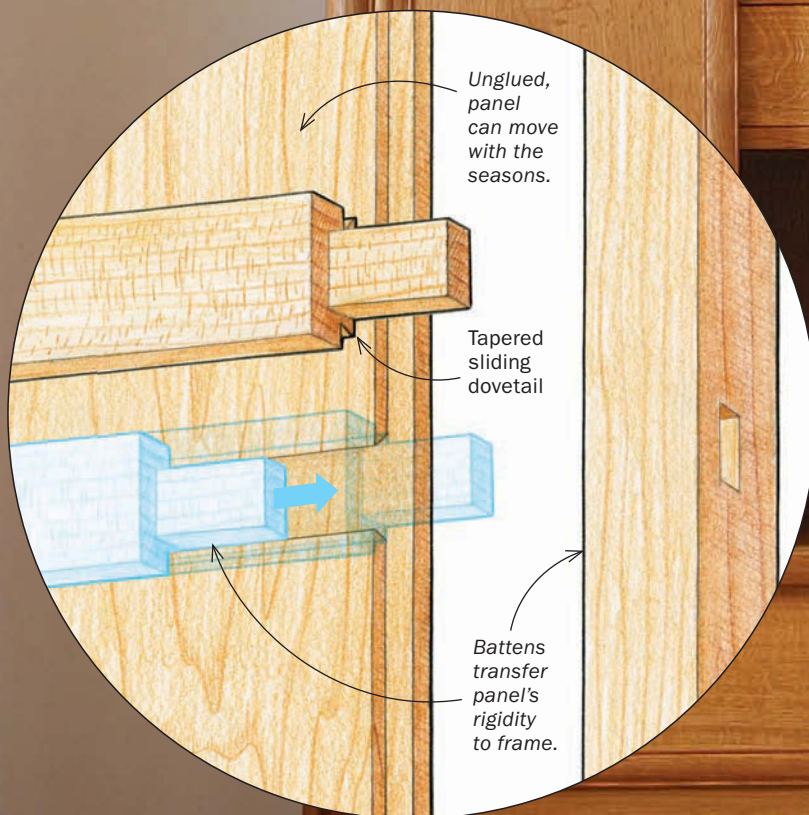


Lighter, Stronger Frame-and-Panels

Dovetailed battens make
even a narrow frame
impervious to racking

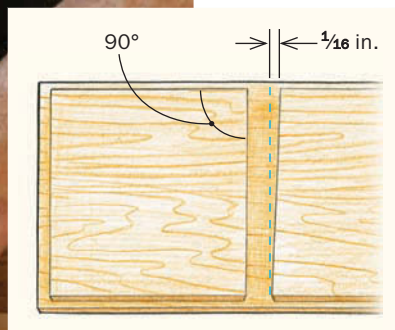
BY ANDREW HUNTER



Battens deliver brawn and beauty. Hunter's cabinet, like traditional Chinese examples, incorporates sliding dovetailed battens in its frame-and-panel doors, making them light, elegant, and amazingly strong. The frame-and-panel sides, top, and bottom of the cabinet are built in the same fashion.

CUT THE SOCKETS

Work on the battens begins after the rails, stiles, and panel are made.



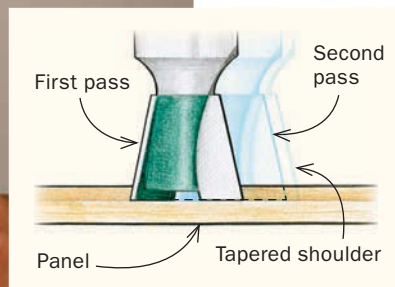
One line is angled. Lay out one shoulder of the dovetail socket parallel to the top of the panel. Draw the second shoulder at a slight angle to produce a taper of $\frac{1}{16}$ in.

The main virtue of a solid plank door is rigidity. It will never sag. Of course, solid-plank doors have serious issues with wood movement and warping, and frame-and-panel construction was invented to solve those problems, cleverly combining the simplicity of a solid panel with the dimensional stability of a rail-and-stile frame. Yet frame-and-panel construction has its own limitations. In a traditional frame-and-panel, the panel is dead weight—left unglued so it can move with the seasons, it simply fills the center of the frame, adding no strength to the structure and relying entirely on the frame joints for strength.

Chinese cabinetmakers figured out a way to harness the power of a floating panel. For many centuries, they've been using a type of frame-and-panel construction that has both the rigidity of a plank and the stability of a frame. They use it for a cabinet's doors, sides, top, and bottom, and also for tabletops and even chairs. Although their panels are typically thin and their frames elegantly slender, the resulting structures are insanely strong, even when assembled without glue. The secret is simple: battens.



Make a setup stick. After using a fence to rout a dovetail socket in a scrap, Hunter records the distance from the fence to the socket (left), then uses that measurement to locate the fence on the panel (right).



Two passes for a tapered socket. Rout one shoulder of the dovetail socket, then angle the fence to cut the tapered shoulder.

TAPER THE BATTEN



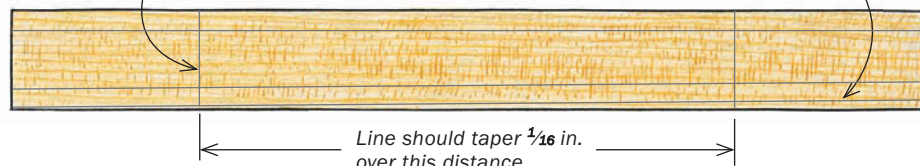
First taper the blank. Transfer the width of the panel blank (above), and draw a $\frac{1}{16}$ -in. taper over that span (right). Then plane the blank to the taper line (bottom).



BATTEN BLANK LAYOUT

Mark panel rabbet shoulders.

Taper blank along this line.



The Chinese frame-and-panel has battens that tie into the panel with sliding dovetails and into the stiles with mortise-and-tenon joints. Thus the panel, while still free to expand and contract, lends its rigidity to the frame, strengthening the whole unit. Are you sitting down? That means the frame can never rack. The stress, instead of being isolated in the corner joints, is now distributed throughout the whole. So even a large door can have a thin, delicate frame and it will not sag over time. Simple, yet genius.

Yes, there is more work to this design, but the structural and aesthetic benefits are huge, and I have a foolproof method for producing the tapered sliding dovetails quickly and precisely.

Frame and panel first

Before worrying about the battens, make the frame: Mill the rails and stiles, cut the corner joints, and run the groove for the panel. Then make the panel, and rabbet its perimeter to create the tongue that will fit into the frame groove. When sizing your frame pieces, keep in mind that they must be thick enough to accommodate both the panel groove and the batten mortises. Exact thickness will depend on whether you intend to dovetail the battens into the rabbeted face



ROUT THE KEY



Create the dovetail key. At the router table, run each side of the blank against the fence to cut the tapered dovetail key (above). To assess the fit, slide the batten into the socket and pull up on each end (right). If one end lifts up and other is tight, adjust the batten's taper (below).



FINE-TUNE THE FIT



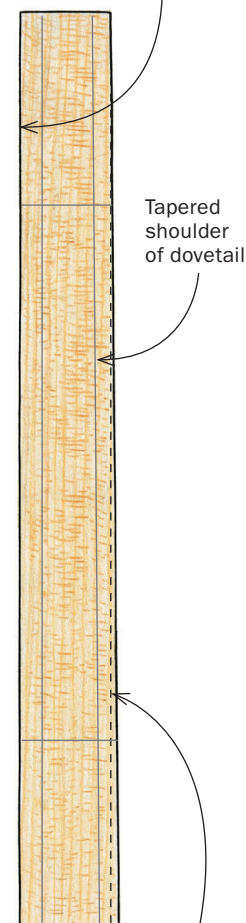
Tweak the taper. Setting your plane for a light cut, take a few shavings off the edge of the batten blank at the end where the fit was tight (left). After adjusting the taper, make another pass on the router table with the tapered edge of the batten blank against the fence.



Rip off the taper. When you're satisfied with the fit of the dovetail, trim off the tapered edge of the batten so the two sides are parallel.

RIP THE BATTEN

Straight edge rides tablesaw's rip fence.



After the dovetail is fitted, rip the tapered edge of the batten so that it is parallel to the opposite edge.

of the panel or the tongued face. Dovetailing into the rabbeted face of the panel will mean you need a slightly thicker frame.

Sockets for the battens

The next step is to lay out and cut the sliding dovetail sockets, orienting them perpendicular to the grain of the panel. For full racking resistance at least two battens are necessary, and for most panels two battens are sufficient. I often place

them so that they divide the panel into equal thirds, which looks good, but I also experiment with different spacing. In Chinese case-work the battens are typically on the inside, but depending on the piece, having the battens visible on the outside can look great too.

Begin by laying out one shoulder of the dovetail socket, drawing a line parallel to the end of the panel. Then lay out the other shoulder, but this time angle your straight-

edge so that the two shoulder lines are $\frac{1}{16}$ in. closer on one side of the panel than on the other. Tapering the socket makes for a tighter joint that's easier to fit.

With the shoulder lines laid out, establish the location of the guide fence for routing. I do a test cut on a scrap piece to determine the precise distance from the fence to the router bit and to dial in the depth of cut. With a $\frac{1}{2}$ -in. dovetail bit, the socket can be cut in two

THE BATTENS GET TENONS



Tenon layout. Start layout by waxing the dovetail keys and driving the battens fully home (above). Mark the location of the panel's rabbet on both ends of the batten (inset).

Split the difference.

Remove the batten from the panel, and use the rabbet marks to center the batten on the rail. Then transfer the shoulder positions of the rails onto the batten (right). Cut the batten tenons (below), leaving the dovetailed face unshouldered.



passes. After the first pass, clean up any fuzz along the edge of the cut with a knife to keep the router riding level. Then reset the fence to make the second cut.

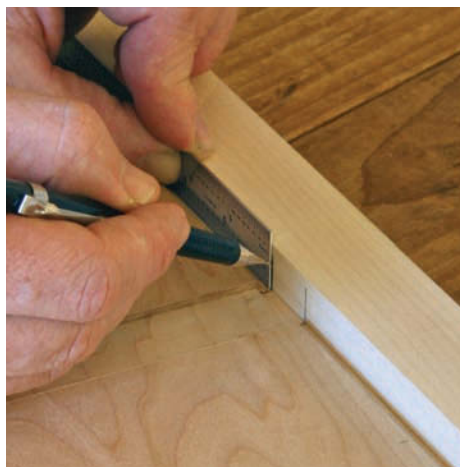
Temporarily tapered battens

To create the tapered dovetail keys, I start by making batten blanks several inches over length and $\frac{1}{2}$ in. over width. The extra length allows me to make adjustments on the way to a perfect fit for the sliding dovetail. The extra width lets me put a temporary taper on one edge of the batten. This tapered edge, when run against the router fence, creates the taper in the dovetail key.

I use a handplane to taper the batten (see drawing, p. 54). Then I cut the dovetail key by running both edges of the batten against the router fence. I sneak up on the fit and adjust the taper of the batten if necessary to achieve the perfect taper of the key. To test the fit, insert the dovetail key and try to lift the batten at either end. If one end is tight and the other is loose, adjust the taper. Take light shavings with a bench plane on the end of the batten that was tight. Run the tapered edge against the



Tenon transfer, step one. With the tenons cut, replace the batten in the panel and mark the location of the tenons on the panel's tongue.



Step two in the transfer. After removing the batten and assembling the frame around the panel, transfer the tenon marks from the panel's tongue to the stiles.



Chop away. Following your layout lines, chop mortises for the batten tenons.

router-table fence again and there will be a slight adjustment to the dovetail. Continue until the taper is right. When you're happy with the fit, rip the extra width from the batten, removing the taper.

Join the batten to the frame

When the sliding dovetail's fit is right, it's time to lay out and cut the batten tenons, and then the mortises for them. Layout is a bit of a trick. With the batten driven home, mark each end at the shoulders of the panel rabbets. Then remove the batten and place it on one of the frame rails. Center the rail between the rabbet marks, and transfer the rail's tenon shoulders onto the batten. Then cut the batten tenons.

To locate the mortises in the stile, first drive the battens into the panel, then mark the width of the tenons on the panel. Remove the battens and assemble the frame and panel without them. Last, transfer the tenon marks from the panel onto the stile, and lay out the batten mortises. Cut the mortises, either stopped or through, and you're finished. You have a frame-and-panel strong enough to endure whatever comes its way. □

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Strong assembly. Hunter typically builds his batted frames with through-tenons and leaves the frames unglued.

