fast and easy

Finger Joints

You can start and finish building a box in one day — without any special tools.

Finger joints always remind me of two hands clasped together. A set of “fingers” on one piece fits between the “fingers” on the other. But what provides the “muscle” here is glue. These interlocking fingers create a lot of edge-to-edge surface area for a really strong glue joint — which, in turn, makes for a solid box.

While cutting all those tiny fingers might seem tedious, it’s really a snap. All you need is a jig that you can build in about fifteen minutes with a few workshop scraps.

Plus, you don’t need a shed full of tools. To make the fingers, I use a table saw outfitted with a miter gauge and a rip blade (or any blade that cuts a flat-bottomed kerf).

FINGER JOINT JIG

To build a box with finger joints, a series of kers are cut with the table saw. And the pieces are supported and positioned with the help of a jig — basically, just an auxiliary fence with a key to index the fingers.

FENCE & LEDGE. My auxiliary fence is a piece of stock temporarily clamped to the miter gauge (drawing below). But I also add a 6mm-thick Masonite ledge under this fence. This way, the workpiece doesn’t ride directly on the table (and over the blade insert that may not be flat and level). Instead, the piece rests securely on the ledge.

KEY. While the fence and ledge support the workpiece, a small key added to the fence is really what makes the jig work. It’s cut to match the width of the kerf left by your saw blade. And this key is positioned so the distance between it and the blade is identical to the width of the key itself.

To add the key, I clamped the fence to the miter gauge and cut a notch in it (Step 1 on the next page). Then I cut the key from a scrap piece to fit tight into this notch (Step 2). A tight fit here is critical — you don’t want any “play” when fitting the kerfs of the workpiece over the key.

SETTING UP THE JIG. With the key glued in place, the jig can now be set up. There are two things to do here: position the key by adjusting the fence on the miter gauge and raise the blade to the right height.

ADJUSTING THE FENCE. When setting up the fence, the distance of the key from the blade has to match the thickness of the blade (and the key). Otherwise, the fit of the fingers will either be too tight or loose, see the box on the next page.

I start by positioning the key with a second, identical key (Step 3). Then I check the setup by cutting a series of finger joints on two test pieces, as you can see in Step 4.

But I don’t just use any scraps that happen to be lying around. Instead, I make the test pieces identical to the final workpieces in width and thickness (but not necessarily length). I even use the same type of wood. This way, I can use these test pieces later when plugging the holes left by the grooves for the bottom.
Using a second key to set the first will get you close. But you’ll probably still need to “tweak” the fence one way or the other, see box and tip in margin at right. It’s important to be patient; it will probably take several adjustments (and test cuts) before the fit is perfect.

I like to end up with a snug fit so that when dry assembling the pieces, I have to work the pieces a bit to press the fingers together and pull them apart. This way, I avoid using clamps when gluing the boxes together. More on that later.

**SETTING THE BLADE.** After the key is set and the fence has been clamped to the mitre gauge, I set the height of the saw blade. Of course, when you’re done, you want the fingers perfectly flush with the mating pieces. But here, when setting the blade, I let the fingers protrude just slightly — less that 1mm. (I’ll sand them flush later.)

To set the blade height, I position the workpiece on the ledge next to the blade. But I start with the blade slightly below the height of the workpiece and sneak up on the final height as I test the fit, see box below. This way, the auxiliary fence will back up the cut completely, and there will be less chance for chipout when cutting the fingers.

**BUILDING A BOX**

With the jig set up, the hard part is over, and the fun really begins. With this simple jig, you can build any number of boxes quickly. Plus, about the only adjustment you’ll need to make is to raise or lower the blade to accommodate different thicknesses of stock.

**WIDE PIECES.** When building a box, I start with all four sides of the box planed to finished thickness...
and cut to final length. But I leave them slightly oversized in width. I don’t worry about the final height (width) until after the fingers are cut. To see what I mean, take a look at Step 10 below.

**LABEL PIECES.** With the pieces ready, the next step is to label them all, as you can see in the drawing at right. I first mark the bottom edge of each piece with an ‘X’ as the good edge I use to reference my cuts. I also number the corners to keep them together as the fingers are cut.

**CUTTING THE JOINTS.** With the jig to guide you, cutting finger joints is just about automatic. But you do need to keep some things in mind.

I found that it’s good to be extra careful with the very first slot that’s cut in each piece, as in Step 5. Check that there’s nothing on the jig (like sawdust) to throw off this cut — the piece should rest squarely on the ledge and against the key. Then, when cutting the rest of the fingers and slots, you need to be as consistent as possible. Steps 6 though 9 do a good job of showing this. Even shifting the pressure slightly can affect the final fit. So I hold the piece against the jig with both hands and try to make each pass exactly the same.

**CHIPOUT.** Be careful, chipout can be a problem any time you cut finger joints, but there are two things that will help. First, make sure your blade is sharp. Second, make sure the notch in the jig matches the height of the slots you’re cutting. This way, the workpiece is backed up completely.

**FINAL HEIGHT.** After the fingers are cut, I simply trim the top edge of each piece so there’s a full finger (and slot) left, as you see in Step 10.

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**FINGER JOINTS: STEP-BY-STEP**

5. **To begin,** set the bottom edge of the piece against the key and hold it tight as you pass it over the blade.

6. **Now,** straddle the first slot over the key and cut a second slot. Repeat this process across the piece.

7. **Next,** flip the piece end-for-end, keeping the bottom edge against the key. Then cut the slots on this end.

8. **Now,** rotate the piece so the first slot straddles the key. Set the mating piece in place and cut its first slot.

9. **To cut the next slot,** slide the slot just cut up tight against the key. Then continue as before.

10. **After all four corners are complete,** trim the top edge of each piece to leave a full finger or slot.
**BOTTOM PANEL.** With all the pieces cut to size, the next step is to cut the grooves for a rebated bottom panel (Steps 11 and 12). The bottom is made from 6mm plywood. Cutting a rebate in each edge of the panel forms a tongue that fits in the grooves cut in the box pieces, refer to drawing of the box on page 3. To cut the grooves for the panel, I use the same saw blade and set the rip fence so that the groove is aligned with the first finger on one of the box sides, as you can see in Step 11 below. Then double-check the setup with the end piece.

**ASSEMBLY.** When the bottom is cut and rebated to fit the grooves (Step 12), I dry-assemble the box. Then when satisfied with the fit, it’s time to glue it together (Steps 13 through 16). Glue. Dry assembling a box can be done at a leisurely pace, but when it’s time to apply the glue, there’s really no time to dawdle. You have to get glue in all the fingers and get the joints together before the glue sets up.

To help, I apply glue to the ends of the pieces, see margin photo below right. And I use a slow setting glue, like white glue or liquid hide glue. Of the two, I prefer hide glue because it cleans up well with water and if any glue is left on the inside corners, it doesn’t stand out much after an oil finish is applied. And speaking of glue on the inside corners, I scrape it out and wipe off as much as possible with a damp rag before it sets up. It’s just too hard to remove after it’s dried. **SEATING THE JOINT.** Once the glue is applied, I drive the fingers into the slots using a mallet and one of the test pieces that I made earlier (Step 13). Often once the joint is seated, there’s enough friction to hold the corner together, so I don’t even have to use any clamps.

**ADDING CLAMPS.** However, once in a while, I’ll have a cupped piece that needs to be clamped (Step 14). In this case, I apply the clamps just inside the fingers and add a small spacer in the middle to keep the sides of the box from bowing in.

**PLUGS.** When the glue is dry, I plug the holes left by the grooves for the box bottom (Step 15). Then I trim them and sand the sides of the box smooth.

**FLATTEN BOTTOM.** Finally, you may notice the corners of the bottom of the box aren’t perfectly flush. But this is an easy fix. Just attach adhesive-backed sandpaper to a flat surface and sand the bottom of the box lightly (Step 16).

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**ASSEMBLING THE BOX: STEP-BY-STEP**

**11** Next, to hold a bottom panel, cut a groove on each piece, using a workpiece to set the fence.

**12** With the bottom panel cut to size, rabbet its bottom edges to create a tongue to fit the grooves.

**13** To seat the joints after applying glue (see margin), use a mallet and one of the test pieces.

**14** Apply clamps to the corners, if necessary. A spacer will keep the sides from bowing in.

**15** With the glue dry, plug the exposed grooves at the bottom of the box and trim them flush.

**16** If necessary, apply adhesive-backed sandpaper to a flat surface and sand the bottom flat.