



Woodsmith **PLANS**

# SLIDING LID BOXES



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*Finger joint boxes aren't all that common anymore. But they're still attractive, strong, and easy-to-build.*

**B**efore plastic and cardboard, people stored and carried things in wooden boxes. The smaller of these boxes were often joined with finger joints. It's a quick joint that's easy to mass produce, and with a little glue, it's quite strong.

I use finger joints for the same reason. I can build a box quickly with a table saw and a simple jig. In fact, I can build a lot of boxes quickly, as you can see in the photo at right.

**LID.** The other thing I like about these boxes are the lids. They're irresistible. As soon as you pick up a box, you just have to slide it open and shut.

Because the lid fits inside rather than on top of the box, the fingers are cut a little different than explained in the article beginning on page 3. Basically, you just cut fewer fingers on the front corners (margin photo).



▲ The lid on this box slides into shallow grooves cut in the sides and back.

Note: The step-by-step drawings here feature the short pine box in the photo above. Overall dimensions for the other boxes in the photo are included in the box on the next page.

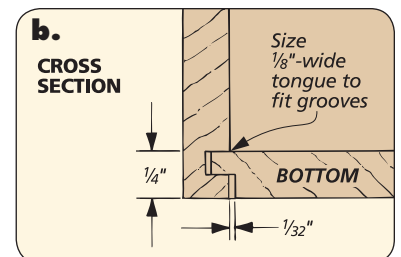
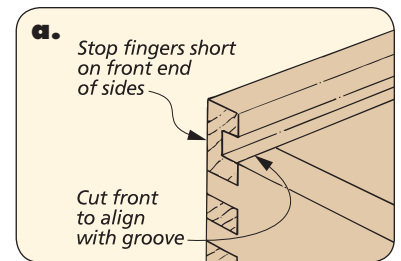
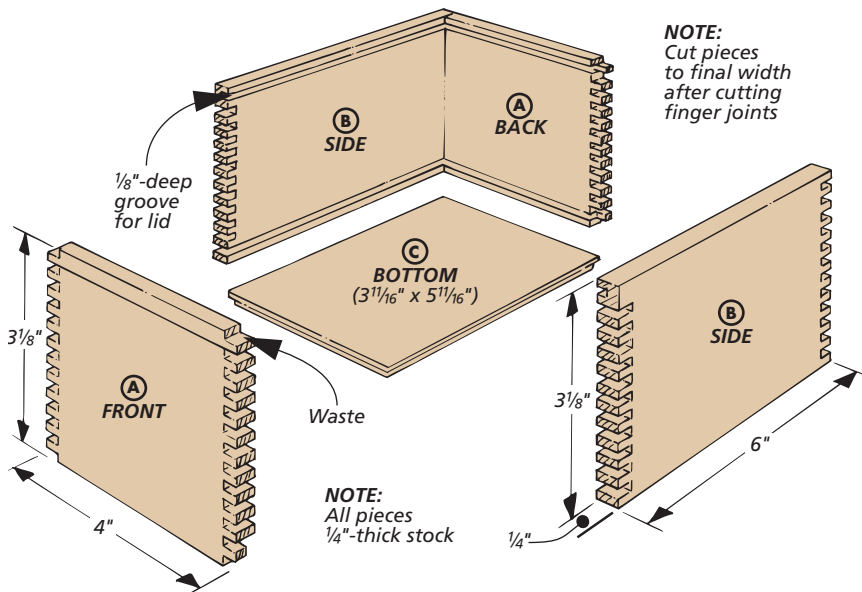
**SIDES & ENDS.** The boxes start out as 1/4"-thick front, back, and sides cut about 1/8" oversized in width. After the finger joints are cut, the box can be assembled, as shown on pages 3 to 6 — except for a few differences.

**FRONT ENDS.** When laying out and marking the pieces, I also labeled the front end of each side piece so I would

remember to cut them differently. The fingers on these pieces aren't cut all the way to the top edge, see photo in margin and detail 'a' below.

What I do is start with the back end of these pieces and count the number of passes I make over the blade (thirteen for the box shown below). Then when cutting the front end, I simply make two fewer passes over the blade (eleven, in this case).

Note: The thirteen slots on the back end will become twelve after the waste is trimmed off the top edge.



**GROOVE FOR LID.** Before trimming the front piece, I cut the groove for the lid on the top inside face of the back and side pieces. This groove is identical to the one for the bottom ( $\frac{1}{8}'' \times \frac{1}{8}''$ ).

**TRIM FRONT PIECE.** After the grooves for the lid were cut, I raised the blade and trimmed off the top edge of the front piece. This way, it lines up with the bottom of the groove perfectly, see detail 'a' on page 1.

Now, a  $\frac{1}{4}''$ -thick hardwood bottom can be added, and the box can be glued together, refer to page 3.

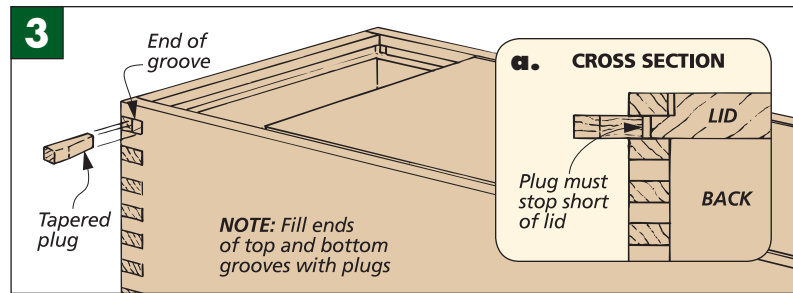
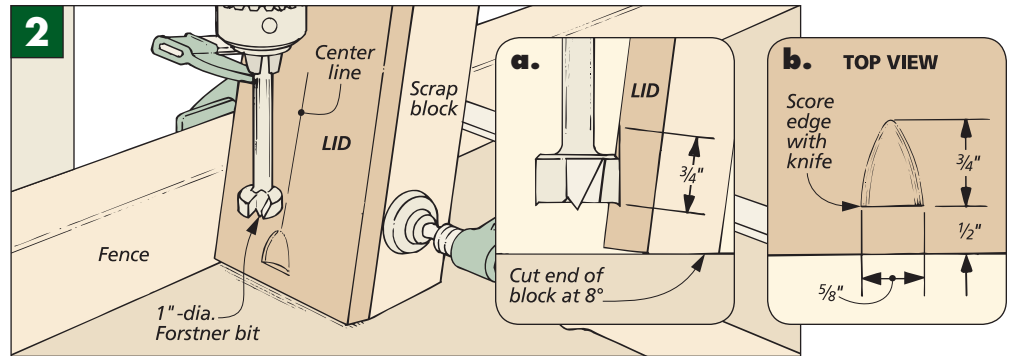
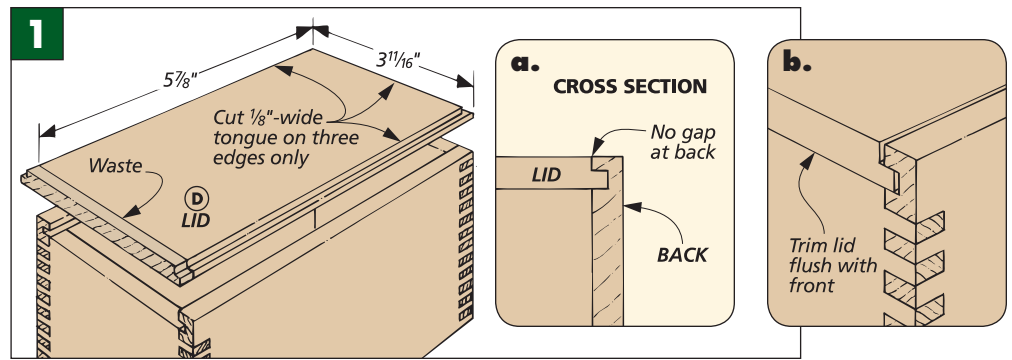
**LID.** With the box assembled, work can begin on the lid, see Fig. 1. The lid is nearly identical to the bottom of the box. But it's  $\frac{3}{16}''$  longer so it ends up flush with the front of the box. And instead of cutting a  $\frac{1}{8}''$ -wide rabbet along all four edges, the lid only has three edges rabbeted.

I sized the tongues created by these rabbets so they would just fit into the grooves in the box. Then I sanded the tongues on the sides of the lid so it would slide in and out easily. But leave the back edge tight so it'll hold the lid in place.

**FINGER PULL.** At this point, the lid will fit into the box, so next I added a small recess so I could pull it out easily with the tip of a finger, see Fig. 2.

Figuring out just how to cut a clean recess took some experimenting. But I found a quick and easy method using a drill press, a 1"-dia. Forstner bit, and an angled scrap block, see Fig. 2.

First, I laid out the position of the pull, see Fig. 2b. Then to prevent chipout, I scored the pull's straight edge  $\frac{1}{2}''$  from the front of the lid.



Now to support the lid, I trimmed one end of a scrap piece of 2x4 at 8° so it would hold the lid at a slight angle, see Figs. 2 and 2a. Next, I positioned the lid so the drill bit would start cutting at the “point” of the pull. Then I lowered the bit to the scored line.

**PLUG GROOVES.** All that's left now is to plug the holes left by the grooves

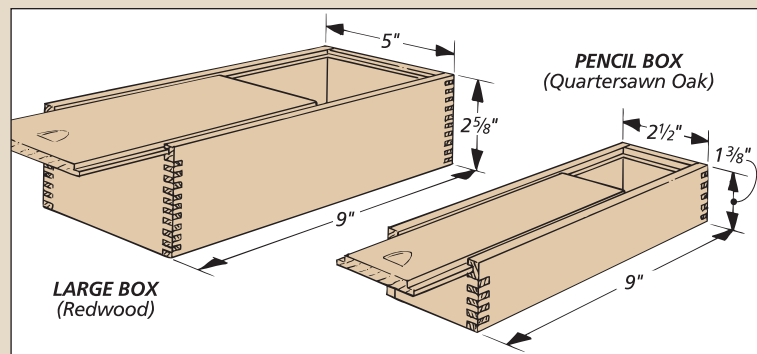
at the top and bottom of the box. But take special care with the plugs at the top. If they extend too far into the groove, they could prevent the lid from closing. You can see what I mean in Figs. 3 and 3a.

Finally, with the plugs glued in and trimmed flush, I sanded the box smooth and wiped-on an oil finish.

## ALTERNATE BOX SIZES

I like these boxes because I can turn out two or three in no time at all. In fact, I found myself trying different woods and changing the size of the boxes, see the photo on page 1 and the drawing at right.

One note of caution, though. Since the stock is only  $\frac{1}{4}''$  thick, don't make your boxes much wider than 5". Otherwise, the lid will more than likely cup.



# FINGER JOINTS

*The nice thing about building boxes with finger joints is that you don't need any special tools. And you can start and finish a box in a day.*

**F**inger 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.

And 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 shop scraps.

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

## FINGER JOINT JIG

To build a box with finger joints, a series of kerfs are cut with the table saw. The pieces are supported and positioned with the help of a simple 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, see drawing below. But I also add a ¼"-thick hardboard ledge under this fence. This way, the workpiece doesn't ride directly on

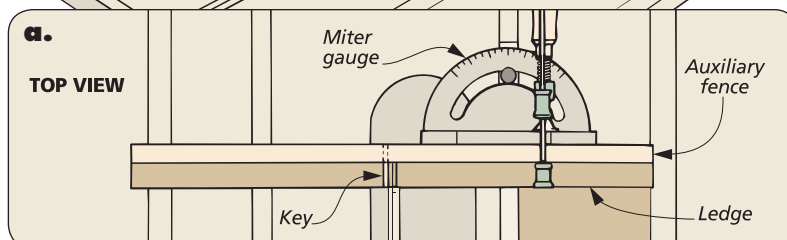
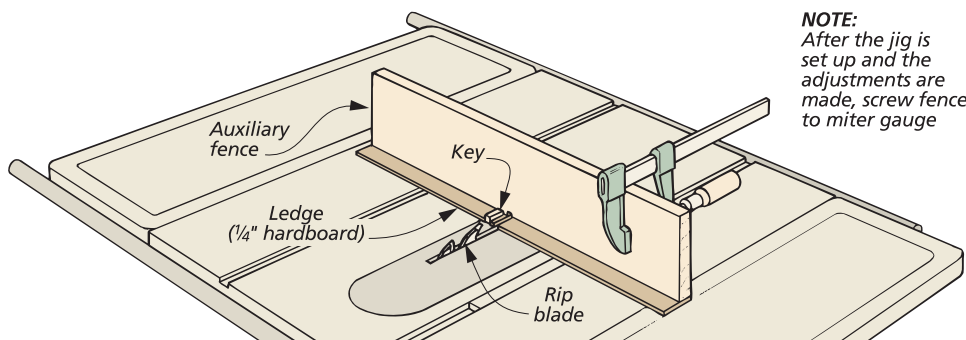
the table (and over the blade insert that may not be flat and level).

**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 clamp the fence to the miter gauge and cut a notch in it (Step 1, page 4). Then I cut the key from a scrap to fit tight into this notch (Step 2). A tight fit 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 is built, but it's not set up. There are two things to do: position the key by adjusting the miter gauge fence and raise the blade to the right height (box on page 4).

**ADJUSTING THE FENCE.** When setting up the fence, the distance from the



## FINGER JOINT JIG: STEP-BY-STEP

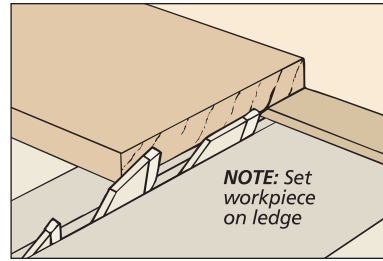
key to the blade has to match the thickness of the blade (and the key). Otherwise, the fit of the fingers will either be too tight or loose, see box.

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, (Step 4). But I don't just use any scraps that happen to be lying around. Instead, I make my test pieces identical to my final pieces 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.

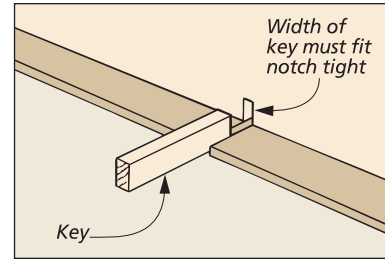
Using a second key to set the first will get you close. But you'll probably still need to "tweak" the fence one way or the other, see box and tip in margin at right. It's important to be patient; it will probably take several adjustments (and test cuts) before the fit is perfect.

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 can usually avoid using clamps when gluing the boxes together. But more on that later.

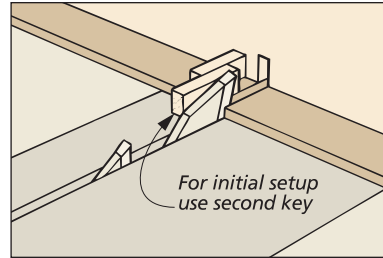
**SETTING THE BLADE.** After the key is set and the fence has been screwed to



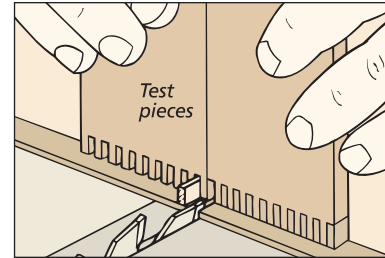
**1** After setting the blade height so it's slightly below the thickness of the stock, cut a notch in the fence (and the ledge).



**2** Next, you'll need to size a key that will fit tight in the notch that was just cut in the fence. Then glue it in place.



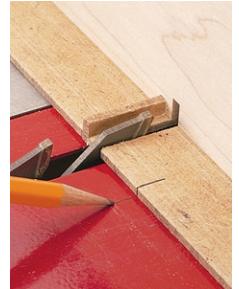
**3** Now, using a spacer the same width as the key, move the fence so the spacer fits between the key and the blade.



**4** Test the setup and make needed adjustments to the fence and the blade. Then screw the fence to the miter gauge.

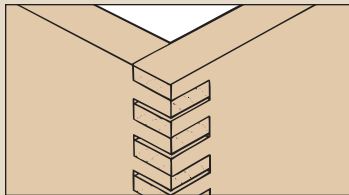
the miter gauge, I set the height of the saw blade. Of course, when you're done, you want the fingers perfectly flush with the mating pieces. But here, when setting the blade, I let the fingers protrude just slightly — less than  $\frac{1}{64}$ ". (I'll sand them flush later.)

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

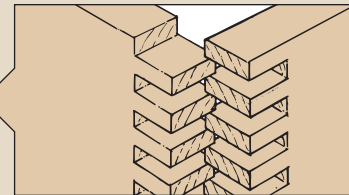
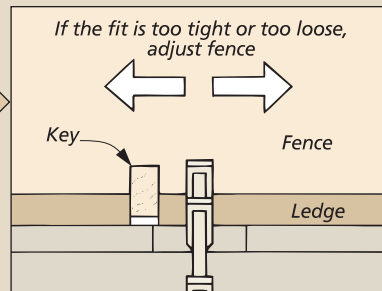


▲ When setting up a finger joint jig, I make any micro-adjustments "visible" by drawing a line across the jig and table.

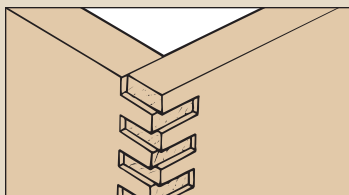
## FINE ADJUSTMENTS



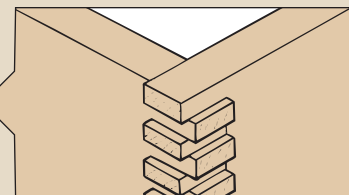
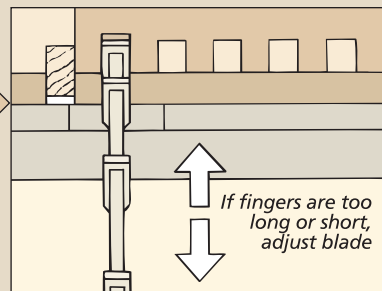
**Loose fit.** If there's a gap between each finger, simply slide the key and fence away from the blade.



**Tight fit.** If the fingers won't fit into the slots at all, then slide the key and fence towards the blade.



**Short fingers.** If the blade is set too low, the fingers will be short, so raise the saw blade slightly.



**Long fingers.** If the fingers extend too far, the saw blade is too high and needs to be lowered.

## Building the Box

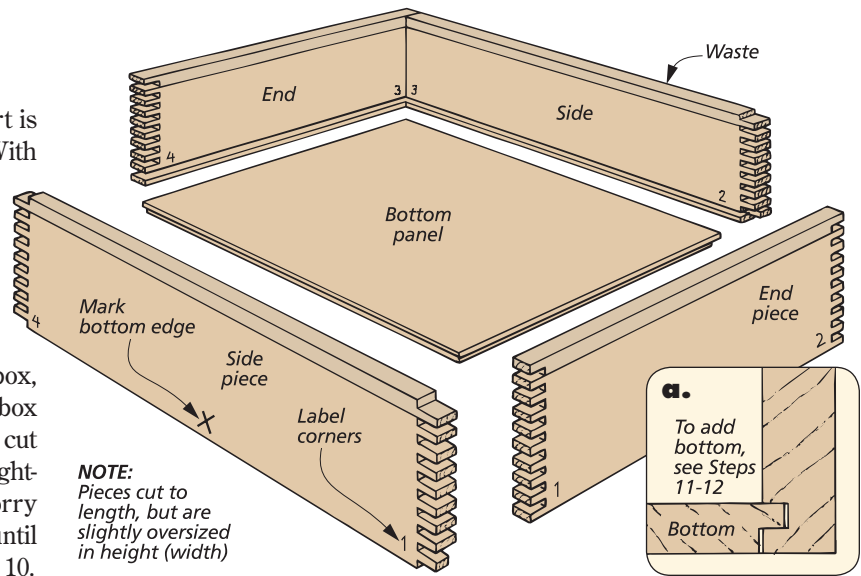
With the jig set up, the hard part is over, and the fun really begins. With this simple jig, you can build any number of boxes quickly. Plus, about the only adjustment you'll need to make is to raise or lower the blade to accommodate different thicknesses of stock.

**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, see Step 10.

**LABEL PIECES.** With the pieces ready, the next step is to label them, see drawing at right. I mark the bottom edge of each piece as the good edge that I reference my cuts from. 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.

**NOTE:** Pieces cut to length, but are slightly oversized in height (width)



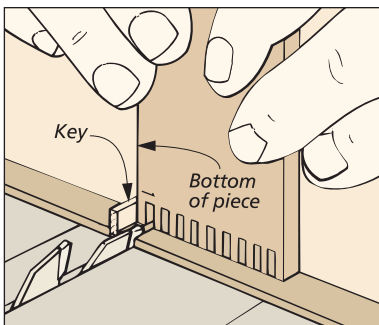
I found that it's good to be extra careful with the very first slot that's cut in each piece, see Step 5 below. Check that there's nothing on the jig (like sawdust) to throw off this cut; the piece should rest squarely on the ledge and against the key.

Then when cutting the rest of the fingers and slots, you need to be as consistent as possible, see Steps 6-9.

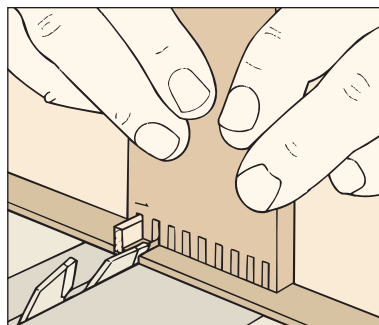
Even shifting the pressure slightly can affect the final fit of the corner. So I hold the piece against the jig with both hands and try to make each pass exactly the same.

**CHIPOUT.** I should also mention something about chipout. Chipout can be a problem any time you cut finger joints, but two things will help. First, make sure your blade is sharp.

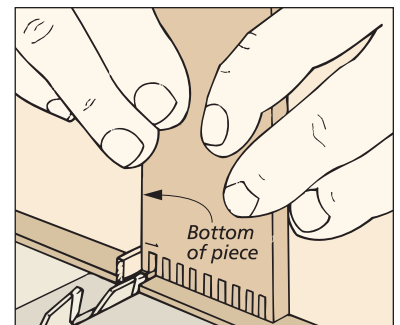
## FINGER JOINTS: STEP-BY-STEP



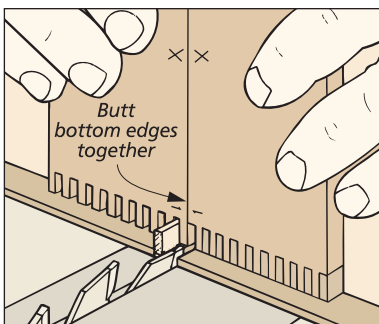
**5** To begin, set the bottom edge of the piece against the key and hold it tight as you pass it over the blade.



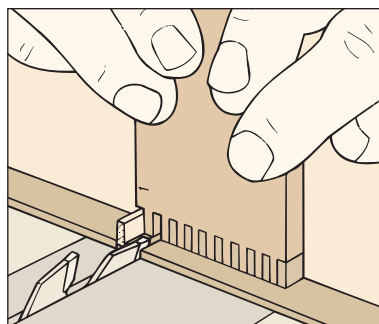
**6** Now, straddle the first slot over the key and cut a second slot. Repeat this process across the piece.



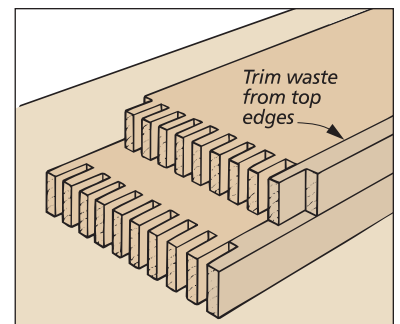
**7** Next, flip the piece end-for-end, keeping the bottom edge against the key. Then cut the slots on this end.



**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.

And second, make sure the notch in your 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 trim the top edge of the pieces so there's a full finger (and slot) left, see Step 10. Because my blade is a hair over 1/8"-thick, I usually find this dimension ends up a little more than the one I'm shooting for, but for most boxes, the final height is not critical.

Of course, there are times when the finished height can't be ignored. A drawer, for instance, often has to be sized to fit a specific opening. When that's the case, I still make the pieces oversized and then trim them from both the top and bottom so the fingers here are identical.

**BOTTOM PANEL.** The next step is to add the bottom panel, see Steps 11 and 12. To cut the grooves for this panel, I use the same saw blade and set the rip fence with a side piece, refer to the drawing on page 5 and Step 11 below. Set the bottom edge against the fence and align the blade with

the first finger. Then double check the setup with the end piece.

**ASSEMBLY.** When the bottom is cut and rabbeted to fit the grooves (Step 12), I dry assemble the box. Then when satisfied with the fit, it's time to glue it together, see Steps 13-16.

**GLUE.** Dry assembling a box can be done at a leisurely pace, but when it's time to apply the glue, there's 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 (margin photo). 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

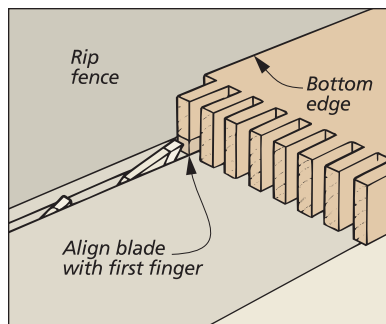
the slots with one of the test pieces that I used earlier to set up the finger joint jig, refer to Step 13. I've found that once the joint is seated, there's often enough friction to hold the corner together, so I don't even have to use any clamps.

**ADDING CLAMPS.** However, once in a while, I'll have a cupped piece that needs to be clamped, see 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.

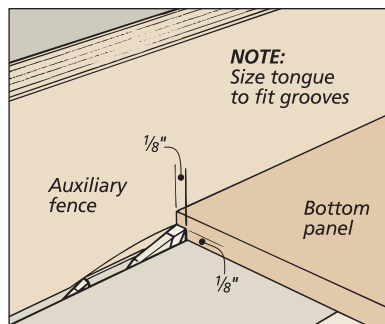
**PLUGS.** When the glue is dry, there are still a couple "clean-up" steps. First, I plug the holes left by the grooves for the box bottom, see Step 15. Then I trim them and sand the sides of the box smooth.

**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 sandpaper to a flat surface and sand the bottom of the box lightly, see Step 16.

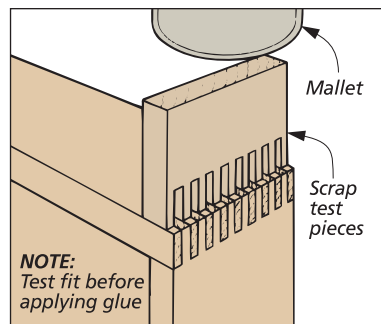
## ASSEMBLING THE BOX: STEP-BY-STEP



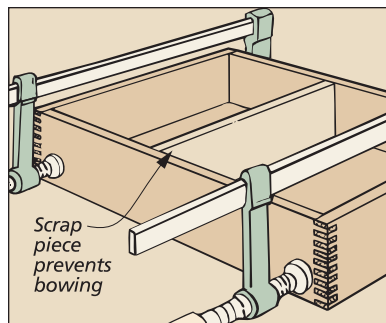
**11** Next, to hold a bottom panel, cut a groove on each piece, using a workpiece to set the fence.



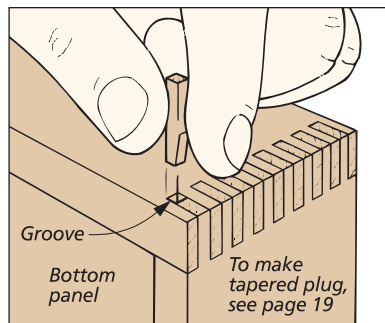
**12** With the bottom panel cut to size, rabbet its bottom edges to create a tongue to fit the grooves.



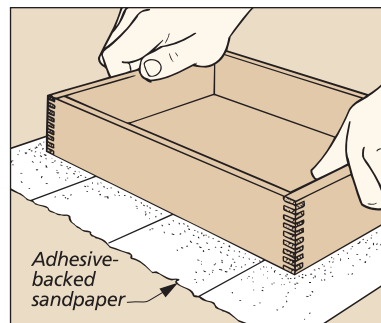
**13** To seat the joints after applying glue (see margin), use a mallet and one of the test pieces.



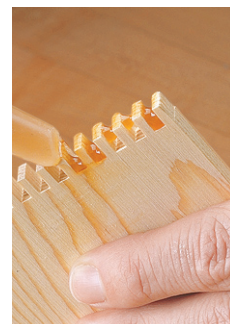
**14** Apply clamps to the corners, if necessary. A spacer will keep the sides from bowing in.



**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.



▲ To assemble a finger joint quickly, I run the glue across the ends of the fingers.