall space, then designs accordingly. Shelf height falls at around 60 inches for an 8-foot ceiling, higher for taller rooms. Panels above the mantel should be at least 4 inches taller than they are wide; sometimes the center panel is wider than the flanking panels. Upper pilasters are typically narrower than the lower pilasters, though centered above them.

Figure 1. The author starts by marking existing conditions on the story pole, such as the width and height of the firebox opening, the size of the noncombustible material surrounding it, and the proposed height of the mantelshelf (top). Horizontal layouts start in the middle and work outward. Vertical layouts originate from the proposed location of the mantelshelf, go down to the floor, and then work from the shelf up to the ceiling (above).

room, which included a new beam-and-coffered ceiling and new window, door, and baseboard trim.

Basic dimensions. In my area, code requires at least 8 inches of clearance between the side of the firebox opening and the closest trim or cabinetry. Code also requires at least 10 inches of noncombustible material directly above the firebox (see illustration, facing page).

I keep these requirements in mind when I establish the height of the mantelshelf, which I base mostly on room size and the height of the firebox opening. In a smaller room with 8-foot ceilings, the shelf may be as low as 60 inches above the floor; in a larger space with tall ceilings, it may sit 68 inches or more above the floor.

Had there been a raised hearth in this project, it could have really limited the detailing above and below the mantelshelf. Fortunately, there wasn't one.

Story Pole Is Crucial

No matter what site conditions I find, I use a story pole to develop the layout (see Figure 1). For most fireplaces, I actually do five layouts. Because I always end up making some adjustments as I look at the proportions, I do my layouts in pencil, labeling all the parts and marking their exact size on the story pole.

Layout 1. Making the mantel work with the width of wall available is usually the greatest challenge, so I do the horizontal layout below the mantelshelf first.

In addition to accounting for the span of the firebox and any noncombustible material, I make sure to leave enough width for the shelf to return to the wall. Determining the pilaster width is the most important part of this layout.

Layout 2. Taken vertically through the middle of the firebox, this layout shows how much room is available for decorative elements under and above the mantelshelf, the shelf height, and the vertical layout of the paneled overmantel.

Layout 3. This layout is taken vertically at the pilasters beside the firebox and shows all of the moldings that will wrap around the pilasters, plus the layout for the corbels that will support the mantelshelf. It also indicates the height and layout of the upper pilasters.

Layout 4. Taken horizontally above the shelf, this layout indicates the width of the upper pilasters and the layout of the paneled overmantel. If the overmantel is a single panel, it should be about 30 percent wider than it is tall. For a three-panel overmantel like the one shown

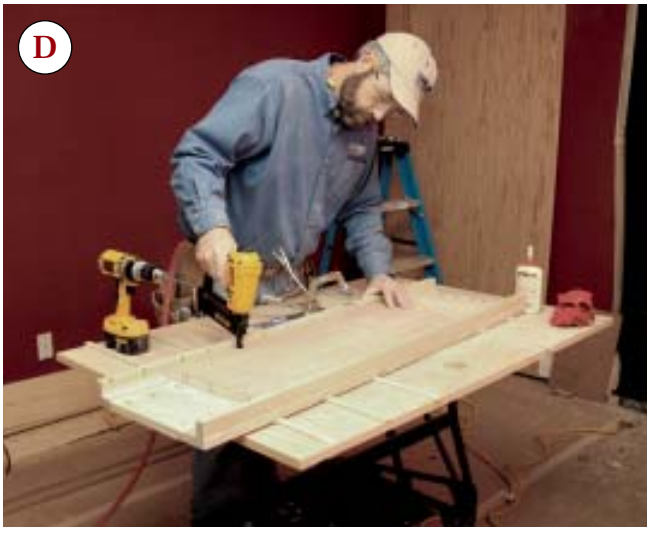


Figure 2. Because pocket-screw joints go together quickly and require little clamping or sanding, the author uses them to build the frame-and-panel assemblies that make up the mantel (A). To add depth to the pilasters, he glues and pocket-screws 1-by rippings to the frames, pinning them them in place first so that they are inset slightly from the edges of the panel (B); later, he will trim the panel edges flush with a router (C). Next, after fastening the plywood panel to the frame (D), he fills in voids and dings with wood glue mixed with sawdust, then cleans up the joinery with a few passes of a belt sander (E).

Figure 3. The pilaster panels are trimmed out with an imprinted panel molding. To help size the panels so that the pattern remains continuous as it turns the corners (top), the author lays out the stiles and rails using a precut section of molding as a spacing jig (center). He back-cuts the miters slightly with a block plane so they'll slip easily into place during installation (above).

here, I make each panel at least 4 inches taller than its width. Usually the middle panel is 3 or 4 inches wider than the side panels, but all three can be the same width. Upper pilasters are usually narrower than lower pilasters, but must be centered over them.

Layout 5. This is a small layout that shows the projection of the mantel from the wall. (Since there are only four sides to a story pole, I usually fit Layouts 4 and 5 on the same side.) The total mantel projection includes the thickness of the lower pilaster, the projection of the corbel, and the combined projection of the moldings used for the shelf. My shelves typically project from the wall about 11 to 14 inches. For useable shelf space, remember to subtract the thickness of the overmantel that will cover up part of the shelf.

As I juggle the widths, heights, and depths of each part in the layout to get all the components to fit together, I try to offset joints by 3/4 inch (a purposeful step looks better than a gap). I also make sure to allow room for trim that runs from one piece onto the next. For example, the field behind a pilaster must be wide enough to allow the base trim that wraps the bottom of the pilaster to die into a flat space.

Finally, before starting to make sawdust I like to do a rough drawing of each piece, on either graph paper, plywood, or a board. The proportions and measurements come from the story pole. The drawings make it easy to develop a cut list and build each part.

Pocket-Screwed Panels Are the Building Blocks

Pocket-screw joinery is the foundation for all my mantel projects. Most of my mantel details are based on frame-and-panel construction, which I assemble on site with pocket screws (Figure 2, page 4).

For example, the lower pilasters on this project are basically frames built with poplar stiles and rails glued and pocket-screwed together. The panels are cut from 3/4-inch birch plywood and are simply nailed to the back of the frames. In cases where the panels are mounted directly on the wall, such as this surround's three-panel overmantel, I cut the panels from 1/4-inch plywood.

Because the pilasters project from the wall, I build out the frames with 1-by rippings pocket-screwed along both outside edges at right angles to the stiles. All of the dimensions for these pieces are derived from my story pole.

Figure 4. After applying glue and carefully positioning the corbels, the author pins each in place to make sure it won't move, then screws into it through the back of the panel for a strong connection (left). When installing the pilaster bases, he is careful to place the molding so that the repeating pattern turns the mitered corners symmetrically (above).

Figure 5. The mantelshelf begins as a plywood box, butt-jointed along the bottom edge and with the front and sides mitered together. A few cleats pocket-screwed inside reinforce the box (above); the butt joint is covered with molding (right).

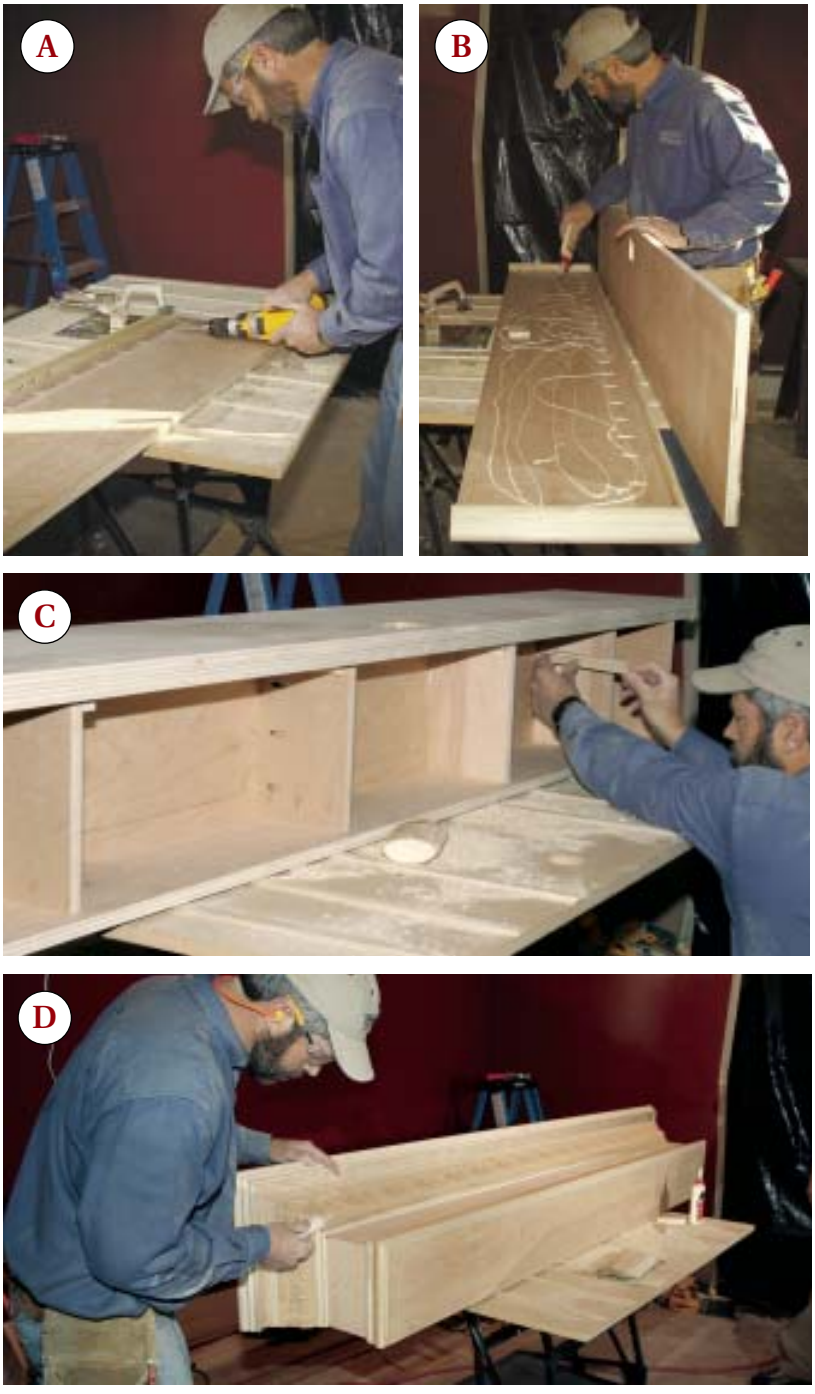


Figure 6. The top of the box — the actual shelf — consists of two layers of ¾-inch plywood. The bed molding that conceals the end joint is securely fastened from behind with pocket screws through the underside of the top layer of plywood (A). Glued into place, the second layer of plywood adds mass to the shelf and conceals the pocket screws (B). The cutouts will accommodate an electrical box. The author fastens the top to the box (C), then finishes the mantelshelf with crown molding (D).

I trim the insides of the frames with panel molding (Figure 3, page 5).

For these pilasters, I used a 2-inch-wide molding with a beaded edge and an applied lamb's tongue overlay, a repeating pattern that requires a little extra care in layout. I like the pattern on this molding to run continuously around the miters rather than meet haphazardly at the corners, which means I have to fine-tune the panel size. Since this particular pattern repeated about every 1¼ inches, the panel dimensions had to be adjusted by 1¼-inch increments; otherwise, the pattern would be interrupted as it turned the corners.

Once I've determined a panel's approximate dimensions, I can cut its molding to the exact lengths required by the pattern. When I assemble the stiles and rails, I lay the actual cut pieces of molding in place along the stile or rail to indicate each component's exact position.

The lower pilasters here are topped with carved corbels, while the bases are built out with additional moldings (Figure 4, page 6). To make sure the glued corbels wouldn't move after I positioned them, I used my 23-gauge pinner to initially secure them to the pilasters, then drove screws through the backs of the panels and into the corbels.

My pinner is also handy for securing all of the various moldings in this kind of project; it won't split some of the more delicate pieces, and the holes left by the fasteners are so small they may not even need filling.

Building the Boxed Mantel

The mantelshelf is really a simple plywood box with moldings covering the joints (Figure 5, page 6). It's sized so that the plywood bottom is ½ inch wider than the projection of the corbels it sits on, while the length equals the outside-to-outside measurement of the lower pilasters.

Both measurements are taken from the story pole.

To make the top of the box shown, I used

Figure 7. To help ensure that the assembly will be plumb and level, the author pins and then pocket-screws the lower pilasters to the plywood frieze before installing them (left). MDF cleats glued and nailed to the wall provide secure fastening for the pilasters (right).

Figure 8. A horizontal cleat (above) provides nailing for the box mantelshelf, which is installed after the lower pilasters (right).

Figure 9. After installing the paneled overmantel (top), the author completes the basic surround by installing cleats and the upper pilasters (center). Then it's time for the finishing details, such as the dentils and moldings that hide the upper shelf joint (above).

two layers of 3/4-inch plywood, with a bullnose panel molding covering the end joint (Figure 6, page 7). Because the crown molding that finishes the shelf also has an applied architectural overlay with a repeating pattern, I was careful to install it so that the pattern remained continuous as it turned the corner.

Of course, the size of the mantelshelf can't be as easily tweaked to accommodate the molding as the size of the panels can be, so I shifted the crown molding until it was exactly centered along the shelf. Then I marked and cut the end miters, and cut the returns to match.

Assembling the Pieces

After the upper and lower pilasters, the mantelshelf, and the overmantel have been made, it's time to put the parts together.

I like to start in the middle and work up and out. I also like to keep my saw close at hand for minor adjustments so that the pieces go together cleanly.

I begin by checking the floor for level. The pilaster on the highest side should be set first; the second pilaster can be brought up level with it (Figure 7, page 8).

To provide nailing for the pilasters, I glue and nail plywood rippings to the wall; they're sized to fit just inside the pilaster returns. Although I try to hit the studs, I know that I can always nail at least the bottom edge of the cleat to the bottom plate of the wall; glue does a good job of holding the rest.

The important thing is that the cleats are plumb and positioned correctly so that the mantelshelf will sit level on the pilasters.

Before installing the shelf on top of the pilasters and frieze, I glue and nail another horizontal cleat to the wall (Figure 8, page 8). I nail the mantelshelf to this cleat and to the supporting pilasters and then fasten the three-panel overmantel and the two upper pilasters directly to the wall (Figure 9).

With the main components installed, I cover all the joints with moldings. Once I've dressed up the undermantel frieze with various carvings and moldings — which I install with my pinner — all that remains is to run the room's moldings either over to or around the mantel; after that I can turn the project over to the finisher.

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