Woodsmith PLANS

TABLE SAW DOVETAIL JIG

best-built jigs & fixtures

table saw Dovetail Jig

Cutting through dovetails on the table saw might seem a little out of the ordinary. But with this jig, you can get perfect-fitting joints every time without a lot of effort. The article starting on page 3 walks you through the process.

The Jig. As you can see, the jig is made of ¾" plywood. Since you'll be cutting through the base of the jig, a cross bar at the front helps keep it together and stable.

To cut both the tails and the angled pins of the dovetail joint, the fence can be indexed. It pivots at one end and locks in place at the other to set the proper angle. The face of the fence has a T-track for holding a stop block and spacers for cutting the pins and tails.

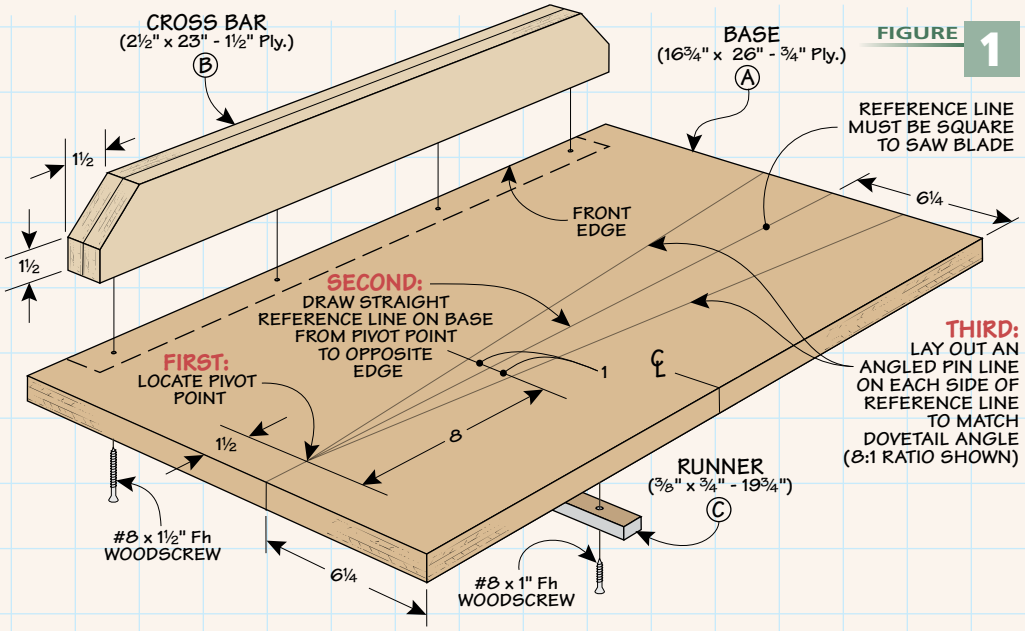
Start with the Base. The jig isn't very complicated to build. It starts with a plywood base (Figure 1). After cutting it to size, I first marked out the centerline that will align with the blade.

The next thing to do is draw several lines you'll use later to install and locate the fence. Figure 1 shows you how to do this. Note: The lines shown are for cutting dovetails with an 8:1 ratio.

Cross Bar & Runner. Next, I added the cross bar at the front. And then to fit the jig to the saw, you can add the runner. I used a strip of phenolic I had lying around, but a hardwood strip or manufactured miter bar would work just as well.

To locate the runner, position the jig so the blade is aligned with the centerline of the base. Then mark the location of the miter slot to attach a runner. Be sure to keep the base square to the saw blade.

FIGURE 1



Fence. You can now turn your attention to building the fence. The first thing you'll need to do is cut a wide but shallow, centered dado that holds a replaceable insert, as in Figures 2 and 2b. The insert backs up the cut to prevent chipout. I used my custom-ground dovetail blade to cut the beveled sides of the dado and remove the waste. Then, cut the ¾"-wide groove for the T-track and ease the top, outside corners of the fence face.

Once that's complete, you can make the fence base. To secure the fence to the jig, you'll need to drill a hole at each end (Figure 3). Go ahead and extend the centerline to the end of the base, as you can see in the lower right photo. This helps align the fence for drilling the indexing holes in the base.

To keep the fence face square to the fence base, I added a set of braces. After trimming them to size, cut dadoes in the two middle braces to hold a blade cover. Finally, screw the fence face, base, and braces together, and then slip the blade cover in place.

Fence Installation. To install the fence, drill a counterbored hole at the pivot point on the bottom, as in Figure 3a. Then, secure the fence in place with a carriage bolt, washer, and lock nut. At the opposite end, align the centerline on the base with one of the layout lines on the base of the jig. After clamping the fence to the jig, drill through the base, using the hole in the fence as a guide. Simply repeat the process for the other two holes.

Finally, you can make the stop block and fence indexing knob (Figures 2 and 3). For more on using the jig, turn to the next page.

FIGURE 2

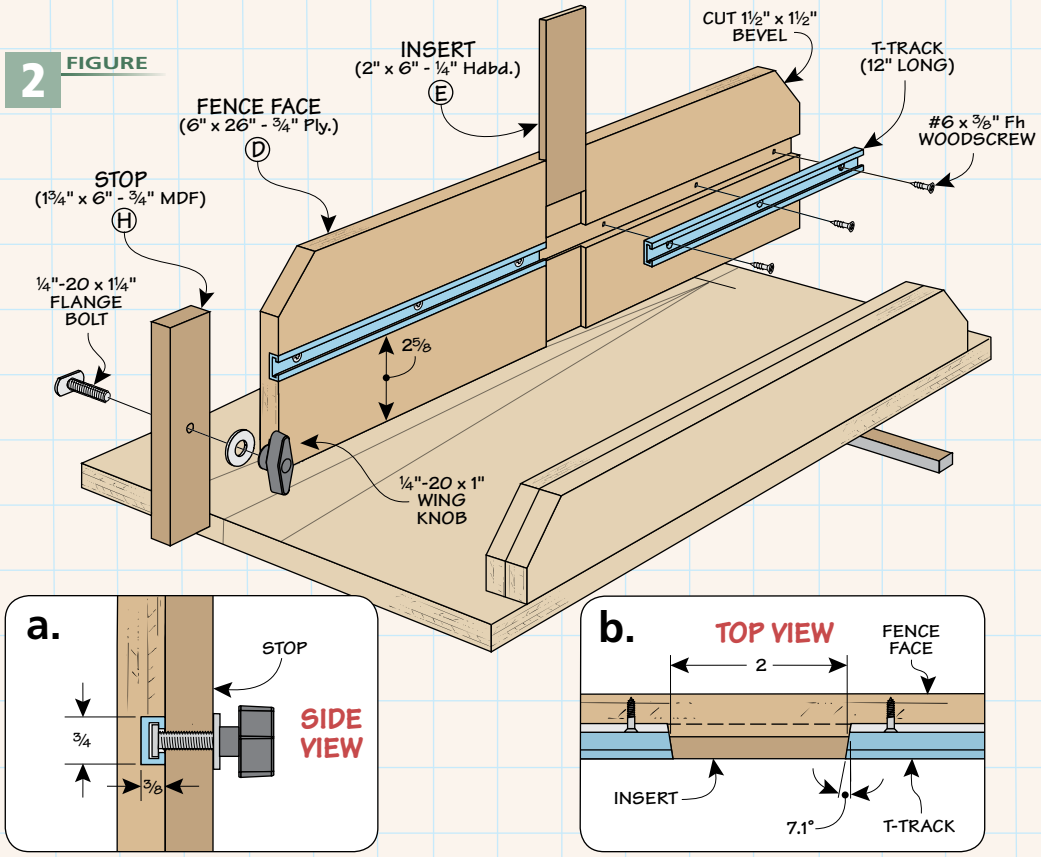
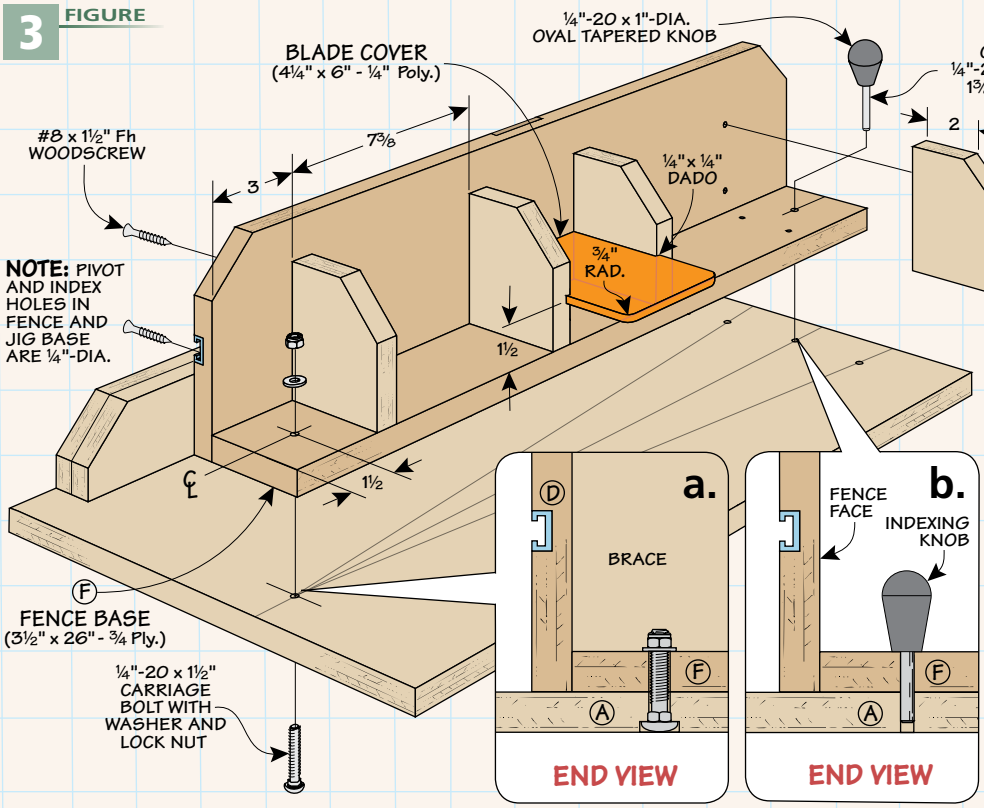


FIGURE 3



▼ ***Index Holes.*** *Use the layout lines to position and drill the index holes in the base of the jig.*

through Dovetails

Cut through dovetails on the table saw? You bet. It's quick, easy, and accurate.

A table saw isn't the first tool you think of when it comes to cutting through dovetails. Okay, maybe it's not a tool you think of using at all. So it might surprise you to learn that you can use your table saw to make perfect-fitting through dovetails, like the ones shown in the inset photo at right.

All you need is a simple shop-built jig and a saw blade ground to leave perfectly angled corners. Best of all, this technique results in through dovetails with that distinct, "hand-cut" look.

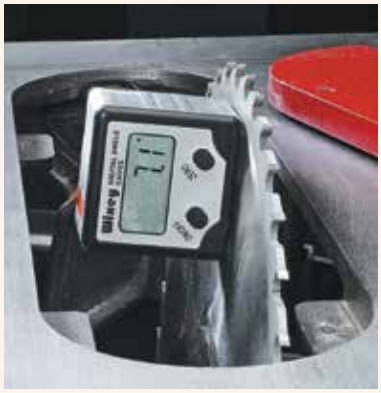
The jig is similar to a crosscut sled but the fence is adjustable to allow for cutting both the pins and tails. (For more on building the jig, turn to page 1.) Besides the jig, you'll also need a special saw blade to cut dovetails on the table saw.

The Blade. If you use a regular blade to make the angled cuts needed for the dovetails, you'll end up doing a fair amount of hand work to clean up the inside corners. The conventional tooth configuration just doesn't make for a good result.

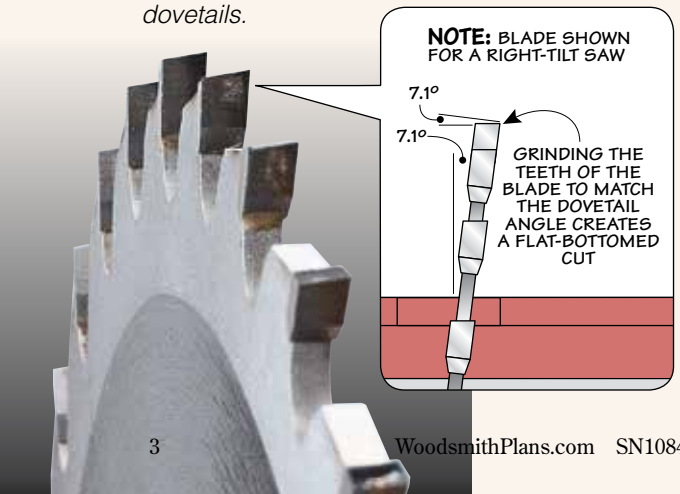
On the other hand, a sharpening service can grind the teeth of a saw blade to match the angle of the dovetail (lower left photo). This means you'll have very little clean-up work to do later.

Most sharpening services will regrind a saw blade for a reasonable fee. But you will need to provide very specific information when requesting this service.

The photos and drawing at left show the relationship between a right-tilt saw and the saw blade grind angle. The grind you'll need



▼ ***Angled Grind.*** *Have a general-purpose blade ground to cut dovetails.*



◄ ***Setting the Blade.*** *A digital angle gauge makes quick work of adjusting the saw blade to match the desired dovetail angle.*

for a left-tilt saw would simply be the opposite.

Once you've determined the direction for the custom grind, you'll also need to specify an angle. And this is really just a matter of the slope you like in your dovetails. For most of my work, I prefer an 8:1 tail ratio. This means the grind angle needs to be 7.1°.

TAILS FIRST

This technique starts with cutting the tails first. You can then use them to accurately lay out the pin positions. Like any method of cutting dovetails, this table saw technique depends on your stock being perfectly flat and square.

While you're milling your stock, go ahead and make a couple of test pieces as well. The test pieces will give you a chance to practice the technique and become familiar with the overall process.

Layout. Once you've finished preparing your workpieces, you can start laying out the tails, as in photo 1 above. The nice thing is, you only need to do this on one end of one workpiece.

Keep in mind that you can vary the size of the tails, but the overall layout needs to be symmetrical about the centerline of the workpiece. Plus, the space between the tails, where the pins will go, shouldn't be any narrower than $\frac{3}{16}$" to provide clearance for the saw blade.

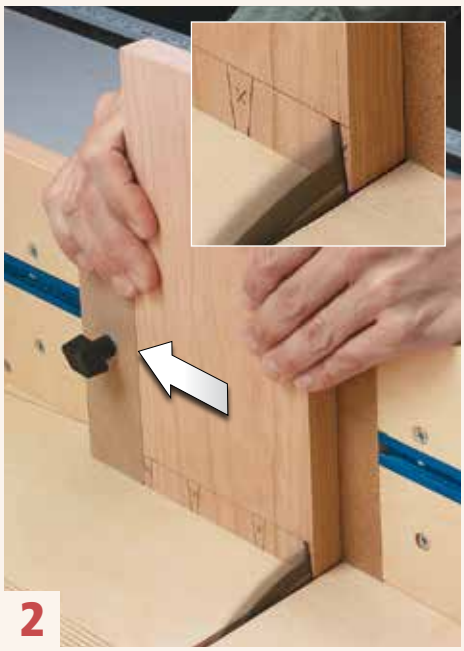
Finally, to avoid making any mental mistakes as you work, mark the waste areas with an "X".

First Cuts. After tilting the blade on your saw, as shown on the previous page, you're ready to make the first cut. Start by putting the jig into position on the table saw with the fence positioned square to the blade to make the tails. Holding the workpiece vertically against the fence, slide the jig forward to align the blade to the outside (waste side) of the first layout mark.

Next, slide the stop block against the workpiece and lock it in place. Once the stop block is set, you're ready to make the first cuts in all your tail workpieces (photo 2 and inset at lower left). Be sure to set the blade height to match your layout line. In fact, I like to go just a hair deeper than the overall stock thickness to be on the safe side.

Photos 3 and 4 below show you how I use a simple, cut-and-flip sequence to make four cuts. You just need to make sure to hold the workpiece securely against the stop block and fence.

▲ ***Layout Marks.*** *With a bevel gauge set to the proper dovetail angle, mark the tail locations on a test piece.*



▲ ***Set the Stop Block.*** *After aligning the layout mark with the blade, lock the stop block into position and make the first cut.*

▲ ***Cut and Turn.*** *Rotate the workpiece to make a matching cut on the opposite side. This technique ensures uniform spacing.*

▲ ***Both Ends.*** *Flipping the workpiece end-over-end allows you to make identical cuts on the opposite end.*

completing the Tails

Now that you've made the first set of cuts that define one edge of the outside tails, you have a good understanding of how the jig and overall technique work. You'll repeat this process to complete the rest of the tails on all your remaining workpieces.

The nice thing is you won't need to worry about working to any layout lines for the rest of the work on the tails. That's going to be taken care of by a set of spacers, like the ones you see in the box below. They're the key to accurate tails — and tight-fitting pins, as you'll find out later.

Spacers. The trick is sizing the spacers. For the technique to work, the spacers must be sized accurately. The box below shows the relationship between the spacers and the layout already completed on the tail workpiece.

▲ ***Second Cuts.*** *At this point, the spacer accurately controls the position of the workpiece for the next cut.*

Completing the Tails. At this point, completing the tail cuts starts with inserting the first spacer into the T-track, sliding it up against the stop block, and then locking the spacer in place (photo 1).

▲ ***Both Ends.*** *As before, flip the workpiece over and repeat the cuts on both ends.*

To verify the correct spacer is installed, simply set the workpiece with your layout lines in place. Then just slide it up to the saw blade and double check that the blade will cut into the waste area between the tails.

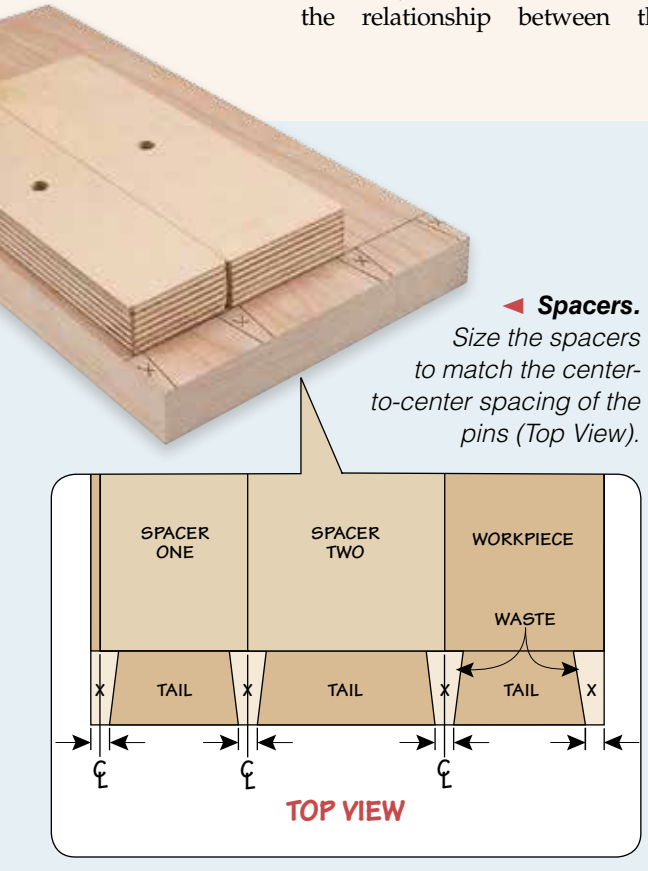
Stay Organized. Once that's complete, you're ready to use the same process to make four cuts in all of your tail workpieces. One note of caution: It's easy to lose your concentration as you repeat the cuts four times on each workpiece, especially if you're making a big project with a lot of parts (like a set of drawers, for instance).

While the jig takes care of properly positioning the workpiece in relation to the distance from the blade, you still need to make sure you're keeping it tight against the fence and stop block/spacer setup. Keep an eye out for sawdust building up on the jig as well, since this can also throw off the position of the workpiece.

In photos 1 and 2 above, you can see the cuts being made with the first spacer in place. Adding the second spacer results in completing the shape of the tails, as you can see photos 3 and 4 at the top of the next page.

After wrapping up all the cuts on all of the tail workpieces, you're

sizing the Spacers

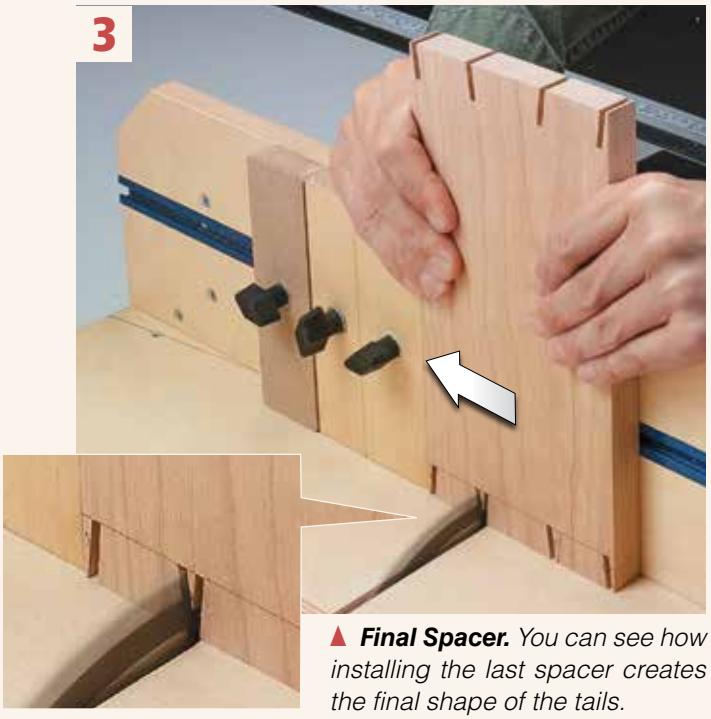


◄ ***Spacers.*** *Size the spacers to match the center-to-center spacing of the pins (Top View).*

When it comes to sizing the spacers, the drawing at left covers what you need to keep in mind.

Basically, to position the workpieces correctly for each cut, you'll need the same number of spacers that you have full pins. In the example here, there are two full pins (the two center pins), so two spacers are required.

Sizing the width of each spacer is just a matter of starting at the center of the half pin at one edge and measuring to the center of the first full pin. Then you continue across the workpiece, measuring from pin center to pin center. You don't need a spacer for the last half pin on the workpiece.



▲ ***Final Spacer.*** *You can see how installing the last spacer creates the final shape of the tails.*

▲ ***Finishing Up.*** *To complete the tails on the other end of the workpiece, flip and rotate everything one more time.*

▲ ***Clean Up Work.*** *A sharp chisel makes short work of removing the waste between the tails.*

ready for a little bit of cleanup work to finish the tails.

Clean Out the Waste. Depending on your dovetail layout, the amount of cleanup work may vary. So you have some options on how to accomplish this task.

If there's a lot of waste to clear out, simply remove the stop and spacers from the jig. Then you can simply cut away the waste with the saw blade, positioning the workpiece by eye.

The thing to make sure here is that you don't cut into any of the tails. You can also use a fret or coping saw to remove the bulk of the waste.

For removing small amounts of waste and final cleanup, I turn to a freshly sharpened chisel, like the one you see in photo 5. A sharp chisel helps prevent tearout as you work across the grain.

Start by cutting down at the layout mark. Then cut in from the end to remove small pieces of waste. Be sure to flip the workpiece over to make the initial cuts on both faces rather than just cutting through from one side.

Lay Out the Pins. Once you've finished removing all of the waste, you're halfway to a complete dovetail joint. Now you can turn your attention to the other half of the joint — the pins.

You can see how to lay out the pin workpiece using a completed tail piece in photo 6 at the lower left. Here again, you'll only need to lay out the pins on one workpiece. The spacers will position the rest of the pin workpieces properly after the initial cut is made for the first pin.

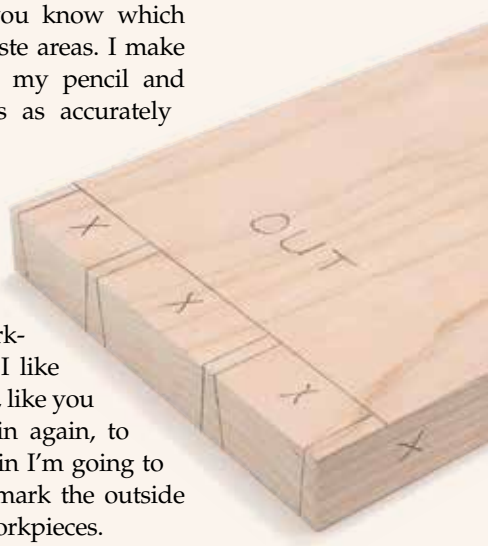
These layout marks will only be used to initially position the stop block. Plus, it helps during the actual cuts so you know which spots are the waste areas. I make sure to sharpen my pencil and make the marks as accurately as possible.

Now, using a square, transfer the layout marks for each pin down both faces of the workpiece (photo 7). I like to mark the edge, like you see in the margin again, to identify which pin I'm going to fit first. Finally, mark the outside faces of all the workpieces.

At this point, you're ready to start cutting the mating pins. For more on this, turn to the next page.

▲ ***Locate the Pins.*** *Use the completed tail workpiece with the original layout to locate the pins on the mating workpiece.*

▲ ***Transfer.*** *Transfer the layout marks down the front face of one workpiece. Finally, mark the outside face of all the pin workpieces.*



First Pin. *Position the stop block so the size of the first pin matches the tail workpiece. Then, make a cut on both ends of all the workpieces.*

Reposition & Cut. *Flip the workpiece and make a cut for the pin at the opposite corner.*

Add a Spacer. *Just like with the tails, add a spacer and make the next set of cuts.*

Final Cut. *With the last spacer in place, cut all the workpieces to complete one angle on all the pins.*

fitting & fine-tuning the Pins

With the layout complete, you're just about ready to start cutting the pins. But there are a couple adjustments you'll need to make to the jig and your table saw. Plus, there's a slight change to the overall process of cutting the pins. But I'll get to that in a bit.

Adjustment. The first thing to do is reset your table saw blade to 90°. Unlike the tails, the pins are cut with the blade square to the table. Instead of tilting the blade, you'll set the angle of the jig to match the tail angle.

The last thing you'll need to do is remove the dovetail blade you used to cut the tails. To get a flat bottom as you make the cut and minimize any extra clean-up work, you'll want to use a rip blade. A dado blade does make removing the waste go quicker, but I've found I get the best results with a rip blade.

Sizing the First Pin. The key to locating and sizing all of the pins lies in carefully matching the first pin with the tail piece. For the edges of the workpieces to end up flush, the first pin needs to match its mating opening in the tail piece exactly.

The nice thing is, the process for doing this is just a matter of sneaking up on the final size. After that, completing the rest of the pins involves using the spacers once again. Then you'll do some fine-tuning right on the table saw for a perfect fit.

Sizing the Pin. *Sneak up on the final size of the first pin until it matches its mating opening in the tail workpiece.*

Making the Cut. First things first, though. Pull the indexing pin and angle the fence on the jig back

Oversized Pins. *After adjusting the fence to angle forward, reposition the stop block to form an oversized pin on the workpiece (photo 6). Then, install each spacer in turn to complete the remaining pins, as shown in photos 7 and 8.*

to match the dovetail angle. Then reinstall the indexing pin. And be sure that the depth of cut of the saw blade matches the layout line on the pin workpiece. At this point, you're ready to create the first pin (photo 1, previous page).

Check the Fit. What you're looking for here is that the pin matches its mating tail piece. Since you can't actually slide the pieces together, checking the fit means comparing both next to each other, as in photo 2 on the previous page.

Cutting All the Ends. Once you have a good "fit," you can lock the stop block in place and cut both ends of all the pin workpieces for this position. Note: The outside face will always be out for the entire pin-cutting process.

As you can see in photos 4 and 5, you'll continue the process using the spacer blocks. Again, use your layout lines to be sure you're only cutting into the waste areas.

Shaping the Pins. To form the final shape of the pins, you'll need to cut the opposite sides of the pins. This means angling the fence forward and locking it in place.

You'll also need to reset the stop block for these cuts. The goal here is to cut the pins slightly oversize. This way, you can sneak up on the final fit (more on this later).

▲ ***Remove the Waste.*** *Without moving the stop block, remove as much waste as possible, then complete the rest of the task with a chisel (photo 10).*

For now, simply use your layout line as a guide to set the stop block to cut oversized pins, as shown in photo 6 at the bottom of the previous page. Once the stop block is set, complete the cuts across the bottom of one pin piece, using the spacers as necessary, like you see in photos 7 and 8 at the bottom of the facing page.

Checking the Fit. At this point, you're ready for a test fit. Since the pieces won't slide together because of the waste, you'll need to remove that. I use the table saw to remove as much as I can (photo 9). Be sure to avoid accidentally cutting into any of the pins as you do this. Then, clean up any remaining waste with a chisel (photo 10).

Once you've finished cleaning up the pins, it's time to test the fit of the joint. What you're looking for here is a fit that just slides together, as pictured in photo 11 below.

Fine-Tuning. Since the pins were oversized, they probably won't fit together. So you'll need to fine-tune the fit by trimming one side of all the pins. This is just a matter of making another cut with a thin paper shim between the stop block and workpiece (photo 12, below). Now, leave the shim in place and use the spacers to trim the other pins (photo 13, below).

Simply sneak up on the fit by adding shims until the pins just slide into the tails. With the shim thickness set, you can complete all the cuts on the remaining pin pieces. After removing the waste, every joint will slide together with an identical, smooth fit.

As you can see, a shop-built jig and step-by-step process make cutting through dovetails pretty straightforward. And you can't beat the "hand-cut" look.

▲ ***Checking the Fit.*** *The pins should be sized so they just slide into the tails. If they're too tight, you'll need to fine-tune the fit.*

▲ ***Fine-Tuning.*** *Zeroing in on the fit is just a matter of slipping in a shim and repeating the cuts with each spacer (photo 13) to shave a small amount off each pin.*

Project Sources

MAIL ORDER SOURCES

Essentra Components
800-847-0486
essentracomponents.com

McMaster-Carr
630-833-0300
mcmaster.com

Rockler
800-279-4441
rockler.com

You should be able to find a saw blade sharpening shop in your area that will custom grind your blade for cutting dovetails. Or, if you prefer, *Forrest Blade Company* offers dovetail saw blades for either left or right tilt table saws. The blades are available with a 7°, 9.5°, or 11.5° bevel angle. Materials for the blade cover and runner are available from *McMaster-Carr.* They could also be made out of hardboard or plywood if you prefer.

- **Rockler**
  3/8" x 4' Universal T-Track . . .20054

- **Essentra Components**
  Tapered Knob BD-6
  Wing Knob DK-228

- **McMaster-Carr**
  1/4" Polycarbonate Sheet.. 85935K28
  3/8" Phenolic Strip 9322K17

Manufacturers and retailers will periodically redesign or discontinue some of their items. So you'll want to gather all the hardware, supplies, and tools you need before you get started. It's easy to adjust dimensions or drill different-sized holes to suit your hardware.