

Graceful Glass Doors

Delicate muntins require exacting machine work and handwork, but they create doors of elegant proportions

BY STEVE LATTA



A pair of properly executed glass doors adds sophistication to a bookcase, a breakfront or a case-on-chest. The doors on this walnut bookcase that I made for my wife are similar to ones I saw several years ago on an English antique. Most glass doors today are built using cope-and-stick knife sets to shape the muntins—not so with these doors. Cope-and-stick sets give rise to a heavier, bulky gridwork that is inappropriate for the lighter and more formal look I prefer in my work. My process involves precise machine work and handwork, but for the end result, the extra effort is well worth it.

Joinery details make a sturdy frame

The joinery for a glass-door frame is standard mortise-and-tenon fare, but there are a few important details to note. Choose straight-grained stock because of its strength and stability. Leave it oversize for several days, and then bring it down to final dimension after it has stabilized. The mortises cut into the stiles and the matching tenons on the ends of the rails are offset from the centerline of the stock thickness. The front cheeks align with the back edge of the small roundover bead that is shaped along the inside edges of the door frame. That bead holds the panes of glass in place. Also, with this design, one other detail stands out: Each of the delicate muntins is made from two separate pieces of wood—a face piece shaped with a small bead that fits over a lattice grid.

Mill and mold the door frame

I make doors slightly oversize and then fit them to their openings. With these doors, the stiles and rails are $\frac{7}{8}$ in. thick by slightly more than $2\frac{1}{8}$ in. wide. On the inside edge of each piece, cut a $\frac{1}{8}$ -in. radius bead (I use

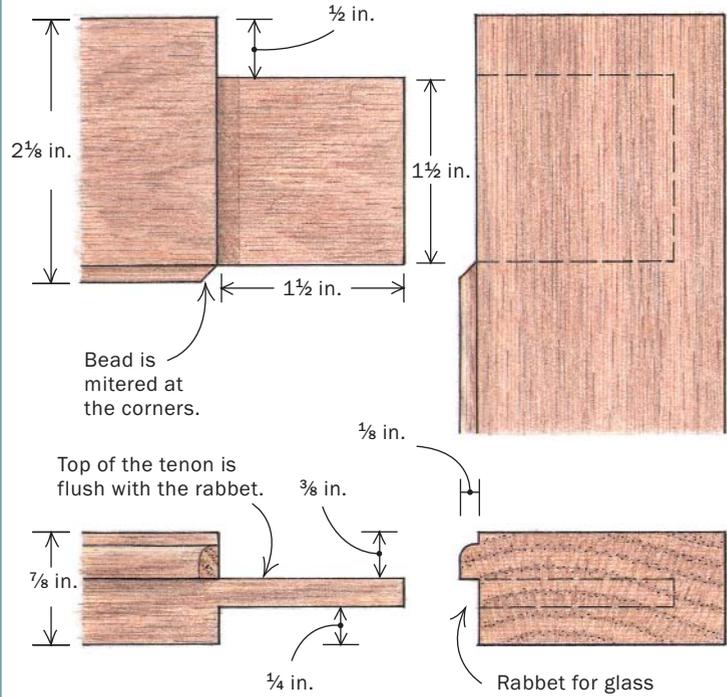
DETAILS FOR ELEGANT GLASS DOORS

This design combines the delicate two-part muntins with strong, traditionally joined frames to make elegant, sturdy doors.

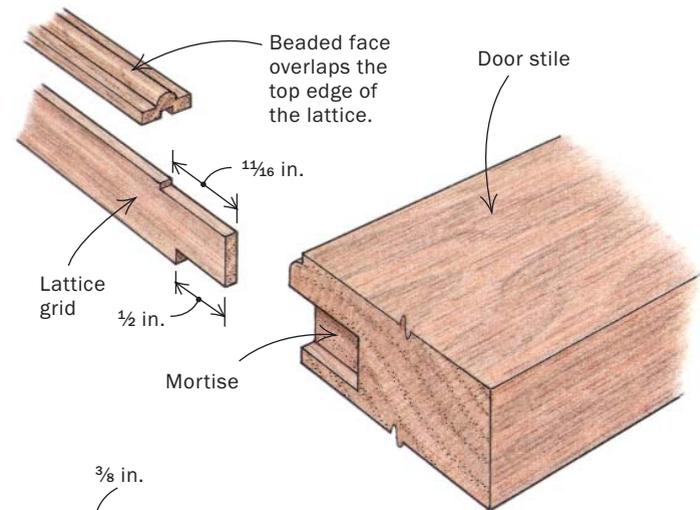
Align the horizontal muntins with the bookshelves behind the doors.



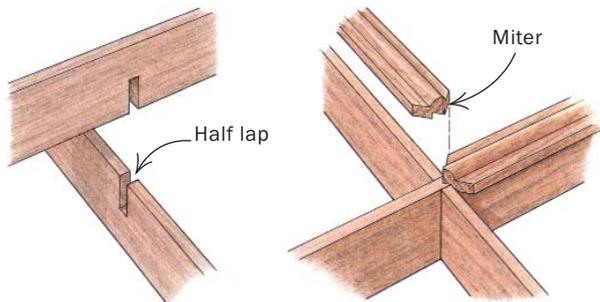
DOOR-FRAME JOINERY



WHERE MUNTINS MEET THE DOOR FRAME

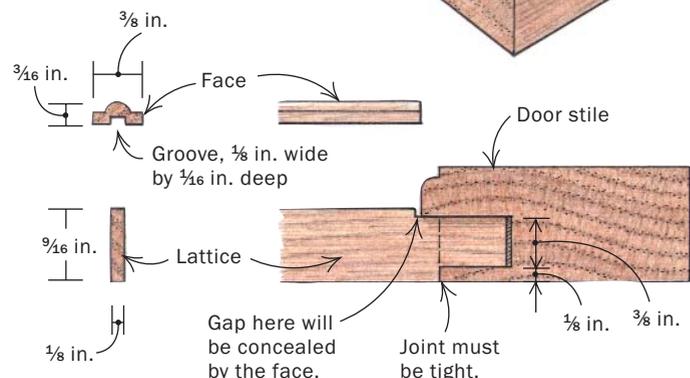


WHERE MUNTINS INTERSECT



The lattice grid, joined with half laps, is glued together as the door is assembled.

Each beaded face is grooved on the underside, custom fitted and glued in place.



SECTION VIEW

SIDE VIEW

CUT SMALL MORTISES FOR LATTICE GRID



Small mortises require machine work and handwork. The 1/8-in. by 3/8-in. by 1/2-in. deep mortises for the lattice grids are drilled out with a brad-point bit in a drill press and cleaned out by hand with chisels.



lengths longer than what you'll need, and always make extras. Start with a piece of stock about 5 in. wide and 3/8 in. thick. Joint an edge, then rout the beaded shape along that edge (I use an Amana #51540 bullnose bit with a 5/64-in. radius to shape the fully half-round bead on the edge faces). Make sure the bead is centered. After shaping the edge, rip it to thickness (mine were just shy of 3/16 in.), using a splitter and a good-size push stick to support the stock as you cut it. Repeat that process—joint, shape, rip—until all of the beaded face blanks are done. Store these muntin faces on a scrap of plywood and tack them down with a string or a rubber band to prevent them from twisting and cupping.

One thing I'd like to stress here is the need for accurately machined pieces. Use a narrow router table with a short fence to accommodate slight deviations in stock thickness or flatness.

Make the lattice grid delicate and strong

The stock thickness of the lattice grid is sized to fit a standard rip-blade kerf—one created by a sawtooth that is square in profile. Rip a shallow groove about 1/8 in. deep in a piece of scrap. This scrap will serve as a test sample for milling the lattice pieces to thickness.

Start with a piece of material about 6 in. wide that is a couple of inches longer than your longest frame member, and plane it down to 5/8 in. thick. This blank will be milled into strips that fit snugly into the groove on the scrap test sample. These strips can be generated a variety of ways. They can be ripped oversize and brought

an Amana #49496 roundover bit), leaving a heavy 1/16-in. step at the front edge. After routing the roundover, calculate the height of the back rabbet and cut it on a shaper or a router table with a fence. The rabbet should be the same depth as the roundover (mine is 1/8 in.). In height, it should leave enough of a bead and flat so that the entire muntin face dies into the flat area and does not have to be coped to the radiused section. To eliminate tearout when cutting the rabbet, make a light pass first and follow that with a full-depth pass.

After the roundover and rabbet have been machined, finish executing the door joinery—mortise-and-tenon with a mitered roundover where the stile and rail join, which some people call a jack miter—and then dry-fit the door.

Mold the bead on the muntin faces

After milling the stiles and rails for the door frame, mill the muntin face pieces to size and shape. At this stage, however, save the task of cutting the grooves in the backs of them until later. Mill the beaded faces in



Cutting tenons on the ends of the lattice-grid stock. Use the tablesaw fence as a stop block and support the thin lattice with a scrap of wood screwed to the miter gauge. Make a first pass to define the shoulder and then drag the stock across the sawblade to cut the tenons.

MILL THE LATTICE GRID



Half-lap joints for the lattice grid. With 3/8-in.-thick stock, you can cut half-lap joints easily. Use a miter gauge to make one pass through each piece.

ASSEMBLE THE DOOR IN STAGES



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Glue-ups can be stressful, especially with so many delicate pieces of wood going together at the same time. Latta recommends breaking down the process into manageable stages.

1. Assemble the lattice grid with a spot of glue at each half-lap joint, and then glue the vertical lattice piece into the top and bottom door rails.

2. Fit the rails and the horizontal lattice pieces into the first stile.

3. Add the second stile and clamp the door assembly together.

to thickness with a wide-belt sander, a drum sander or a thickness planer. Or you can just rip the lattice pieces to thickness on the tablesaw, using a zero-clearance insert, a splitter, and a push stick. Although the resulting sawmarks are not desirable, they won't be seen because the glazing compound that holds the glass in place will cover them. Once you've milled the lattice-grid pieces, bundle them up and set them aside. I keep mine wrapped in plastic to prevent them from twisting out of shape.

Cut mortises for the lattice grid—To lay out the mortises for the lattice grid in the dry-fitted door frame, measure the rabbet-to-rabbet dimension between stiles and rails to get the correct locations. I use a 1/8-in. brad-point bit mounted in the drill press to remove most of the waste, then I clean up the mortises with a chisel. Scoring a line with a knife down the center of the mortise layout helps the small brad-point bit stay on track better along the center of the mortise. Cut the mortises about 1/2 in. deep with one end flush against the back edge of the small roundover bead that is shaped along the inside edges of the door



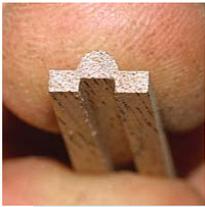
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frames and the other end about 1/8 in. in from the back of the doors. When you've finished cutting all of the mortises for the lattice grid, you can cut the lattice pieces to length and shape the tenons on the ends.

Notch ends to make tenons—When calculating the exact length of the lattice-grid pieces, figure a 7/16-in.-long tenon on each end. This will leave a pocket at the bottom of the mortise for excess glue or debris. You need to cut rabbeted shoulders on both the top and bottom edges to form tenons. The bottom (or back) edge is the most important because it forms a visible door seam where it joins the door frames. The



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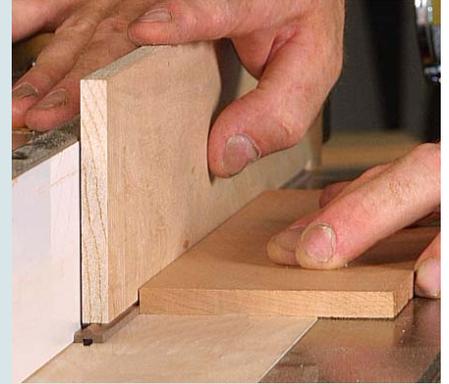


There's no room for slop when shaping and milling these small muntin faces. It's an exacting process.

MILL THE MUNTIN FACES



Joint, rout and rip. Shape the muntin faces two at a time, working from both edges of a board. Joint each edge flat, rout the beaded shape, and then rip off each side on the tablesaw, using a large paddle-style push stick to keep the stock flat on the saw table.



Small pieces require extra care. To mill a $\frac{1}{16}$ -in.-deep groove into the delicate muntin, hold down each piece from above and push it tightly to the fence.

upper (or front) rabbet does not have to fit tightly to the roundover bead because that seam will be covered by the muntin faces.

To cut the shoulders on the lattice-grid members, use a miter gauge with an auxiliary fence for support. You can use the main fence of the tablesaw as an indexed stop for the length of each tenon cut. Set a combination blade about $\frac{1}{8}$ in. high, make a shoulder cut, and then drag the stock across the blade to cut the rest of the tenon shoulder. Once the proper tenon length has been established, cut all of the horizontal lattice pieces, and then repeat the process with the vertical pieces. Reset the fence to

cut the upper rabbet on all of the lattice-grid pieces—horizontal and vertical—so that you end up with a tenon width that matches the width of the mortise.

Half laps stiffen the grid—The lattice-grid pieces must be joined with standard half-lap joints. This is best done on the tablesaw with a rip blade and an L-shaped auxiliary fence mounted to the miter gauge. The fence eliminates tearout and helps locate each notch. Cut a notch halfway through the horizontal frame members in the exact middle of each piece. Hold the vertical members against the stiles and

transfer the locations of the mortises onto those pieces. Cut the notches to fit. The vertical and horizontal members should fit together at 90° . After all of the notching has been completed, dry-fit the door with the lattice grid in place to see whether it all fits.

Glue the door together before fitting the muntin faces

Glue up the door one section at a time. Havoc awaits fools who attempt to do it all at once. Start with the lattice grids, using yellow glue, and then glue the lattice-grid verticals into the top and bottom rails. After that, join each stile, one at a time. Make



Mark and cut each muntin face separately. With a 2-in.-long layout scrap as a marker, Latta uses a plane iron to score each muntin face in place on the door. Then he removes each piece to custom-cut it to length.

FIT THE MUNTIN FACES



Shopmade setup for trimming small miters. A scrap of wood cut with 45° miters on both ends and screwed to a scrap of plywood serves as a guide for mitering the delicate muntin faces. A sharpened plane iron makes the cut.

sure the door is flat and not twisted, using the same type of clamps throughout on a flat, level bench.

Fit the muntin faces one at a time—

Using the rip blade again, cut a groove down the center of the back of each muntin face piece. Because these pieces are so small, use a large push block that will hold the whole piece tightly against the saw table and another scrap of wood that will keep it pushed against the fence. The groove should be a heavy $\frac{1}{16}$ in. deep.

Where muntin faces join, I use a plane iron or a wide chisel as a sort of guillotine to chop the mitered ends cleanly. To make a guillotine, screw a block of wood with a 45°-angle cut on both ends to a small piece of plywood. This block will serve as the guide for the plane iron as you press it against the sides of the block. You'll need a layout piece to mark for all of the miter cuts. Cut a 2-in.-long scrap piece of muntin face stock. Leave one end square and make opposing 45° cuts on the other end.

To begin facing the lattice grid, cut a piece of muntin a little bit longer than the first point of intersection, with one end square. Fit it over the lattice grid, being sure to butt the square end tightly to the top or bottom rail. Coming in from both sides, slide the square end of the layout piece up to the muntin face and transfer a mark with the plane iron. These points in-

dicate where the miters begin. Line up each mark to the edge of the guide block and, with a slicing motion, trim the miters to length with the iron. Check the fit by pressing the muntin face onto the frame and sliding the mitered face of the layout piece up to it. If the fit is good, cut and join each of the two side muntins that intersect that joint, and then continue with the next vertical piece. Work your way down the full grid of the door. As tedious as this process may sound, it actually goes quite quickly, providing your iron is sharp.

Once all of the muntin faces have been fitted, take them off one at a time. Using a small glue syringe, put a light bead on the inside edges of each groove and press them in place over the lattice grid. Do this to all of the muntins, adding a small drop of glue where the pieces butt together. Any excess glue must be removed because it will interfere with installing the glass and cause blotches in the final finish.

Once all of the muntin faces have been glued in place, and before installing the glass, fit the door to its opening and hang it on hinges. After that, sand and finish the doors before glazing them. Glass doors with this delicate gridwork are ageless and speak to a time when attention to detail meant a little more than it often does today. □

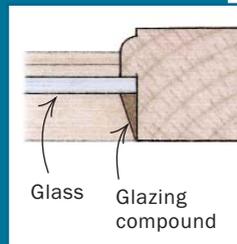
Steve Latta teaches cabinetmaking at Thaddeus Stevens School of Technology in Lancaster, Pa.



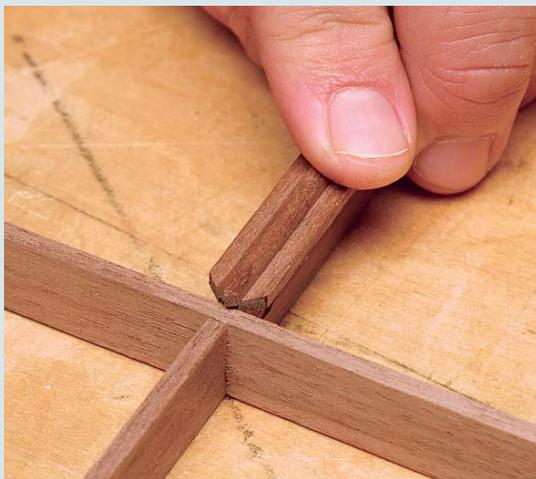
Match the color of the putty to the finished wood

Doing the glazing isn't difficult with a little patience and practice. A talented glazier named John Rush gave me more than a few pointers. Start by tacking each pane in place with a few dabs of clear silicone along each lip. This keeps the glass from rattling as the door is opened and closed, and it works much better than traditional glazing points that would tend to split the thin lattice-grid pieces.

The glazing compound should be colored using universal tinting colors (UTCs) to match the finish on the wood. UTCs are used by painters and are available at most paint stores. Use a



drill with a mixing paddle to blend the colors into a can of regular glazing putty. If the mixture becomes too thin, add a little whiting—also available at paint stores—to thicken it. Mix the glazing a few days ahead of time and set it aside. This allows it to thicken a bit, and as it dries you get a better idea of the final color. You don't need a dead match for the color; you just want it to be close and unobtrusive. To apply the putty, I use a shortened putty knife with one corner ground off, which helps me get neater results when trimming away the excess putty.



Eight miters for each intersection. Four muntin faces join together over each half-lap joint of the lattice grid.



Don't use too much glue. A syringe is ideal for applying glue to the small muntin face pieces. (One source is Lee Valley, 800-871-8158.) Any excess glue should be removed before it dries.