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Dave Campbell
Editorial Content Chief, *WOOD* magazine



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hand-cut dovetails

for a custom look

Cutting dovetails the old-fashioned way is more than a link to the past. Such well-made joints add a one-of-a-kind handcrafted appearance to your work.

With practice and patience, you can master the satisfying skill of hand-cutting dovetails. If your first attempt isn't perfect, don't worry. Everyone makes kindling-quality practice joints before getting the knack.

Start by gathering the essential tools, shown *page 65 top*. Practice on moderately soft wood, such as poplar, and machine your pieces to equal

widths and thicknesses. (With practice, you also can dovetail boards of unequal thicknesses.) Temporarily label the part faces ("front inside" or "side inside") and edges ("top") to keep pieces in order.

We'll cut the pins first, and use those to mark the cuts for the dovetails. But in some situations, it makes more sense to cut the tails first. We'll show you that process, starting on *page 67*.



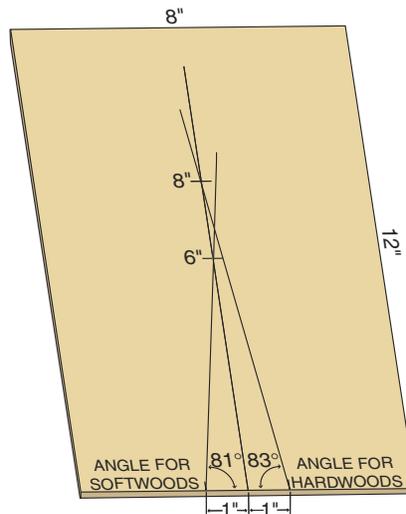
ESSENTIAL TOOLS

Tools you'll need include a mallet (A), chisels (B), a combination or try square (C), a marking gauge (D), sliding bevel (E), and fine-tooth saw (F). Not shown are a crafts or marking knife, a ruler, and pencils.

1 Set your sliding bevel

Here's a simple way to find the correct angles for the dovetails you'll make. Place a square along the straight edge of a scrap panel and mark a 90° line about 10" long down the center, as illustrated at *right*. Mark that line at 6" and 8" from the edge. Now, place two marks on the edge, 1" from the line on both sides. Draw lines from your 1" marks to the 6" and 8" marks. Set your sliding bevel to the angle of the shorter triangle for softwoods or the longer triangle for hardwoods, as shown in the photo at *far right*.

Traditionally, dovetail angles in softwood are steeper than in hardwood because softwood compresses and slips as the joint is stressed. But the difference is small: an 81° angle (a 1:6 ratio) for softwoods versus 83° (a 1:8 ratio) for hardwoods.

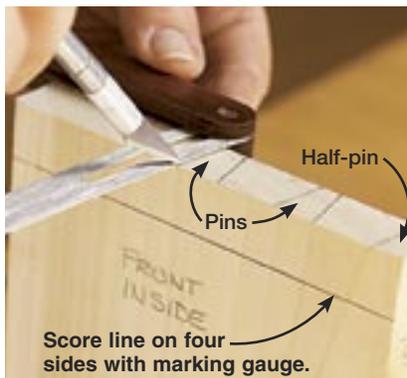


2 Mark your pin cuts

Pins always include the pieces closest to a part's edges and are marked at an angle on the ends, while tails have angled marks on their faces. The number and position of the pins is up to you. For evenly spaced pins, select the number of pins you want between the half-pins on the ends. Divide the space between the half-pins by that number, and then mark the centers of the pins at even distances along the end of the board at the edge of the inside face. After deciding what width you want for the pins at their narrowest point, mark the edge of the board. Avoid making the narrow side of the pins $\frac{1}{4}$ " or smaller; you'll need more working space than that between the tails to be cut later.

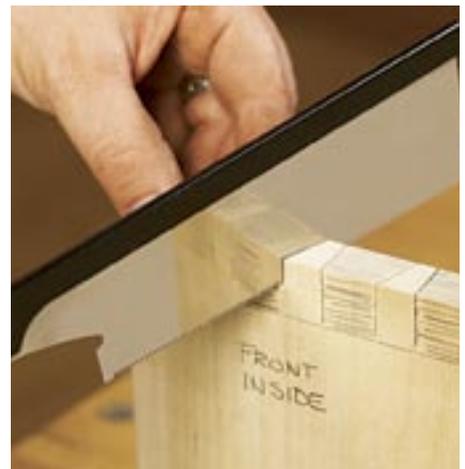
Using a marking gauge set to $\frac{1}{64}$ " greater than the thickness of your stock, score a line on both faces and edges of the ends where you'll cut your pins and, later, your dovetails. You'll sand both faces flush after the final assembly. With your sliding bevel set, mark your pins on the end of the board with a crafts knife, as shown at *right top*.

Using a square, score lines from the edges of the pin lines down to the line you scored earlier, as shown at *right bottom*. Shade the scrap areas to be removed.



3 Cut the pins

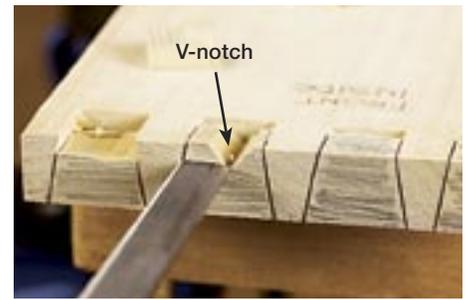
Use a thin-kerf saw, such as the Japanese pull saw shown *below*, to cut along the score lines to the scored marking-gauge lines on both sides. Hold your saw at 90° to the end grain, and cut slowly to prevent the grain of the wood from drawing the saw blade off course. A small square beside your saw can help you maintain a true 90° angle until experience allows you to visualize it unaided.



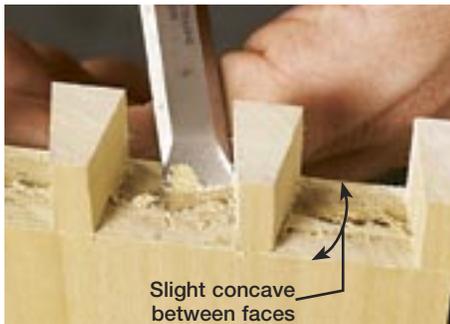


4 Chisel away the waste

Using the widest chisel that will fit between the pins where they're closest together, make shallow stop cuts along the scored line, as shown at *far left*. Don't cut too deep into the wood— $\frac{1}{8}$ " is deep enough for the first pass. Your goal is a clean, straight line. Carefully remove the waste from the end, as shown at *left*, with light taps on the chisel. Make another set of stop cuts, remove the waste, and repeat these two steps until you're about halfway through the thickness of the board. Creating small V-notches helps the waste pop out as you cut between the



wide faces of the pins, as shown *above*. Flip and reclamp your workpiece to repeat this process on the other face.



5 Clean between the pins

Clean the area between the pins with a chisel. To make the joint easier to assemble, create a slight concave in the end grain between the pins below the faces of the board, as shown *above*. Your pins are now ready; don't alter them after you begin cutting the dovetails.



6 Mark the dovetail locations

The pins serve as your pattern for laying out the dovetails. Hold the front inside board vertical, and place it on the inside face of your other board at the end. Line up the wide side of the pins on the score mark of



the other board. Mark the dovetails using a crafts knife, as shown *above left*. Once those are clearly scored, use a square and a knife to mark your 90° saw lines along the end of the board, as shown *above right*. Darken the waste areas, if necessary.



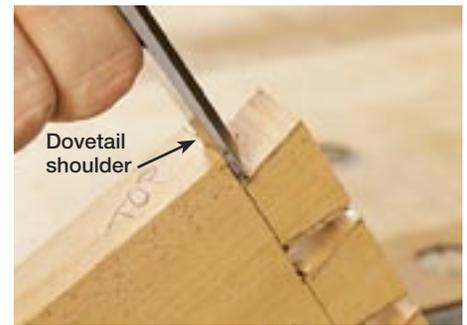
7 Carefully saw the dovetails

Saw the dovetails at an angle, as shown *above*. Unlike the other piece where you cut directly on the scored line, **saw on the waste side to give yourself a margin of error for fine-tuning the joint.**



8 Cut and trim the shoulders

Cutting on the waste side, as shown *above left*, saw away the shoulders of the



dovetails. Then clean up your work with a chisel, as shown *above*, until the shoulders match the scribed line.



9 Cut between the dovetails

This step resembles cleaning between the pins, except that you'll cut on the waste side up to your score lines to fine-tune the joint. You can see at *left* why we cautioned you against making your pins too narrow at their tips: Narrow pins make it hard to work a chisel between the dovetails.

10 Fine-tune the dovetails

Working slowly and precisely, use your chisel to remove waste almost to the lines you scored with your crafts knife. Begin test-fitting your joint as you work, as shown at *right*. Remove tiny amounts of waste from

the dovetail with each fitting until the joint squeezes together with light mallet taps. Avoid altering the pins. This can be time-consuming until you gain experience, but it makes the difference between a joint you'll admire and one you'll patch.



When making the treasure box shown *above* and plan **DP-00496a**, you'll want to reverse the procedure shown earlier and cut the tails first. Why? You'll likely have too little space between the tails to squeeze in a chisel and clean up your cuts, as shown on **Step 9**. By marking the tails first and sawing to your marks, you eliminate the need to clean up the tails, just as you didn't need to fine-tune the pins when you cut those first.

As explained in the previous section, temporarily mark each of your box parts to

identify the front, back, and left or right sides; the inside surfaces; and the top edges. While preparing your stock, cut a couple of backup parts and save any remaining scraps for practice. You'll use the same tools as before, but a $\frac{1}{8}$ " bevel-edge chisel will help you reach between the tails.

The design of this box calls for the ends of both pieces to extend about $\frac{1}{16}$ " proud of the faces. To do this, set your marking gauge $\frac{1}{16}$ " greater than the thickness of your stock, and score lines on the faces and edges at both ends where you'll cut your pins and tails.

2 Mark angles from the ends

For a precise way to extend your tail lines from the ends down the sides, hold the top of your crafts knife inside the end score line at the edge and lightly push your sliding bevel's metal edge against the knife, as shown *below*. Let the knife tip travel over the end of the workpiece and along the sliding bevel down to your score line. Slightly darken the score lines with a sharp pencil, and mark the waste areas to be removed, if needed.



3 Saw the tails

Rest the tip of your thumb against the smooth blade of your saw for support, as shown *below*, and carefully saw along the angled tail marks down to the score lines on both faces. Note the tight working space; there's less than $\frac{1}{8}$ " between the wide ends of the dovetails. Next, cut on the waste side of your score line to remove the shoulders. You'll remove the rest with your chisel for a clean, precise line.

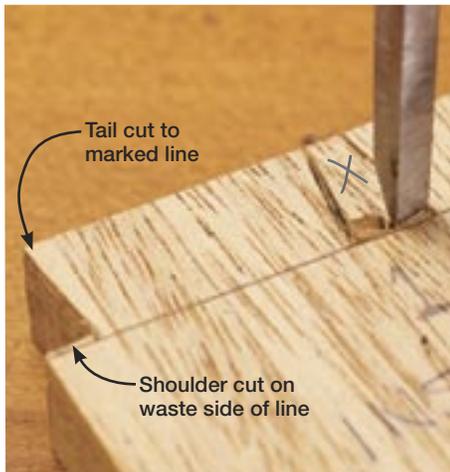
1 Lay out the tail locations

Refer to the tail locations specified in the pattern on the **WOOD Patterns®** insert, and then measure and mark the tails on the ends of your stock using a crafts knife, as shown at *right*. At each mark, use your square to extend the mark across the thickness of the ends. Using a fine-tip pencil, darken your score lines to make them more visible.



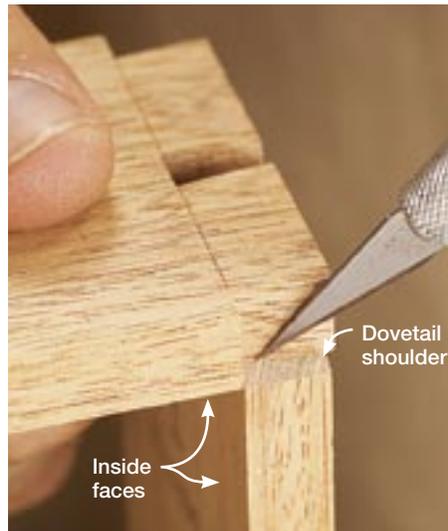
4 Clean between the tails

Here's where you'll need a $\frac{1}{8}$ " bevel-edge chisel, although you can remove the waste using a $\frac{1}{4}$ " chisel close to the score line and the tip of a crafts knife inserted carefully between the tails to pry loose the waste material. Start with a shallow cut barely $\frac{1}{32}$ " above the score line in the waste area, as shown *below*, and begin removing the waste on each face of the workpiece. Then go back with your chisel and remove the last of the waste down to the score line.



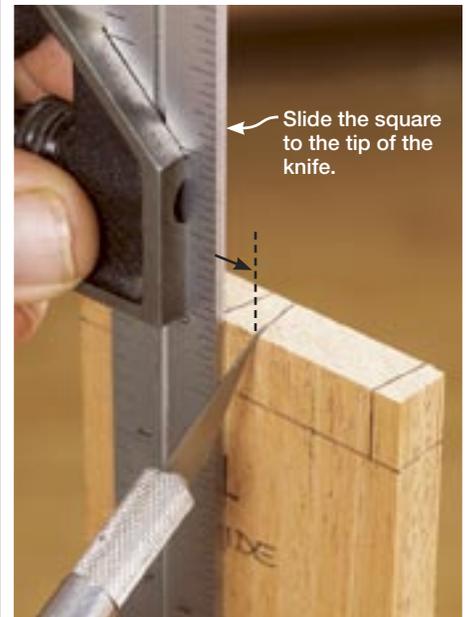
5 Use tails to mark pin cuts

Turn the tail piece so that the inside faces downward. Clamp the pin piece in a vise so the inside faces the inside of the tail piece, as shown *below*. With the shoulder resting along the inside face of the pin piece and the two boards aligned along their edges, score the locations of the pins on the end of the pin workpiece. Light cuts with the crafts knife can be darkened with a pencil.



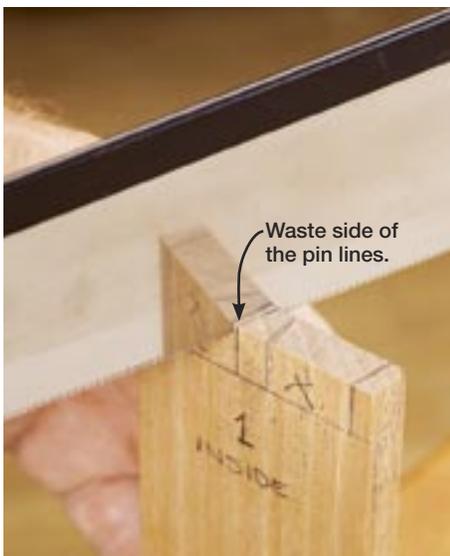
6 Mark the pin locations

Hold the tip of your crafts knife at the edge of your end grain score marks and slide your square against the knife, as shown *below*. Then extend the pin lines down to the scored line. Repeat on the other face. If needed, mark the waste areas to be removed.



7 Rough-saw the pins

Place your saw blade about $\frac{1}{32}$ " into the waste side of your line and cut to the score line, as shown *below*. Chisel away waste between the pins using the same technique from **Steps 4 and 5** of the previous section. Then use your chisel to shave away the remaining waste on the edges of the pins, bringing them down to your score line as shown in **Step 9** of the previous section. Avoid cutting beyond your score lines.



8 Test fit and fine-tune the joint

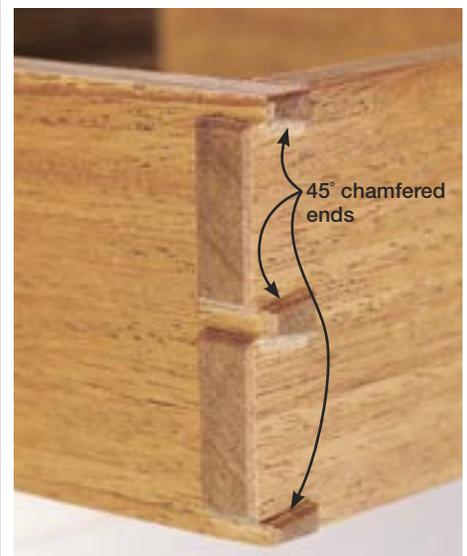
As you chisel to your marks, periodically test-fit the joint to see which areas mate well, as shown *below*. Trim any pins that need it. The joint should go together with gentle taps from the bottom of the mallet handle. Aim for a joint with consistent wood-to-wood contact between the pieces, not one that has to be hammered together.

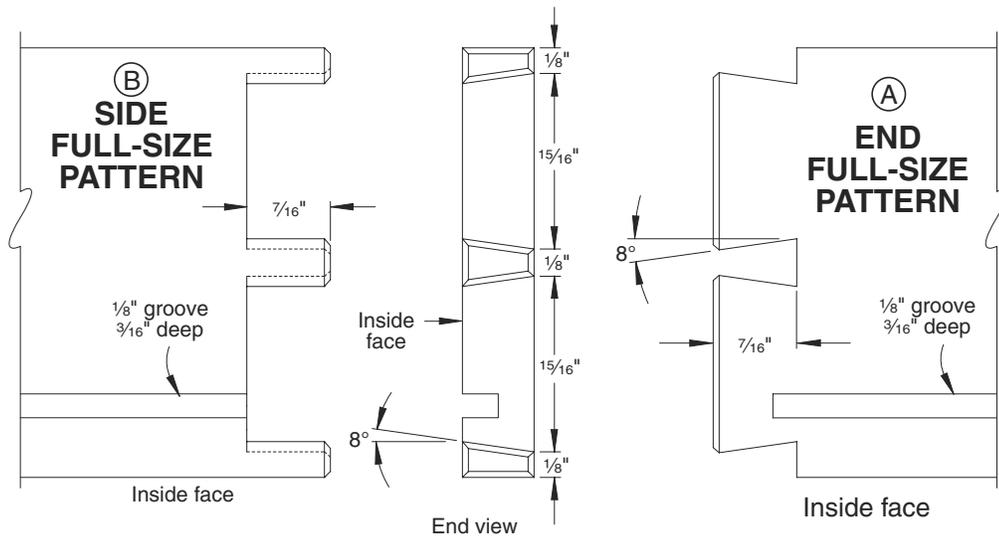


9 Bevel the edges and assemble

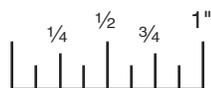
Once you assemble the joint, use 150-grit sandpaper on a hard sanding block to create a 45° chamfer on the ends of the dovetails and pins, as shown *below*. Sand carefully to create a consistent angle. Then sand the faces, ends, and edges up to 180 grit before gluing and assembling the joints. 🌲

Written by **Bob Wilson** with **Jeff Mertz**
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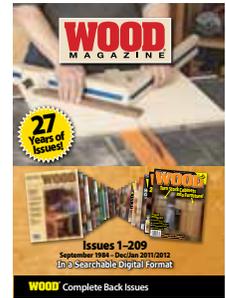
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