

Just Plain Drawers

Router jig makes them quick

by John Lively



Router dovetails are ideal for built-in drawers like these in a floor-to-ceiling storage center. Sturdy, durable dovetail joints you can cut without any fuss are a great improvement over the nailed rabbet joints usually found in these situations.

The built-ins and utility furniture I make usually call for lots of drawers. I could spend a couple of days hand-cutting the dovetails for a big case-work project. Or, going to the opposite extreme, I could rabbet and nail the drawers together and be done in a couple of hours. But what I really want is the strength and durability of dovetails, without spending the time it takes to do them by hand. That is why I cut the drawer joints for projects like the ones shown here with a router and dovetail fixture.

Router dovetails

I use an inexpensive router fixture I bought from Sears 20 years ago. It cuts only half-blind dovetails (meaning they're visible from one side only). Sears and most of the woodworking tool catalogs offer a similar fixture now for less than \$100. I've thought about buying more expensive and more versatile fixtures that cut through dovetails, as well as half-blinds, and which promise the variable spacing of hand-cut work. But then I might as well cut them by hand if that's the look I'm after.

Hand-cut dovetails consist of pins, which are typically cut on drawer fronts and backs, and tails, which are cut on drawer sides, as shown below. Router dovetails, however, get pins on the drawer sides and sockets on the fronts and backs. With hand-cut dovetails, you can tailor the joint to suit the dimensions of the piece. With router dovetails, you can't.

One thing that makes router dovetails fast is that you don't have to lay them out. The fixture clamps two boards at 90° to each other (drawer front or back on top,

side hanging clown). On top of both boards goes a finger template that controls the router and dovetail bit by means of a template-following guide bushing. The thickness of the drawer stock can vary from a little less than one-half inch to more than one inch. Width can vary too, from about three inches to 12 inches. But regardless of the width and thickness, the size and geometry of the pins and sockets stay the same.

That means you have to size your drawers to the geometry of this cookie-cutter joint. You want to end up either with a whole pin at the top of the joint or a half-pin. Anything less than a half-pin looks awkward and is liable to splinter away.

Two adjustments control the fit of the joint. The router's vertical depth of cut determines whether the joint is too loose, too tight or just right. The in/out positioning of the finger template controls the lateral travel of the router and thereby determines the depth of the sockets. If the sockets are too deep, the drawer sides will be recessed below the ends of the front and back; if the sockets are too shallow, the drawer sides will stand proud.

Once the fixture and router are set up and adjusted, you can cut both parts of the joint at once. When you get used to the routine, clamping up the stock, routing and unclamping take only a couple of minutes. Doing the joints for an entire drawer takes less than ten minutes.

This method lets me complete and fit six drawers, pretty much regardless of size, in about as many hours, starting from uncut (but thicknessed) stock. What about the time it takes to set up the router and fine-tune the cut? You can eliminate that

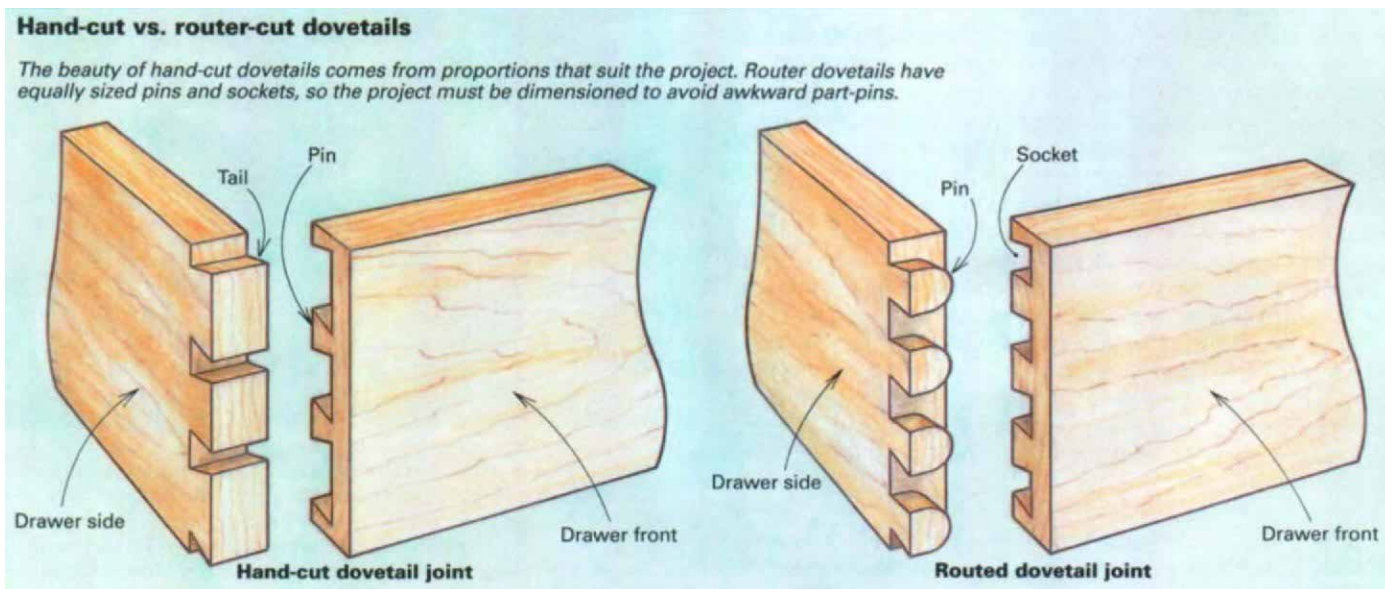


Workmanlike utility furnishings, like the author's little cabinet for storing nails and screws, make the shop efficient and pleasant. Rabbeted corners, screwed and plugged, join the pine case, which measures 17 in. by 24 in. by 10½ in. deep.

completely, as explained in the sidebar on the following page.

Buy unwarped stock

For the drawer sides and backs of utility projects, I buy 8-ft. planks of 1x12 #2 pine from the local lumberyard. Lauan and poplar are also good choices, although better suited to more upscale projects. Find a yard that will let you pick through the stock. Prepare to spend some time eye-



balling the planks. Everybody wants to buy boards as knot-free as #2 grading will allow. But in selecting drawer stock, wood clarity is less desirable than flatness. You want pieces free of twist and cup, though a slight bow or crook is tolerable. Reject those twisted and cupped boards because you'll pay the devil later if you don't. Twisted boards make twisted drawers that will never fit right, and cupped stock requires a lot of fussy clamping during glue-up.

So what I do first is select the flat stuff and then go through it for clarity. I avoid boards with a lot of large knots or with any loose knots. And when I plan to make the fronts out of pine, I make sure the boards have enough clear cuttings in them.

Rip first, then crosscut

Pine 1x12s are about 11 inches wide and three-fourths inch thick, and unless your

drawers are really deep and wide, you can get several drawers out of a single board. Start by jointing one edge of the eight-footer, and then rip to width, larger drawers first. Avoid the temptation to rip slightly undersized to eliminate trimming to fit later. Every time I have done this, I've been sorry. Shoot for parts that fit snugly in their openings.

Another reason for ripping first is that long offcuts are good for moldings, battens, cleats, face frames, story poles and tomato stakes. Long scrap is always more useful than short scrap.

While drawers for a single project may vary in depth, most likely they will all be uniform in plan. This means you can set a saw stop and crosscut all the fronts and backs in one session, all the sides in another. Use a clean-cutting crosscut blade here because rough endgrain won't glue

well and because ragged edges will show up in the joints and on the faces of the pins. One more thing: you don't want knots in the joints, so be sure to crosscut so all knots are two inches or more away from the ends.

Now stack the drawer parts in discrete piles. From this point on, each drawer is a family of four members, and shuffling them around will introduce error.

Which piece goes where

Begin by clamping the fixture to your bench. Take a stack of drawer parts and mark their outside faces. Draw lines about where you'll plow the grooves for the drawer bottom. On the bench immediately behind the fixture, stand the members on their bottom edges and position them just as they'll be in the finished drawer, with the front facing you. Now push the

Ditzy setup: what the manual won't tell you

The owner's manual for your dovetail fixture will cover the details of setting up, but there are some important points that it probably won't mention.

The precise depth of cut, which determines joint tightness, seldom is exactly what the manual calls for. My Sears manual says to set the cutting depth to exactly $1\frac{7}{32}$ in., a measurement that requires a machinist's combination square and a thick magnifying lens for people over 40. But setting my carbide dovetail bit by this rule produces too loose a joint. A slightly deeper cut tightens the joint. The owner's manual will get you in the ballpark, but you'll have to discover the setting that's right for your bit, router and template (see the photo at right).

Another thing the owner's manual won't explain is what's too tight a joint and what's too loose. What I've learned is that glue takes up space, and a joint that I have to tap together dry, I'll have to bang together during glue-up. You should be able to push the dry joint together by hand without recourse to your mallet.

The manual describes how to control socket depth, but it probably won't discuss the correct depth. If you've cut your drawer fronts to fit snugly in their openings, then you want the pins on the drawer sides to lie about $\frac{1}{4}$ in. below the tops of their sockets. This condition lets you belt-sand the endgrain edges of the front and back flush with the sides and provides just enough clearance between the sides of the drawer and the opening. If you do this right, the side-to-side fit should require no further fiddling.

No manual will admit that setting up and adjusting both router and fixture is tedious and time-wasting. It can take a half-hour to go through the steps: install the guide bushing in your router, chuck and adjust the bit, make a trial cut, fine-tune the depth of cut, try again. At last you've got it. But next time, you'll have to go through the whole ditzy routine again.

About six years ago, I got fed up with setting up, so I went out and bought myself a new plunge router. This meant I could dedicate my old Sears router to dovetails, and since then, I haven't had to remove the bushing or adjust the bit.

—J.L.



Bit setting determines joint tightness. Owner's manuals typically specify a depth-of-cut setting, which determines how the joint fits. The deeper the cut, the tighter the joint. But finding that just-right setting for your router and template is really a matter of tedious trial and error. A carbide-tipped bit is best for dovetailing because you cut to full depth in a single pass, which calls for cutting edges that stay sharp.

sides over flat, as shown in the top photo below. The lines representing the grooves will keep you oriented when you clamp the pieces into the fixture. You'll need the help because they go into the fixture inside out and backward, and it's easy to get confused.

I begin at the front right-hand corner of the drawer, which means that I clamp it on the right side of the fixture with its bottom edges facing right. Temporarily clamp up the drawer side, so its end protrudes about half its thickness above the baseplate of the fixture. Now slide the drawer front under the clamp bar, and butt its end against the protruding drawer side. At the same time, shove the front into contact with the fixture's registration pin.

When the joint end of the drawer front butts hard against the side and its bottom edge hard against the registration pin,

tighten the clamp bar. A little pressure here goes a long way. Now put the finger template in position, and tighten its locking knobs. Next, back off on the vertical clamp bar, and raise the drawer side up flush against the finger template. To keep the template from flexing upward, hold it down firmly with one hand while you butt the drawer side into it with the other. Once the board is in position, hold it there with your thumb, and tighten the clamp bar, as shown in the bottom left photo.

Give everything a final check to make sure you've properly positioned the pieces. The drawer front should be on top, the drawer side should hang down vertically. The inside faces of the front and side should face out with the groove lines to the outside. Both pieces must be indexed tight against the registration pins. Be sure about this because imprecise registration

will make a joint that doesn't fit. If you mix up the pieces, you'll cut the pins on the wrong board, which means wasting wood and wasting time.

Driving the router

The actual routing is surprisingly quick. Hold the router firmly down against the finger template while cutting, and never lift it upward. If you do, the bit will cut through wood you don't want to waste, and possibly through the template as well. Always exit the cut by pulling the router out horizontally.

Begin routing by making a light right-to-left pass down the front of the drawer side. If you take too deep a bite when cutting right to left (climb cutting), the router will self-feed right into the fixture, so go easy. This initial cut keeps the bit from tearing out the wood at the base of the joint.

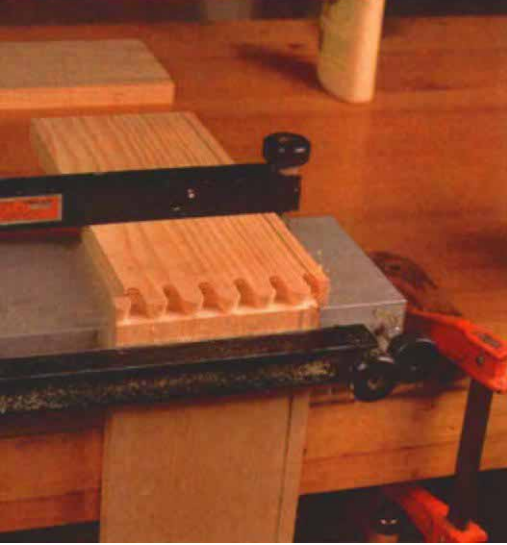


Carefully arrange the parts of each drawer to keep track of the pieces. Stand them up drawer-wise behind the dovetail jig, then push them over flat so their bottom, inside edges, marked with pencil for grooving, face one another.

Position the parts in the jig. Clamp up the front right corner of the drawer. Insides of the pieces face out, the drawer front goes on top, and the side goes vertical. Both pieces index hard against the jig's registration pins, one of which is visible by the author's right thumb. The black plastic comb is the template that guides the router.

Steer the router in and out of the template slots by pressing its guide bushing against the phenolic plastic. Make a light climb cut from right to left, then return left to right at full depth. The router always exits horizontally (an upward exit would chew into the template).



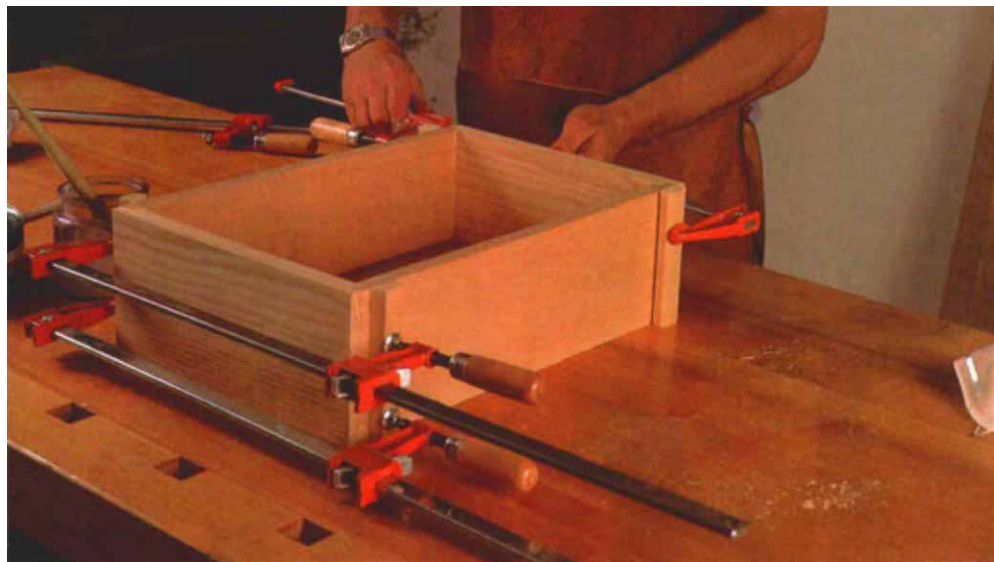


The completed joint, still in the jig, shows how pins (on vertical board) will interlock with sockets (on horizontal board). Routing four joints takes less than ten minutes.



Use a stiff brush to work glue down into the pins. Don't apply glue in the sockets because it can pool up and keep the joint from closing.

Glue-up. Blocks set just behind the joint allow the clamps to pull the pins lightly into their sockets. The drawer bottom goes in during assembly, not after.



Now you're at the left side of the joint. Follow the finger template in and out, moving the router from left to right. As you round the template fingers, twist the router slightly counterclockwise, as shown in the bottom right photo on p. 61. This helps you negotiate these hairpin curves smoothly and quickly. Because you're cutting to full depth in a single pass, don't force the router. Listen to the bit's whine, and if its bright voice begins to dull, slow down. But don't go so slowly that you burn the stock and glaze or overheat the bit. A carbide-tipped dovetail bit will put less stress on you and your router.

After cutting the joints for the front right corner, go to the front left, then to the left rear and, finally, to the right rear, moving around the drawer in a clockwise manner. The drawer front or back always goes horizontal on top of the fixture; the side always goes vertical. Before moving on to the next drawer, mark conjoining parts with a number, so the joints that were cut together will be assembled together.

Grooves for drawer bottoms

For drawer bottoms, I use 5mm lauan plywood captured in grooves on all four sides. Rather than use a dado set to cut a 1/4-in. groove, too wide for standard plywood, I make two passes on the tablesaw to make a groove that leaves but a little play.

Set the rip fence so that the first pass cuts just to the inside of the bottom socket on the drawer back and the blade depth to cut clear of the bottom of the socket. Now saw the first groove on all the drawer members, making sure to register the bottom edge of each against the fence. Your pencil line helps here. Move the fence and make the second series of cuts. One nice

thing about router dovetails is that you don't have to stop any grooves in the drawer fronts or backs because the groove enters in and exits from a socket, which gets filled with a pin.

Dry-assemble one drawer to measure the length and width of the drawer bottoms. Cut the plywood about 1/16 inch shy of the full dimension to ensure that your joints will close completely on the first try.

Assembly and glue-up

The fastest way to get good glue coverage is to paint the pins with a stiff bristle brush. While you're clamping up one drawer, keep the brush soaking in a jar of water, and wipe it dry when you're ready to glue up the next one. Squirt a couple of tablespoons of yellow glue into a shallow container—I use a plastic coffee-can lid—so you can dip your brush often. Thoroughly coat the pins on both ends of one drawer side (see the center photo). Now slip the drawer front and back onto the pins, and lightly tap the joint together. Slide the bottom into the grooves, apply glue to the pins on the other drawer side and tap it into the sockets.

Squeeze the whole thing together with bar clamps and blocks. Position the blocks at the baseline of the pins, so the clamping pressure will pull the sides until the pins bottom out in their sockets, as shown in the bottom photo.

Fitting the drawers

If you've cut the drawer members to fit tightly, the assembled drawer won't slide freely in its opening and might not even enter. To trim it for an easy fit, beltsand the endgrain edges of the front and back flush with the sides. Test fit the drawer. If it still won't go into the opening, most likely the sides are a bit too wide, so handplane a little off the top and bottom edges all around until the drawer runs in and out without binding. Chamfer all the inside and outside edges (block plane or router), and wax the edges top and bottom, along with the back outside corners.

There's a sweet place in fitting a drawer. If you don't trim it down enough, it will fit too tightly and bind. The same thing will happen if you remove too much wood because the drawer will cock in its opening and bind. And, to make a bad matter worse, too much air around a drawer's edges looks sloppy. But if you trim off just the right amount, the drawer will whisper in and out. □

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