

A Breath of Fresh Air

Making a Victorian screen door

by Alasdair G. B. Wallace

On a trip through southern Ontario, I was impressed by the number of carefully restored and lovingly maintained older homes. Wherever I looked, there were beautiful old doors—some were hand-carved, many swung on wrought-iron hinges, others had leaded lites. But it saddened me to see these original doors hiding behind standard aluminum combination storm-and-screen doors that lacked aesthetic rapport with their surroundings. Southern Ontario does require storm doors and screen doors in the appropriate seasons. Antique doors occasionally show up at country auctions, but they usually command exorbitant prices. Making such a door, however, requires only basic woodworking skills, and will provide you with a good excuse for an indoor project this winter and a welcome breeze next summer as well.

The door detailed in this article is a copy of a well-worn original. It consists of an inner oval frame enhanced by turned spindles, a separate lower decorative screened opening, and a raised panel at the base (photo right). The frame of the door may be joined by dowels (as was the original) or mortised and tenoned. I recommend the latter for its greater strength. You'll require a table saw, basic woodworking hand tools and a lathe. A bandsaw or saber saw will speed some of the work. Some of the cuts and grooves described below can also be made with a radial-arm saw, a shaper or a router.

Materials and hardware—Regardless of the wood you use—oak and pine are popular in Ontario—you'll need boards that dress out to a minimum thickness of $\frac{7}{8}$ in.; 1 in. is preferable. Anything less will result in a flimsy door. Select wood that is dry (9% moisture content or less), straight grained, and quarter-sawn if possible. You'll need about 18 bd. ft. of stock, and about 2 bd. ft. of 4/4 maple for the spindles.

For my door I purchased new hardware from Lee Valley Tools

Ltd. (2680 Queensview Drive, Ottawa, Ont., Canada K2B 8H6). You might also take a look at their catalog of antique hardware. You'll need one 9-in. Chicago door spring with an adjustable tensioning device and a cast-iron screen-door set, which includes a mortise lock, knob, drop handle and strike plates. Make sure it is suitable for doors at least 1 in. thick. Brass sets are also

available. Also get three standard butt hinges. Since I planned on alternating the screen door with a standard storm door as the seasons changed, the hinge leaves for each are identical in size and placement, and align with the leaves on the door frame. I have only to remove the pins to change doors.

For screening, you'll need enough to allow a 2-in. overlap on all sides of the opening. Bronze and copper screening (if you are able to obtain them) are strong, an important consideration if you have children or a pet or are plagued with squirrels. I used black anodized aluminum screening. It is easily installed and becomes almost invisible against the shadows.

Laying out the plans—Don't assume that your door frame is either square or plumb. Measure from corner to corner diagonally. If the diagonals are the same, your frame is true; otherwise you'll have to make allowances in the door. Measure the width and height at several locations, then make your screen door $\frac{1}{4}$ in. shorter and $\frac{1}{8}$ in. narrower than the opening. In calculating the length of your rails, remember that you need to add 3 in. for the $1\frac{1}{2}$ -in. long tenons (drawing, next page).

Making the door—Select the straightest-grained boards for the stiles. Once you have marked out your stock, rip it to the required dimensions and square the edges. I prefer to remove any planer marks with a sharp smoothing plane because it leaves the surface of the wood bright and crisp-looking. If you wish, though, you can sand them out. To avoid possible error later, lightly pencil in the future location of each piece—top rail, left stile—on its outdoor face.

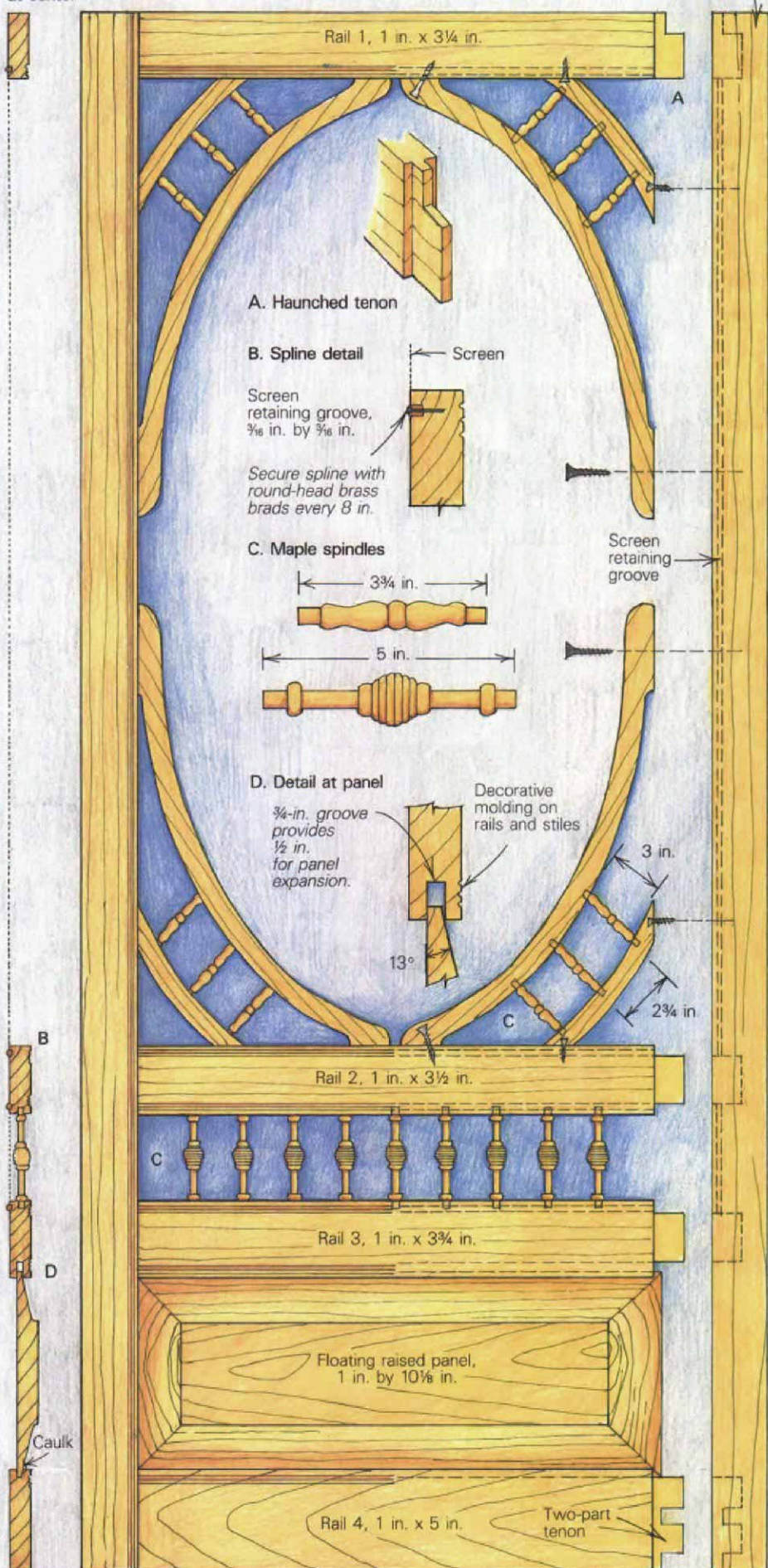
The design of this door includes a decorative molding, which may readily be cut on the rails and stiles with a shaper head such as a Craftsman 9-2352 AM or a Multiplane. I prefer the Stanley 45



Section
at center

Victorian screen door — a reproduction

Stile, 1 in. x 2 3/4 in.



grooving plane, but this old tool is hard to come by. A series of passes over the angled blade of a table-saw will achieve a similar effect, or you could use a router. But to avoid weakening either the mortises or the groove for the panel, run the pattern to a depth of only 1/16 in.

The tenons should be approximately one-third the thickness of, and centered in, the stock. For additional strength, tenons in the top and bottom rails should be haunched (see detail A at left). Because the bottom rail is 5 in. wide, its tenon should be in two parts in order to reduce the possibility of weakening the stile.

Once the tenons have been marked out, they may be cut in the traditional manner with a hacksaw. An alternative method uses the simple tenon-cutting jig described in the sidebar on the facing page.

Mortises can be simply marked out by laying the rails across the stiles in the appropriate location and marking the edge of the stock around the already cut tenons. Mortises may be cut with a router, but you can also chop them out with a mortising chisel. If you use a router, either the edges of the tenons must be rounded over with a rasp to match the rounded corners of the mortise, or the mortise must be chiseled square to match the tenons. Either way, accuracy is essential if you want to avoid having the door twist out of shape.

Run the grooves for the lower panel in the noted locations in rails and stiles. Making these grooves the same thickness as the tenons and centering them on the edge of the stock enables you to run them through to the ends of the stiles, where they serve to locate the haunched part of the tenons. If you're using the dado head on a table saw, be careful not to over-run. Mark the location of the blind end of the groove in pencil on the face of the stiles. Mark the location of the leading edge of the dado cutter on the rip fence, stopping the groove just before the two marks align. Square up the stopped ends with a chisel.

After you have dry-assembled the frame of your door to check dimensions and flatness, mark on the inside face of the door the location of the 3/16-in. by 3/16-in. groove that will house the screen-retaining splines. This groove should be 1/4 in. from the inner edge of rails 1, 2, and 3 and the stiles. Running these grooves the length of the stiles will considerably weaken the door in the area of the mortises and the panel-retaining groove. Instead, I recommend that you match the ends of these grooves with stopped grooves in the stiles. A router is a most convenient tool for this operation.

To make the panel, you'll have to glue up several narrower boards. Make sure you alternate the direction of the annual rings in order to minimize the liability of warping. Rather than shape both faces of the panel, I decided to leave the back flat. This results in the front face protruding beyond the rails and stiles, adding a bolder relief to the bottom part of the door.

Once the panel blank has been dimensioned, the center raised portion can be formed on the table saw. To do this, tilt the blade to an angle of about 13° and run the panel through on edge, using a 6-in. high rip fence to help support the

work. With a sharp carbide-tipped rip blade, you can raise the panels in a single pass. To cut the small vertical shoulders that border on the field, lay the panel face down and use the fence as a guide. Experiment with scrap wood to achieve the effect you want. Clean up the bevels with a rabbet plane and sandpaper block. The finished panel edges should be $\frac{1}{4}$ in. thick.

The width across the grain of a $10\frac{1}{8}$ -in. panel may vary considerably, depending on the species of wood and the ambient humidity. To accommodate this potential movement, run the panel-retaining groove in the bottom of rail 4 to a depth of $\frac{1}{4}$ in., and allow about $\frac{3}{4}$ in. for the groove in rail 3. The panel will be fully seated in the first groove, and the second will accommodate expansion.

Spindles and inserts—I experimented with several shapes and spacings of spindles before deciding on the combination that looked best. I used nine of the smaller spindles and twelve of the longer ones (detail C on the facing page). Mark the locations of the spindles on the bottom of rail 2 and the top of rail 3, and center the holes in the stock unless your frame is less than 1 in. thick. In that case, offset the location of the holes toward the outer face of the door so that they don't run through to the screen-retaining groove on the inner face of these rails.

The inserts that define the oval shape of the door's interior also serve to strengthen the frame. Prepare two full-size patterns for the two different parts of the oval frame insert, and lay out the stock so that the grain runs with the length of the stock. After the stock has been marked, cut out the inserts with a bandsaw or saber saw. On my door, I rounded the inner edges slightly with a $\frac{1}{4}$ -in. cove bit fitted to my router. Use a framing square to make sure the ends are square to each other. The inspiration for this screen door had inserts that were nailed in place, but I prefer to fasten the inserts with 2-in. #9 brass screws, countersunk.

Once the entire door (with the exception of the oval inserts and spindles) has been dry assembled, test-fit it in the door frame. Note and correct any irregularities before beginning the finishing process.

Finishing and assembly—Traditionally, many pine doors were painted, while others were finished with a varnish stain and still others were grained to simulate oak. The door I built was lightly stained to match the existing pine exterior door, then finished with four coats of exterior satin Varathane. I rubbed each coat down with steel wool, using progressively finer grades down to #000.

I learned the hard way on the first door I built that finishing is much easier if it is done before the frame is glued up. This makes it easier to get at all the nooks and crannies of the completed door, and later, when the raised panel shrinks during dry weather, no unfinished margins will appear. Finish the spindles as they rotate on the lathe; then cut them to their final length. Be careful, however, to keep finish away from any portion of the door that will receive glue.

Gluing up will proceed more smoothly and

rapidly if you have a helper to assist in aligning the panel and the lower spindles. Check that the frame is flat and square. If you need to adjust it, a long clamp placed diagonally from corner to corner will enable you to squeeze it slightly into square. (An additional advantage of finishing the parts of the door prior to assembly is that any excess glue can be readily removed from the finished surface.)

Don't glue the panel in place. Instead, leave it to float within the grooves in the surrounding frame. If your door will be exposed to the weather, run a thin bead of clear silicone caulking along the exterior seam between panel and bottom rail to keep water from collecting in the groove. Once the glue has set (remember to use a waterproof plastic-resin glue), the oval inserts and spindles may be installed.

Installing the screens—The next step is cutting enough $\frac{3}{16}$ -in. by $\frac{1}{4}$ -in. pine splines to retain the two separate screens of the door. I gently rounded the top edge and tapered the sides of my splines with a block plane. The taper accommodates the double thickness of screening within the groove, and the pine itself is soft enough to compress slightly in the groove.

You don't need anything fancy to persuade the screening into place. I used a scrap of metal plate and lightly tapped it with a mallet to push the screen into the grooves, long sides first. Enlist your helper to stretch the screening as you urge it into the grooves, checking frequently that it is taut. For a good-looking job, make sure that the weave of the screen aligns with the frame. Cut your splines to length and tap them into position, using a scrap of wood to avoid scarring them. Secure the splines every 8 in. with $\frac{3}{4}$ -in. brass escutcheon pins. Any excess screening along the edges can be removed with a razor knife run along the outer edge of the spline—I trim it flush with the door. Finish the splines to match the door before installing them.

Installing hardware—Test-fit your door and mark the location of hinges and the handle. Then install them and hang the door. On my door, I installed a Chicago door-closing spring with adjustable tension. To eliminate most of the ratchet when the door bangs shut, I slightly recessed three 2-in. lengths of self-adhesive weatherstripping in the door frame.

I'm a slow worker, so this door and another one I made took me quite a while. But the breeze from the verandah through the kitchen area and the open feeling on the back porch make all the work worthwhile. My neighbor stopped me as I was mowing the lawn this morning, asking if I might find time to make a door for him. But I think I'll try designing one for our front door first, in maple, maybe, to match the staircase. □

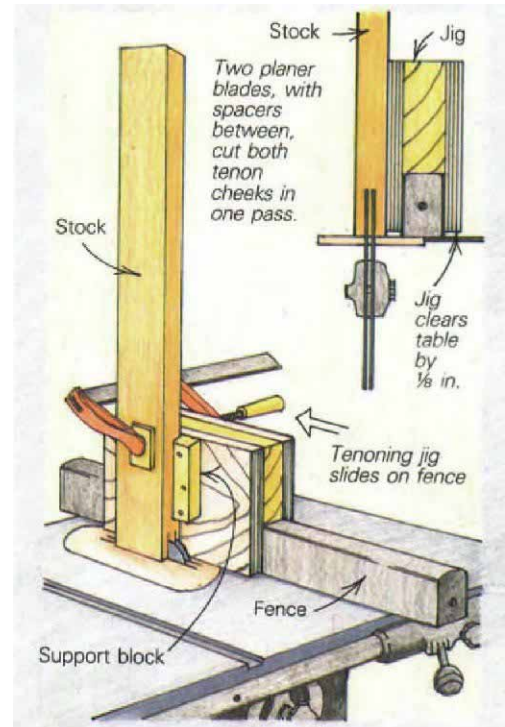
Alasdair G. B. Wallace, of Lakefield, Ont., is a contributing editor of Fine Homebuilding. Photo by the author. For more on this subject, see Amy Zaffarano Rowland's Handcrafted Doors and Windows (Rodale Press Inc., 33 E. Minor St., Emmaus, Pa. 18049, 1982; \$12.95 paperback; \$21.95 hardcover).

A useful tenoning jig

If you have a series of tenons to cut, this tenoning jig is simple, inexpensive and will save you a lot of time—with one pass over your table saw you can cut both cheeks of a tenon (drawing, below). The idea is not mine, but I've been using it for years and am indebted to whoever figured it out.

You'll need two identical blades. I use 9-in. planer blades, running side by side in my 10-in. table saw. I use these blades only for tenoning, and sharpen them together in order to keep their diameters identical. They are separated on the saw's arbor by a metal spacer. A local machine shop made me a set of spacers, $\frac{1}{4}$ in., $\frac{5}{16}$ in., $\frac{3}{8}$ in., and $\frac{1}{2}$ in. wide, and they have saved me endless hours and plenty of frustration. Check your saw's throat-plate clearance before you order your blades. To accommodate the width of the paired blades, I had to make a special table plate out of plywood. For safety, the throat-plate opening should be only slightly larger than needed to clear the blades.

The jig itself consists of a U-shaped wooden device which fits over the rip fence and slides along it. The fit should allow the jig to slide freely but not be so sloppy that



the workpiece wobbles. To minimize binding, you might try waxing the inside of the jig, or the fence. To cut the tenons, install the appropriate spacer between the blades so they will cut the exact thickness of tenon you wish. Raise the blades a distance equal to the length of the tenon, and adjust the fence with its sliding jig in order to center the tenon in the stock. Align the stock against the vertical backing block, clamp it in place, run it through the blades and you have two perfect cuts in one safe, efficient operation.

To remove the waste and cut the shoulders, make up an end-stopping attachment for your saw's miter gauge. Set your miter gauge at exactly 90° to the saw blade, and use a single planer blade to remove the waste. —A. G. B. W.