Bold Joinery for Casework

Make your cabinets stand out with clean, attractive through-tenons

BY BRIAN HUBEL

Luse exposed joinery to call attention to the effort, accuracy, and care that goes into furniture making. But it's also a form of expression and an opportunity for design.

For boxes and cases, dovetails certainly fill the bill for some woodworkers. But I prefer to use multiple throughtenons at the corners, which provide a more modern look and feel. For decorative effect, and also to close any small gaps, I often insert thin splines into the ends of the tenons.

This joinery is robust and attractive, but it can be unforgiving. Mistakes are not easily concealed. To do it accurately and fast, I came up with two simple router jigs, one for the mortises and another for the tenons.

Router jig guides the mortising

One of the great things about this technique is that you have to lay out the mortises only once, on one of the case panels. The number and layout of mortises is mostly personal preference, but to prevent cup or twist, they should start ¹/₂ in. to ³/₄ in. from the front and



Elegant and versatile. A row of through-tenons looks handsome on the corners of a case and, unlike dovetails, also works for overhanging tops and interior partitions.



Top left photo, this page: John Tetreault

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JIG CUTS BOTH THE DADO AND THE THROUGH-MORTISES

The jig guides a ⁵/₈-in.-dia. bushing and a ³/₈-in. router bit along a straight path. A series of spacers drop into the long slot to limit the travel for the long dado and the individual mortises. The spacers are simply pieces left over from building the jig. When cutting them to length, be sure to factor in the bushing offset, and label them all to avoid confusion.



MORTISE JIG COMES FIRST

Form the long slot by gluing pieces together, rather than attempting to rout it accurately. That makes it easy to drop in snug-fitting spacers.



Match the spacers to the bushing. Saw or plane long spacer strips to the same thickness as the bushing. You want the bushing to slide freely in the slot without slop.



Simple glue-up. Glue in the end strips, feeling with your fingers to be sure the pieces are aligned. After the glue dries, scrape and sand off the squeeze-out.



Add a fence. Mark a line on the underside of the jig to indicate the end of the panel. Tack down a fence along that line.

Drawings: Dan Thornton

Mortises

START WITH A SHALLOW DADO

Use an upcutting spiral bit and dust collection to keep dust from packing the slots. The dark stain on the jig is wax for easy routing action.



ADD SPACERS FOR ANY ARRAY

Cut individual spacers from the same long strips you made earlier, and they will press snugly into place in the template slot. Factor in the offset at the ends of the mortises when cutting the spacers to length.

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Spacers for shallow dado



Long dado first. Pop in the pair of end spacers (above), set the depth, and rout the dado in one pass (right). Dust collection is a must to clear chips that could get compacted and interfere with the router's travel.

back edges of the panels. Also, keep in mind that several smaller mortises and tenons will be stronger than one or two oversize ones because of the increased glue surface.

To cut the mortises I use a jig that works with a ⁵/₈-in.-dia. guide bushing and a ³/₈-in.-dia. spiral upcutting bit (see drawing, p. 45), though other combinations would work. The jig has a long guide slot that lets me rout not only the shallow dado but also the individual mortises. I use small, tight-fitting spacers that drop into the slot to limit each cut.

Carefully mark the center of the slot both horizontally and vertically. You'll use those marks to align the jig on the first workpiece, which also should have the layout marks on it. Mark a line on the underside of the jig where the panel ends. Then attach a fence along that line.

After cutting the spacers to length, you can lay out the first workpiece and start mortising. Mark a centerline on the workpiece, and align the jig's centerline with that, while pulling the end of the panel flush against the fence. Clamp down the jig in that position. With the dado spacers in place, first rout the long dado. Then use a combination of the other spacers to rout the through-mortises. I square up the ends of the mortises later during the fitting process.

Rout the tenon using a jig

Cutting a row of multiple through-tenons to match a row of mortises is usually very tricky, but my tenon jig delivers



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THEN TACKLE THE THROUGH-MORTISES



Now the mortises. Pop in the various spacers needed (above) to rout each through-mortise, taking a series of shallow passes (right). Place a backer board underneath the workpiece to prevent blowout.





a great fit with no fussing. First you use the jig with a bearingguided router bit to form the tenons, making them a bit wider than the existing mortises. You use it again later to mark the ends of those mortises, so you can chop them to the same width as the tenons for a perfect fit.

To lay out the tenon jig, start by turning over one of the mortised panels so that you are looking at the outside face, and mark tenon lines just outside the mortises. Move a combination square from side to side to make the tenon layout symmetrical. That way you never have to worry about which way you attach the jig to the workpiece. Now transfer those same combo-square settings to the jig.

Draw the full tenon layout on the jig, including the shoulders and the shallow stub tenon that will fit the ends of the dado. I leave the stub tenon a little short so that it won't stop the joint from closing, but I add about $\frac{1}{32}$ in. to the tenons so they will protrude slightly and can be trimmed flush. To cut out the jig, I use a dado set on the tablesaw with a miter gauge and stop block.

With the template complete, use it to trace the tenons, then cut out most of the waste with a bandsaw. Next, place the jig under the panel, clamp both to the benchtop, and use a ¹/₄-in. spiral flush-trimming bit to chase the jig, forming perfect tenons with just a few small rounded inside corners to clean up later.

With the tenons shaped, I go back to the dado setup on the tablesaw, running the tenoned panels on their sides to cut rabbets that form the tenons' shoulders and define their thickness. Don't forget to account for any offset joinery.

I usually get the tenon thickness very close to fitting right off the tablesaw, and then fine-tune it with a shoulder plane. After the rabbet work is done, I square up the inside corners of the tenons with a chisel.

Tenon jig dials in the mortises, too

The thickness of the tenons should be dead-on at this point, with the tenons a bit wider than the mortises. This is where the tenon jig appears again, guiding you as you square and widen the mortises for a perfect fit.

Orient the mortised panel so that the show face is up, and erase the lines you drew before. Position the tenon jig on the panel with its edges aligned flush. Use a sharp pencil to trace the edges of

Tenons

MAKE THE TENON JIG

This ¼-in.-thick MDF jig, cut to the width of the workpiece, guides a router to form the tenons. It also serves as a guide to fit the tenons.

Mark the tenons. Make the tenons on the jig just wider than the actual mortises. Flip the square from side to side to make the array symmetrical. When marking the tenon shoulders, don't forget the little haunches where the stub tenon ends.





Cut out the template. Use a dado set, supporting the workpiece with a miter gauge. Use a backer board to control blowout, and a stop to ensure the tenons are symmetrical from side to side. Leave your pencil lines to be sure the tenons end up wider than the mortises.

the template tenons. These are the lines you'll be working to as you square each mortise.

You can square the mortises with bench chisels, but I do it with a $\frac{3}{6}$ -in. hollow chisel that I dedicated to the job. It chops a square end in one step. Try to keep the chisel at 90°, though a slight undercut is OK. And when you pull the chisel out of the mortise, be careful not to pull up fibers at the edges.

After chopping, I do a partial dry-fit to see how close the fit is. The goal is a joint that comes together squarely and tightly with almost no gaps, requiring only light taps with a dead-blow mallet. Typically I need to shave only a slight amount of material from the tenons using a chisel or a file.

Splines polish off the look

After a successful dry-fit, the last step before assembly is getting ready to wedge the joints. I use a handsaw to cut kerfs in the ends of the tenons. While too much wedging pressure will split

TENONING GOES QUICKLY



Trace the outline and saw the waste. Position the template carefully and run a sharp pencil around it. Then use a jigsaw or bandsaw to remove most of the waste.





Pattern bit takes over. Clamp the template in place and let a pattern bit form the tenons perfectly, leaving only small curves in the corners (above).

Dado the

shoulders. Use the dado set again to form the cheeks and shoulders of the tenons, starting on the outside of the joint. Use the rip fence as a depth stop. Last, use a chisel to square the rounded areas left by routing.

JIG HELPS WITH THE MORTISES, TOO

As you square the ends, widen the mortises to fit the tenons.

Mark new lines. Use the template to mark new lines on the outside faces of the mortised panels. They should fall just outside the mortises.



Square the mortises. Hubel dedicates a ³/s-in. chisel from his mortising machine to this job.



the panel, I sometimes leave the splines a little bit fatter than the sawkerf to push out the ends of the tenons and close gaps. In those cases, I cut the spline kerfs down to the tenon shoulder if necessary. Otherwise, ¼ in. is deep enough. There are a variety of ways to make small splines, but be sure to form a small chamfer on the leading edges to make them easier to drive in.

When possible I assemble one corner of the case (or intersection with an interior partition) at a time. I use notched cauls to work around the slightly protruding tenons. I use the cauls to pull the joinery tight, remove them to drive in the splines, and then quickly clamp the cauls back in place.

Once things have time to dry, I clean up any squeeze-out, plane the protruding tenons flush, and finish up with sanding. The look of the clean, polished tenons always makes me feel good.

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FAUX WEDGES FINISH THE JOB

After a full dry-fit and any tenon adjustments, Hubel usually adds thin splines for decorative effect. They can also fill small gaps, but too much wedging action is dangerous at the end of a panel.



Saw kerfs. If no wedging action is needed, Hubel only goes about ¹/₄ in. deep. To fill small gaps, Hubel saws almost to the shoulder and uses slightly thicker splines.



Assemble and wedge. Hubel puts glue in the mortises and dado, draws the joint together, and then removes the clamps temporarily to drive in small, flat splines.

Plane and sand. A block plane and sandpaper bring the tenons and splines flush for a modern yet timeless look.



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