

March 2002
 UPDATE

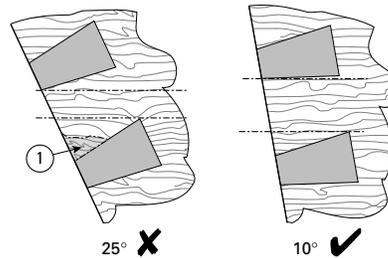
How To Rout Angled Through Dovetails On Your Leigh Jig

 These instructions are based on the assumption that you are fully conversant with the dovetailing instructions in the Leigh Jig User Guide. Do not attempt the following procedures until you are.

ANGLED THROUGH DOVETAILED

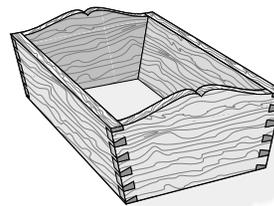
Routing angled dovetail joints is much like routing 90° dovetails, but there are minor differences in preparation and procedure. First, it is important to understand that angles that are greater than say, 10° - 12° from normal do not make good jig joinery. The routed pins and tails cannot be cut in line with the grain as they are in hand cut angled dovetails. Heavily angled jig joints can not only look a bit odd, the short grain on one side of each tail ① is a weak point and an added tearout problem. So keep the angles modest.

Except for Obtuse Angled joints, joint alignment is achieved by transposing marks from one board to its mating board. With these instructions, we are assuming you are proficient with normal dovetail cutting on the Leigh Jig.

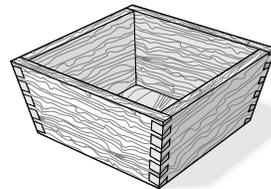


Three Types of Angled Dovetails

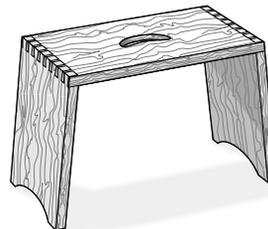
The three most common angled dovetails are: the Single Angle, where one board is angled and the mating board is square ended, like this cradle.

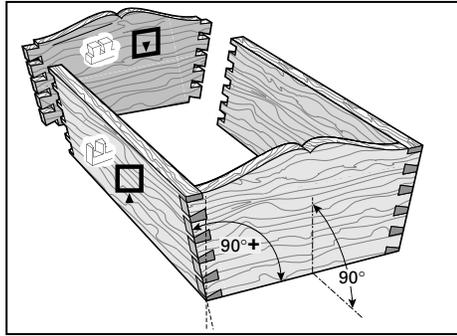


The Compound Angle, or "Hopper" joint. The ends of both adjoining boards are angled.

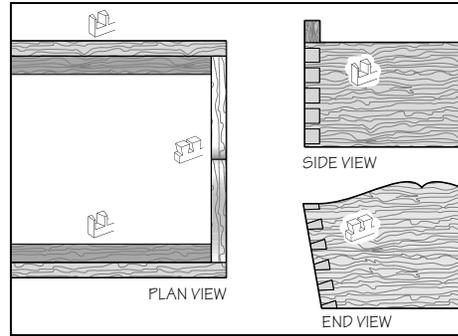


The Obtuse Angle, where the boards are joined at a corner greater than 90° as in this simple stool.

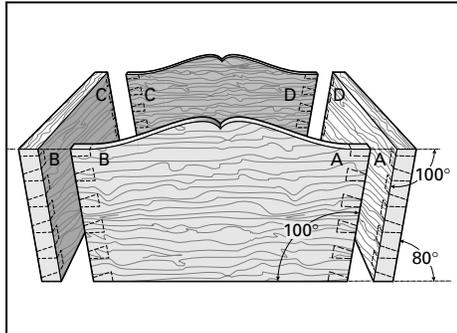




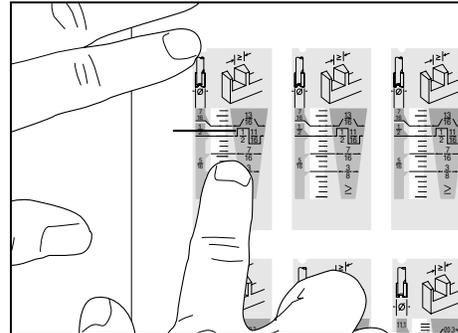
1-1 Through Dovetails, Single Angle Corners
Let's start with the simple "single" angle corner using 1x6" [20x140mm], where one board is vertical, the adjoining board angled. We will put tails on the cradle ends and pins on the sides, the traditional approach. The natural locking of the tails on the pins resists the inside pressures from baby Jane. (The curved cradle end shapes are optional).



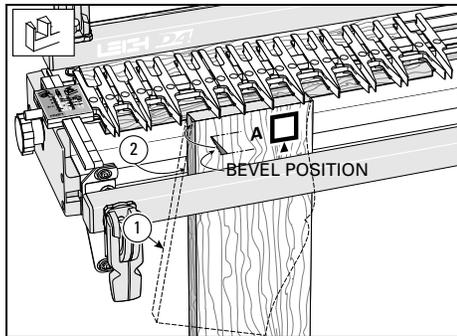
1-2 Bevel the top and bottom edges of the side (pin) boards at the same slope angle of the end boards. The side ends are cut square.



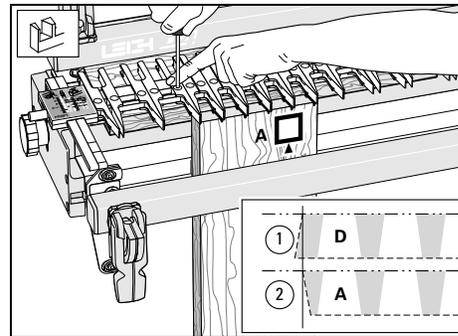
1-3 Angle the two ends (tail boards) of the cradle. We have chosen 10° in this example. Select the faces and mark the eight ends of the boards as to which will mate with which, i.e. "AA", "BB", "CC", "DD".



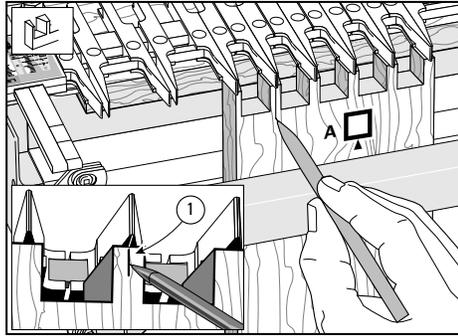
1-4 In angled dovetails the pins are routed first. So make sure you have already established the correct pin scale setting for joint tightness for the cutters being used. You will have recorded this in your jig user guide.



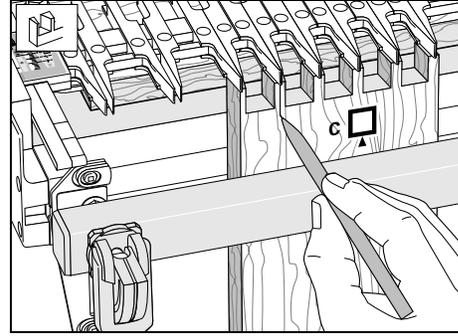
1-5 Mount the "A" cradle side (pin board) vertically in the front clamp face side out, "A" end uppermost. The side stops are not used, so mount it far enough away from the side stop so that the angled tail board ① will be able to go under the same position later. Mark the board's position with a pencil on the jig body ②.



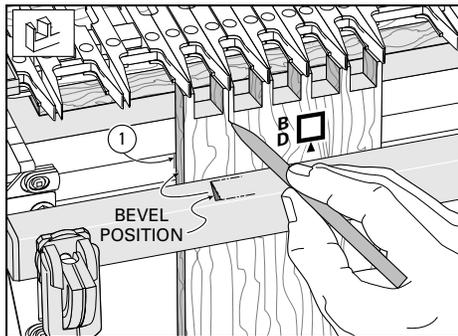
1-6 Lay out the joint pattern in the TD PINS mode. Remember the cradle side board edges are bevelled. When the pin board is reversed to rout the "D" end, the edge bevel will face the other way. So make sure the half pins at ① are wide enough to allow sufficient pin size at ②. Lower the finger assembly onto the spacer board and pin board. Set the TD PINS scale to your prerecorded setting.



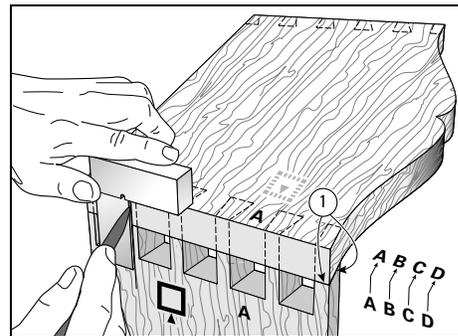
1-7 Rout the pins. **Do not remove the board yet.** Mark the centre line of only one pin of the "A" pins on the board face. Use the join line between a pair of guide fingers to centre the mark ①.



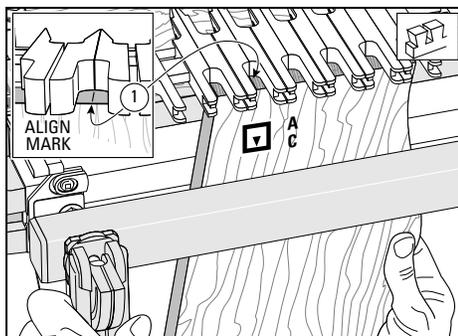
1-8 Remove the "A" pins and clamp in the "C" pins with the board edge against the pencil mark. Rout the "C" pins and again mark the centre of one pin and remove the "C" pins.



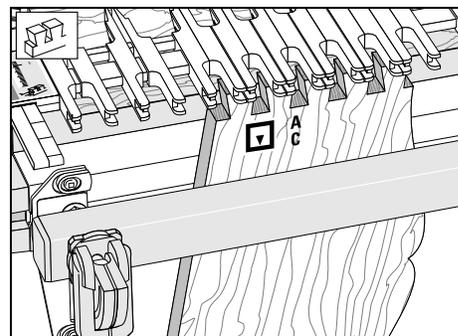
1-9 Assuming you are using an evenly spaced symmetrical layout, mount the pin board end "B" under the same guides. Position the board at the pencil line ①. Note that the bevel now is opposite. Rout pins "B" and mark the centre of one pin. Mount, then rout pins "D" and mark the centre of one pin.



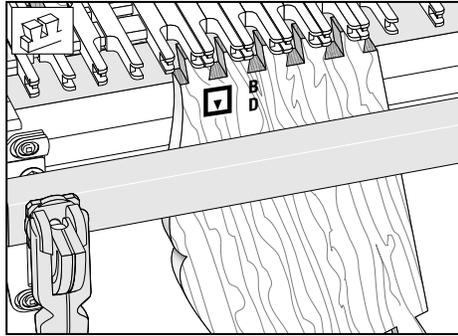
1-10 Butt the side and end boards together flush at the edges ① and transpose the single pin centre markings to their respective tail boards "A" to "A", "B" to "B", "C" to "C" and "D" to "D". Square the marks accurately across the tail board end edges. (Vise and bench not shown). **Transpose only one mark per corner, total four per cradle.**



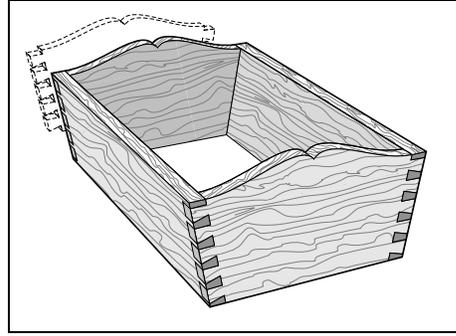
1-11 Rotate the finger assembly to TD TAILS mode, but bring it forward so that the croches of the tail guides overhang the jig front face. Clamp the tail board end "A" vertically in the front clamp, inside face \square away from the jig. Line the pin mark with the centre of the **same pair of guides** that produced the marked pin ①.



1-12 Move the finger assembly to the ≤ 1 "[26mm] setting and rout the "A" tails. Repeat for the tail end "C".

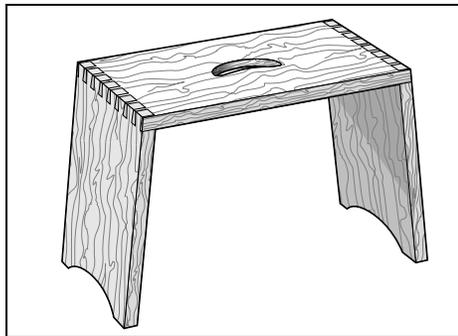


1-13 Repeat this procedure with tail ends "B" and "D".

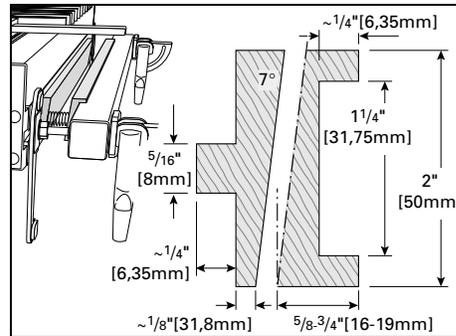


1-14 Dry assemble the sample cradle case and check for alignment.

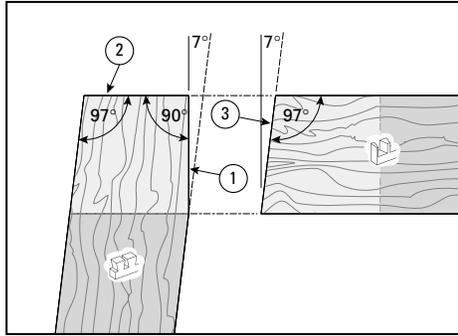
OBTUSE ANGLE CORNERS



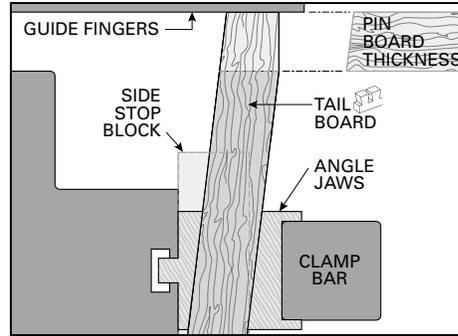
2-1 **Through Dovetails, Obtuse Angle Corners**
We are showing Obtuse before Compound because some of the obtuse procedures are required for creating compound angles. Obtuse angle through dovetails are useful to give for example, a slight splay to the sides of a stool.



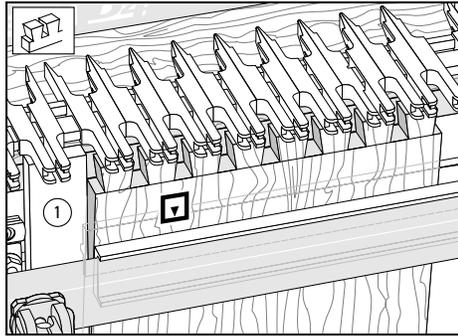
2-2 Obtuse angled joints require the use of simple shop-made angled clamping jaws. The angle should be maximum 10°-12°. For the stool illustrated we have chosen 7°. Make the jaws 2" [50mm] shorter than the jig capacity to allow for an auxiliary side stop. *Hint: Form the clamping jaws from a single piece, ripping the angle cut last.*



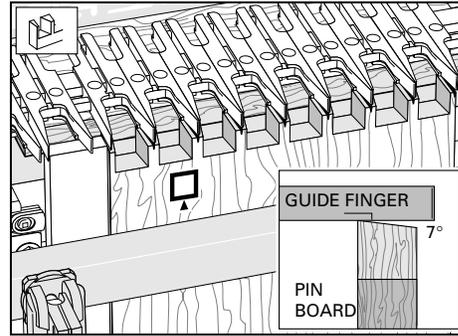
2-3 Prepare the boards as shown. Bevel the tail board at 7° on the inside face to the thickness of the pin board ①. Also bevel the top edge of the tail board ②, and the end edge of the pins ③ at the same angle.
Note: In this example, the pins are in the stool top. They could just as well be on the sides.



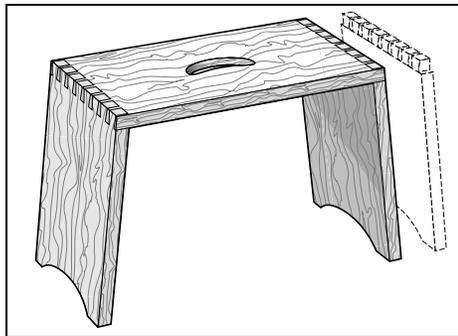
2-4 Obtuse tail boards are clamped with the lower end angling down away from you under the bench.



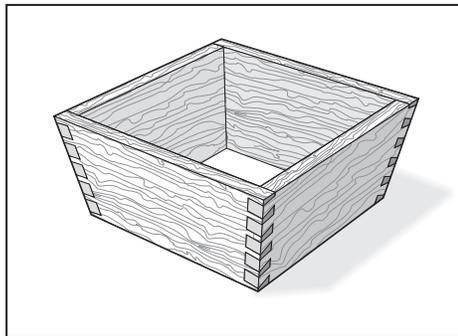
2-5 **Note: the angled jaws take the side stops out of play, so make this alternative arrangement.** With double sided tape, stick a narrow block ① on the front face of the jig and against the side stop. The block should be thick enough to act as a side stop, but not interfere with clamping. Use the block for both pins and tails. **Note: You will need to bring the finger assembly forward to get the tail guides over the board edge.** Rout the tails.



2-6 Obtuse pins are clamped **vertically** in the front clamp, face side out, but with the end edge bevelled at the same required angle (7° in this instance). Rout the pins.
Note: Do not rout pins with board at an angle. The sides of the pins would be compound angled and would not have a good glue interface with the sockets. Always rout pins vertically in the jig.



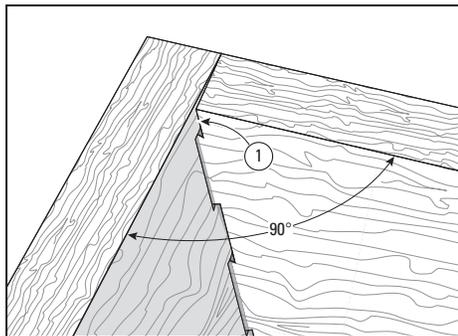
2-7 Dry assemble the sample stool and check for alignment.



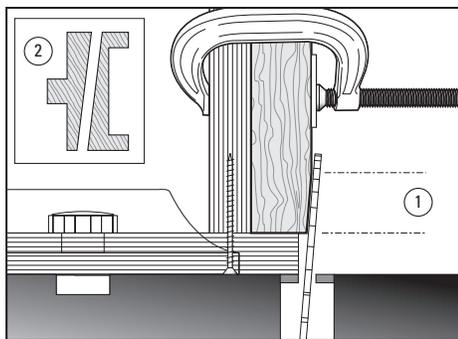
3-1 Through Dovetails, Compound Angle Corners

Compound angle corners or "hopper" joints are where both the ends and sides of a case are angled. We have left these to last as the procedures involve the use of both single angle and obtuse angle techniques.

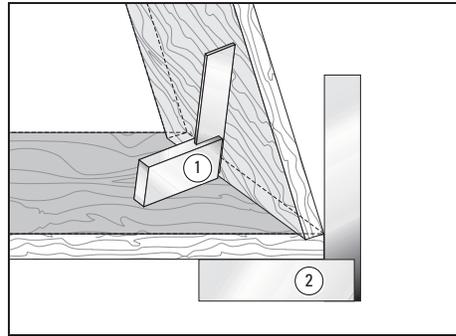
⚠ Do not attempt compound angled dovetails until you have mastered single angle and obtuse angled dovetails.



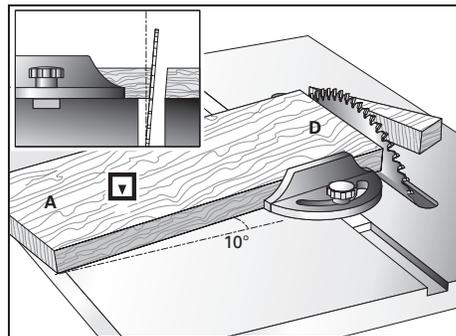
3-3 This means that if the boards are routed vertically in the jig, the finished corners will have to be forced open to 90° in the plan view. Gaps will show on the inside corners. Steeper compound angles make larger gaps. Our 10° side slope requires a 1.5° saw blade angle (see below). If left square, this 1.5° angle over 3/4" [19mm] thick boards would mean an unacceptable .020" [.5mm] gap ①.



3-5 Bevel the inside face of the tails—only to the thickness of the pin board ①. At the same time, make up the angled jaws to the required angle 1½° ② in our example. See 2-2 for dimensions.



3-2 First, it's important to understand that if two angled end boards that have been sawn with a vertical saw blade, are butted together to form a compound angled corner, the faces of the boards will be at 90° ① but the corner in the plan view shown here will be less than 90° ②. This example is steeply sloped to clearly illustrate this.

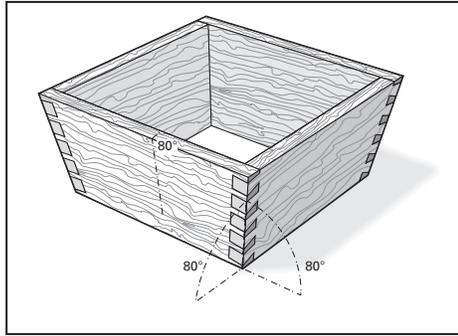


3-4 To avoid this gap and to make the board ends flush it is necessary to compound saw the board ends (inside face up ④ here). Angle the mitre fence by the side slope amount (in our example, 10°). Angle the saw blade as required in the chart below, Fig 6 (our example, 1.5°).

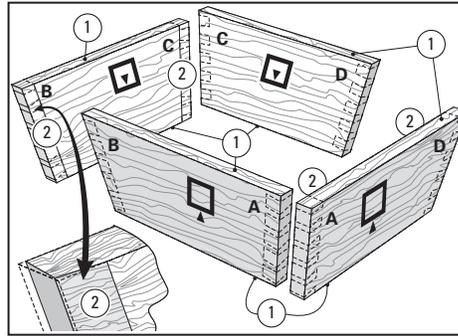
3-6 The chart* below shows the correct saw blade angle relative to the side slope required, for side slopes of equal angles. **Note: We have previously recommended not to angle boards in the clamp jaws by more than 10° obtuse.** You can see from the chart that this would theoretically allow a maximum side slope of about 25° from the vertical for equal sloped sides; but please see the note on the front page for angles greater than 10-12°.

| Side Slope | 5° | 10° | 15° | 20° | 25° |
|-------------|------|--------|-------|--------|-----|
| Mitre Gauge | 85° | 80.25° | 75.5° | 71.25° | 67° |
| Blade Tilt | 0.5° | 1.5° | 3.75° | 6.25° | 10° |

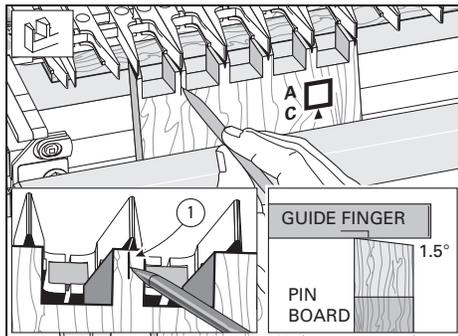
*Butt-Hopper-Joint-Angle Chart from Wood Joiner's Handbook, reprinted with permission of Sterling Publishing Co., Inc., 387 Park Ave. S., NY, NY 10016 from WOOD JOINER'S HANDBOOK by Sam Allen © 1990 by Sam Allen



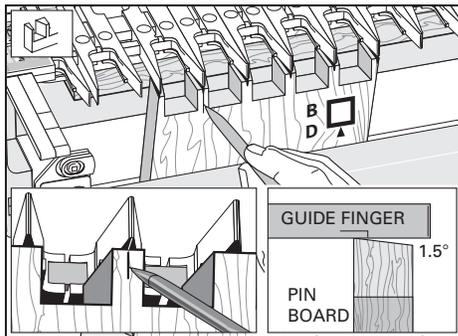
3-7 Let's make a sample hopper. We'll keep it simple and have a 10° side and end slope. Use 12"[305mm] lengths of 1x6"[20x140mm] pine.



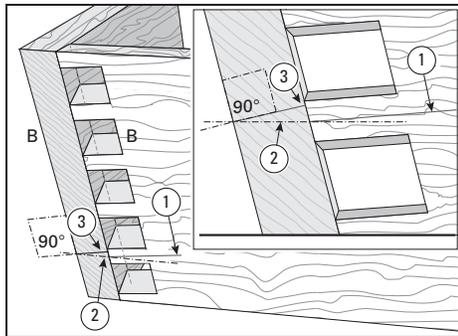
3-8 Bevel the side edges of all the boards at 10° ①. Cross cut the boards at 10° on the mitre, and with the blade at 1.5° off vertical to form the four hopper pieces. Mark the four corners "AA", "BB", "CC" and "DD". Bevel the inside faces of the tailboards 1.5° ② (see page 6, Fig 5).



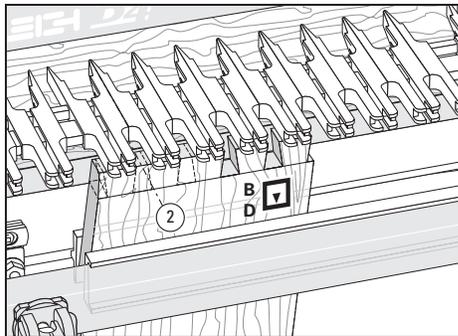
3-9 The side Stops are not used in this procedure, so mount the pin board far enough away from the side stop so that the angled tail board may go under the same position later. Rout pins "A" and "C" vertically under the TD PINS guide fingers, and mark the centre of one pin on each board ①.



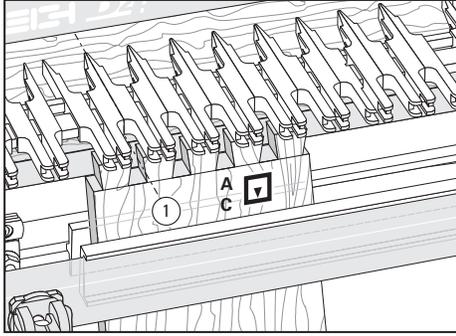
3-10 Rout Pins "B" and "D" and mark one pin on each.



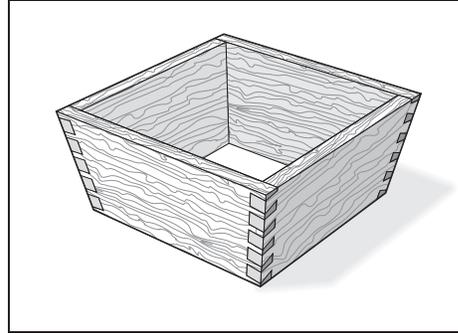
3-11 Regardless of any fancy shapes there may be on top and bottom edges of both pins and tail boards, align the boards so that the cut pins are butting against the uncut tail boards, with both boards at their correct angles. Beginning at the existing marked line ①, extend a horizontal line across the tail board end ②, then square this back to the inside face of the tail board at 90° ③. Repeat on all four corners.



3-12 In the TD Tails mode, mount the tailboard, inside face ④ and bevel away from the jig, using the 1½° angled jaws. Align the square mark ② with the centre of the same pair of guides that produced the pin and rout tails "B" and "D".



3-13 Repeat for TD TAILS "A" and "C".



3-14 Dry assemble for alignment and fit.

LEIGH

Leigh Router Joinery Jigs

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