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# Box Joint Jig



*A unique micro-adjustment system lets you "dial in" perfect fitting box joints on your table saw or router table.*

**T**he thing that impresses me most about this box joint jig isn't the tight-fitting joints you can make with it. After all, that's what you expect from a precision-made jig. What's unique is how quickly and easily it can be adjusted.

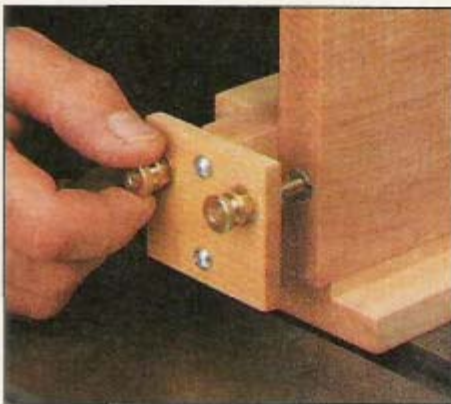
Unlike most box joint jigs I've used that require an almost endless amount of "tweaking," this jig can be set up in a matter of minutes. The secret is a built-in system that lets you adjust the jig in extremely small increments.

**MICRO-ADJUSTMENT SYSTEM.** This system is designed to adjust to the desired *size* and *spacing* of the pins and slots that make up a box joint, see photo A. By simply turning a knob, the jig can be

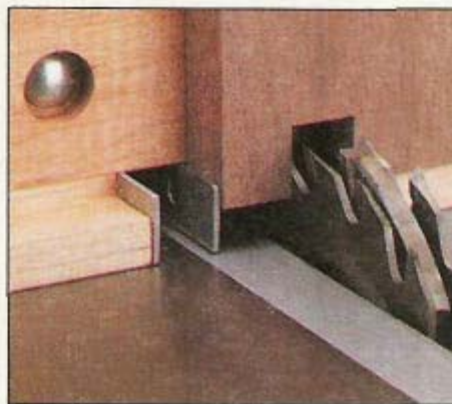
set to cut slots that range in size from a width of  $\frac{1}{4}$ " to  $\frac{13}{16}$ ". A second knob changes the spacing of the pins and slots. This tightens (or loosens) the joint which allows you to sneak up on a perfect fit.

**KEY.** The adjustment system works by moving two metal brackets, see photo B. The brackets form a "key" that automatically positions the workpiece so each slot is cut a uniform distance apart. This creates a series of pins and slots that fit together like fingers in a glove.

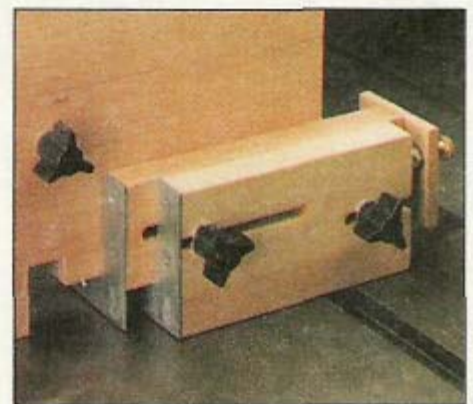
**LOCKING FEATURE.** To prevent the key from "creeping" once it's adjusted, a pair of plastic knobs locks it securely in place, see photo C. The result is perfect fitting box joints.



**A. Micro-Adjustment System.** A pair of knobs adjusts the jig to the desired size and spacing of the pins and slots.



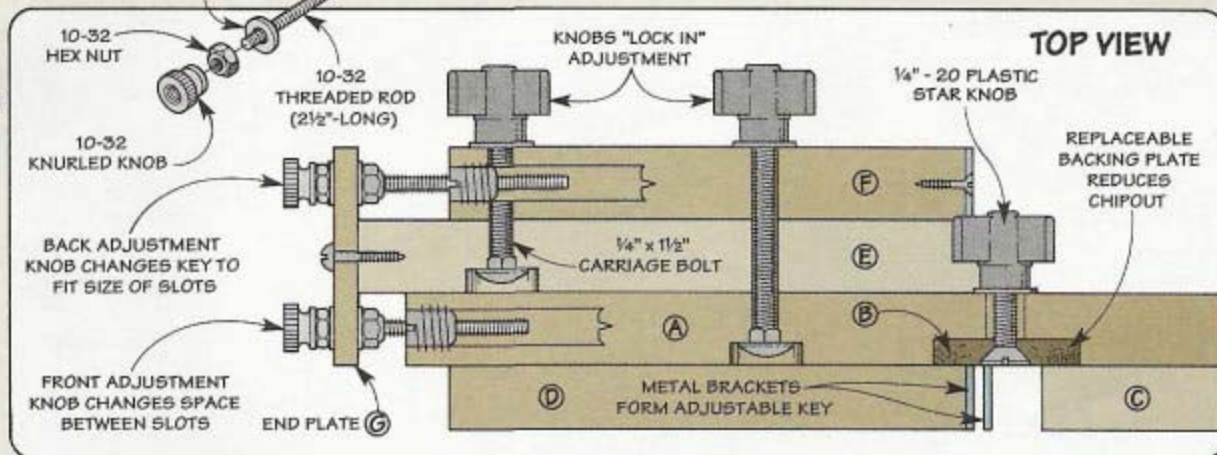
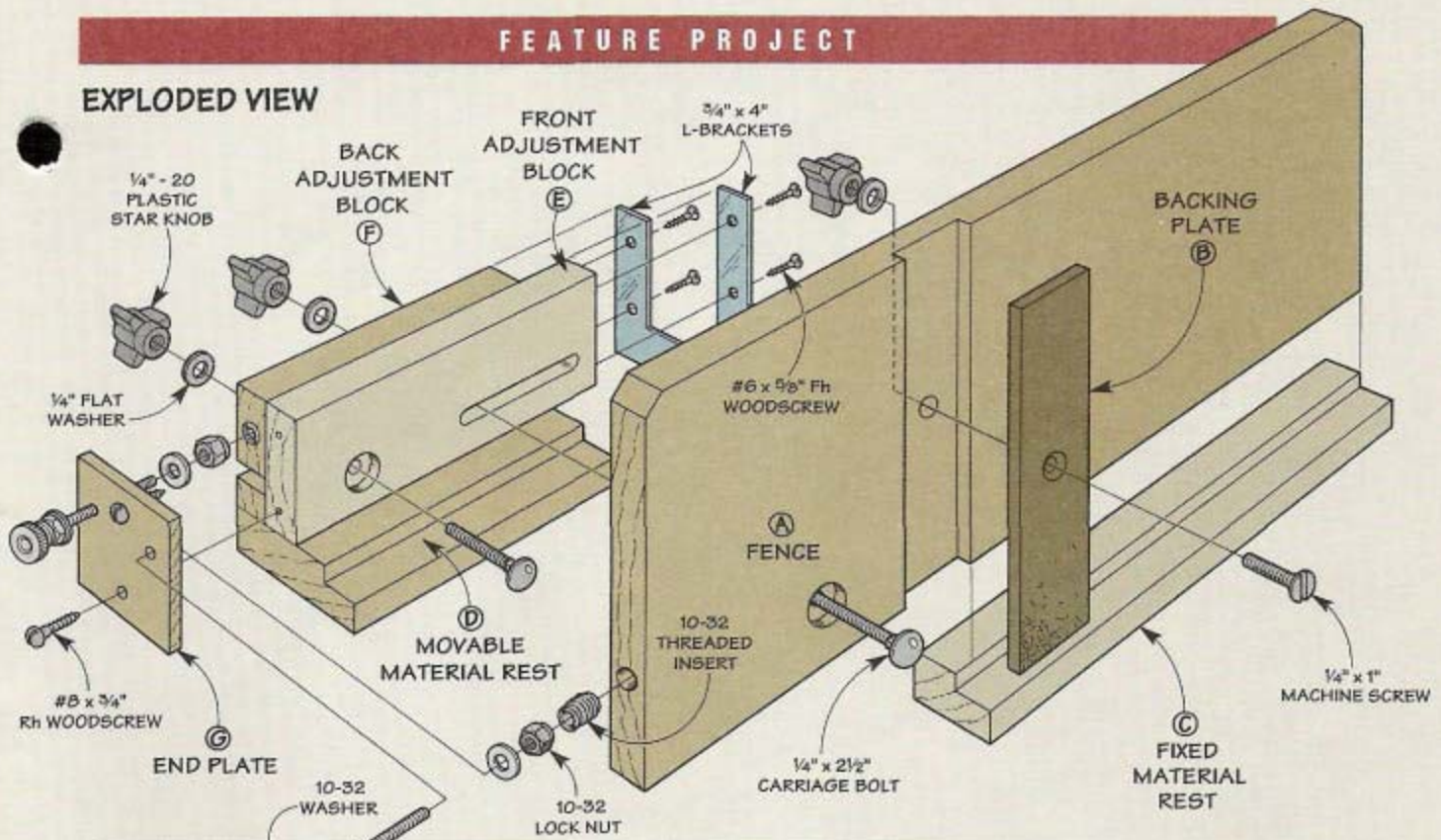
**B. Key.** To cut identically spaced pins and slots, two metal brackets form a "key" that positions the workpiece.



**C. Locking Feature.** After adjusting the box joint jig, it can be locked in place with two plastic knobs.

## FEATURE PROJECT

### EXPLODED VIEW



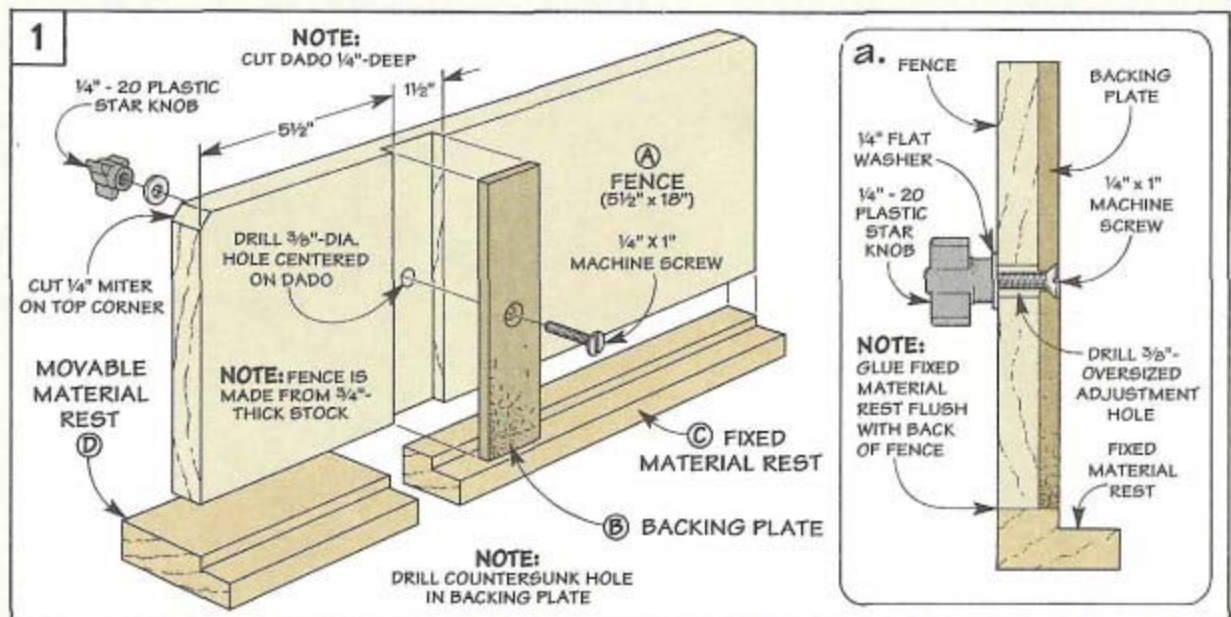
### Hardware

- (1) 1/4" x 1" Machine Screw
- (3) 1/4" - 20 Plastic Star Knobs
- (3) 1/4" Flat Washers
- (2) 3/4" x 4" L-Brackets\*
- (5) #6 x 5/8" Fh Woodscrews
- (1) 1/4" x 1 1/2" Carriage Bolt
- (1) 1/4" x 2 1/2" Carriage Bolt
- (2) #8 x 3/4" Rh Woodscrews
- (2) 10-32 Threaded Inserts
- (4) 10-32 Washers (Brass)
- (2) 10-32 Lock Nuts
- (2) 10-32 Hex Nuts (Brass)
- (2) 10-32 Knurled Knobs (Brass)
- (2) 10-32 Threaded Rods - 2 1/2" (Brass)  
\* also sold as mending plates

### Materials List

A Fence (1)	3/4 x 5 1/2 - 1B
B Backing Plate (1)	1 1/2 x 5 1/2 - 1/4 Masonite
C Fixed Material Rest (1)	3/4 x 1 1/2 - 1 3/8
D Movable Material Rest (1)	3/4 x 3 - 5/8
E Front Adjust. Block (1)	3/4 x 2 - 6 1/2
F Back Adjust. Block (1)	3/4 x 2 - 5 3/8
G End Plate (1)	1/4 x 2 - 2 1/4

# Fence and Material Rest



The box joint jig is designed with a tall fence that supports a workpiece when you stand it on end. This lets you cut slots on the *end* of the workpiece by pushing the jig through the blade (or bit).

**FENCE.** The fence (A) is just a piece of 3/4"-thick hardwood (maple) with the top corners mitered, see Fig. 1. To provide plenty of support, the fence is 5 1/2" tall (wide) and 18" long.

**BACKING PLATE.** After you've cut the fence to size, the next step is to add a replaceable backing plate. The plate prevents the wood fibers around the back of the slot from chipping out as the blade passes through the workpiece.

So why doesn't the fence alone solve the problem of chipout? Because as the jig passes over the blade, a slot is cut in the fence as well as the workpiece. The problem is once a large slot is cut, you've removed the support.

That's where the *backing plate* (B) comes in. It's a piece of 1/4" Masonite that fits in a shallow dado in the fence, see Fig. 1. To make it easy to replace when it gets chewed up, the plate is held in place with a machine screw and knob (or wing nut), see Fig. 1a.

## MATERIAL REST

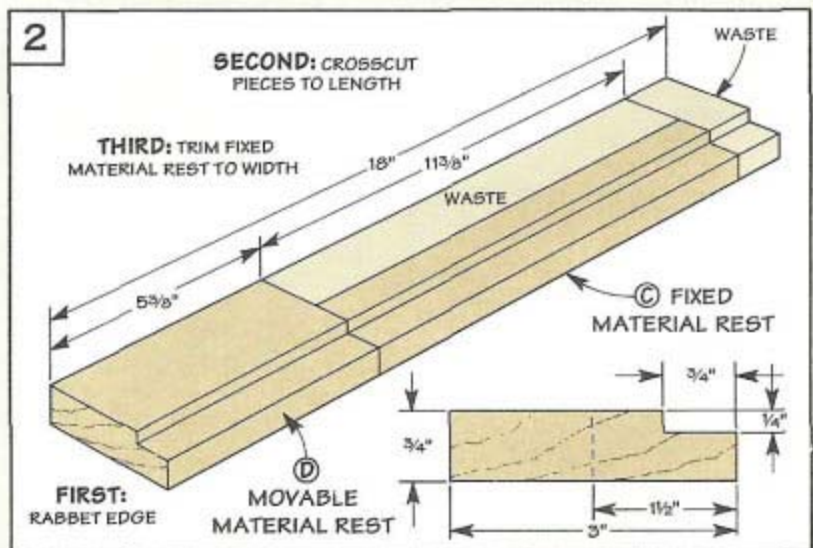
With the fence complete, the next step is to add a material rest. It serves as a "shelf" to raise the end of a workpiece above the saw or router table. This way, the workpiece spans any irregularities in the table insert that can cause the depth of the slots to vary.

**TWO PARTS.** The material rest consists of two parts. A *fixed rest* (C) is attached permanently to the jig. And a *movable material rest* (D) that slides from side to side, see Fig. 1.

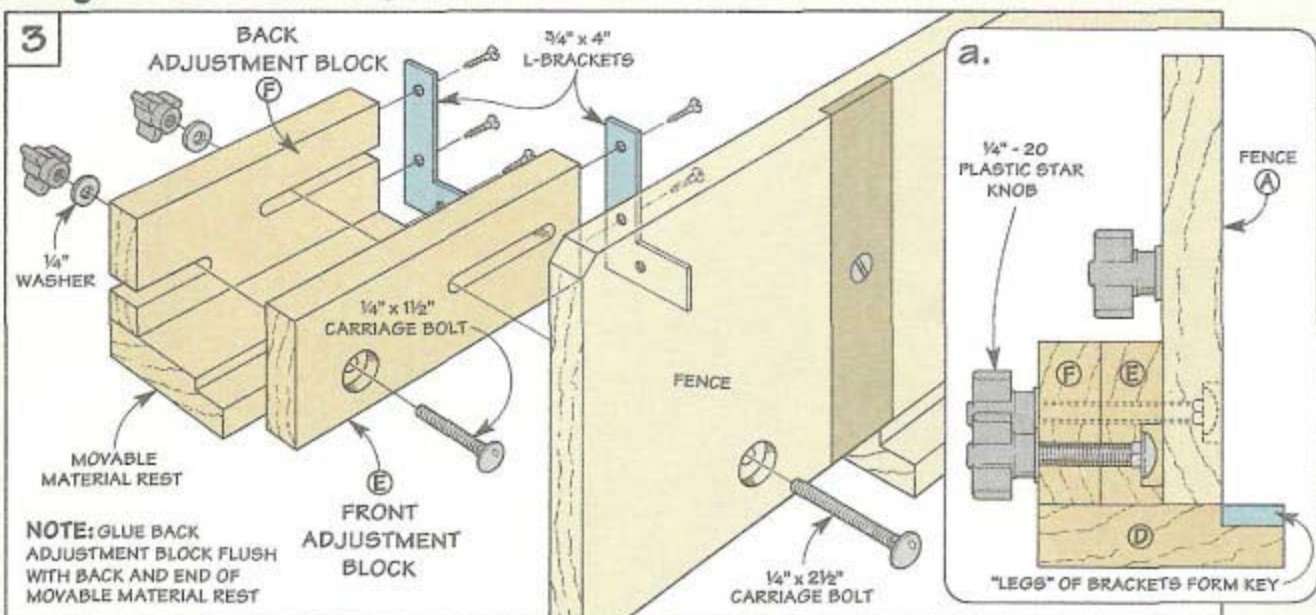
This two-part rest creates an opening that provides clearance for an adjustable "key" that's added later. And it lets you slide the jig through the blade without cutting into the material rest.

**BLANK.** Both parts of the rest start out as a 3/4"-thick blank, see Fig. 2. After cutting a rabbet on one edge to form the shelf, the two parts are cut to final length.

Then the fixed rest is trimmed to width and glued to the bottom of the fence, see Fig. 1. The movable rest is used later as a platform for the adjustment system.



# Adjustment System



After completing the material rest, work can begin on the adjustment system. Basically, this system consists of two adjustment blocks and a pair of L-shaped metal brackets, see Fig. 3. The blocks and brackets work together to form a "key" that adjusts to the desired size and spacing of the slots that make up the box joint.

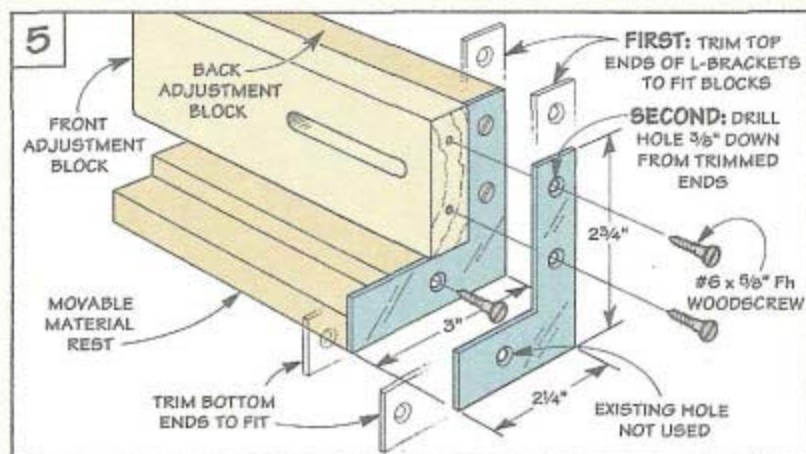
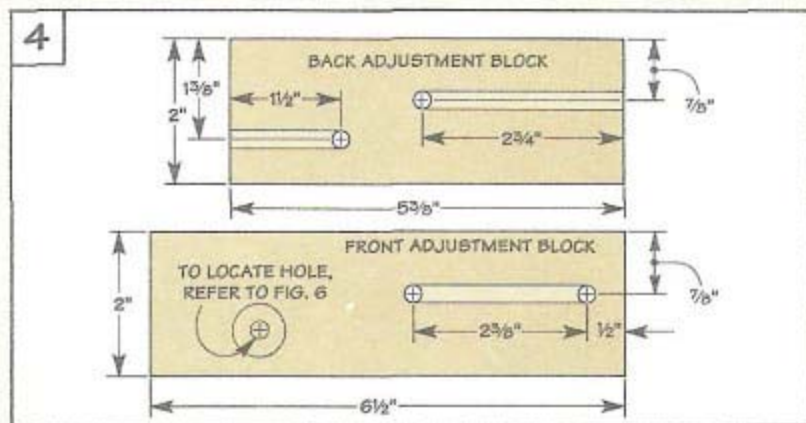
**ADJUSTMENT SLOTS.** To make the key adjustable, slots are cut in the *front (E)* and *back adjustment blocks (F)*, see Fig. 4. Then the back block is glued to the movable material rest (D) that was made earlier to create an L-shaped assembly, see Fig. 3.

**KEY.** When the glue dries, the next step is to add the adjustable key. To do this, the L-brackets are attached to the ends of the blocks. These brackets are just 4" mending plates that I picked up at the local hardware store. (See page 31 for other sources.)

The only unusual thing is the brackets need to be modified slightly to fit the adjustment blocks. This requires trimming the ends and drilling an additional mounting hole in each bracket, see Fig. 5.

**ATTACH BRACKETS.** Now the brackets can be screwed to the ends of the blocks so the bottom "legs" are flush with the front edge of the material rest (D). Af-

ter the adjustment system is assembled, the legs will extend in front of the fence and form the key that's used to position the workpiece, refer to Fig. 3a.



# Locking System

The two adjustment blocks allow you to set the size and spacing of the key. To prevent this key from moving once it's adjusted, I installed a special locking system.

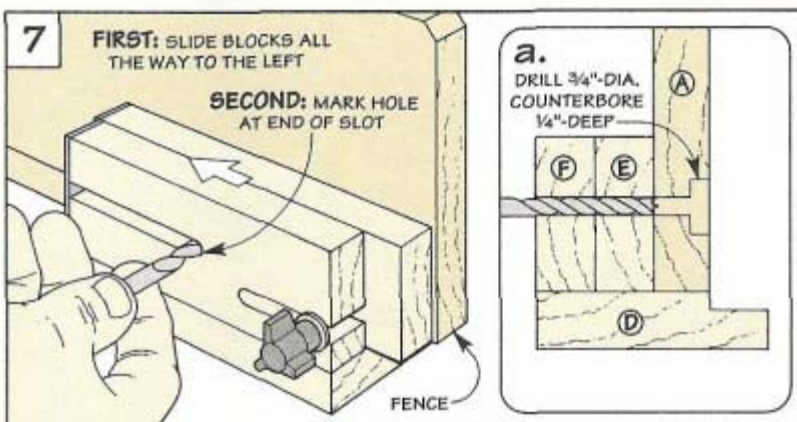
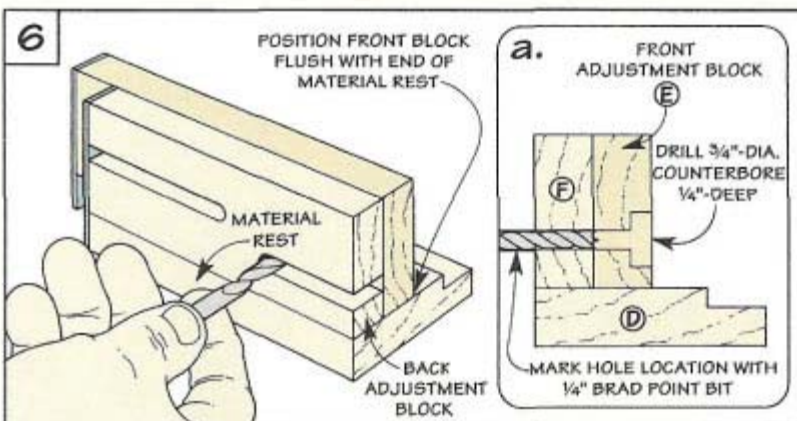
This system has two separate "locks" — one for the *size* of the key, and one for the *spacing* between the key and the blade.

**SIZE LOCK.** To lock in the size of the key, the adjustment blocks are held together with a carriage bolt and knob, refer to Fig. 3a. The bolt passes through a hole drilled in the front block (E) and through the short slot in the back block (F), see Figs. 6 and 6a.

**TEMPLATE.** To ensure the hole in the front block aligns with the slot, I used the back block as a template, see Fig. 6. With the ends of the blocks flush, a 1/4" brad point bit can be used to mark the center of the hole at the *end* of the slot, see Figs. 6 and 6a.

**DRILL HOLE.** After locating the centerpoint, drill a shank hole for the carriage bolt. Then to recess the head of the bolt, I used a Forstner bit to drill a counterbore. Now the carriage bolt can be installed and a washer and knob (or wing nut) threaded on.

**SPACING LOCK.** The next step is to provide a way to lock in the



spacing between the key and the blade. Here again, a carriage bolt is used. But this time it passes through a hole in the *fence* and the long slots in *both* blocks.

To locate this hole, place the assembly under the fence. Then

slide the blocks to the left as far as possible, and mark the hole at the *end* of the slot, see Fig. 7.

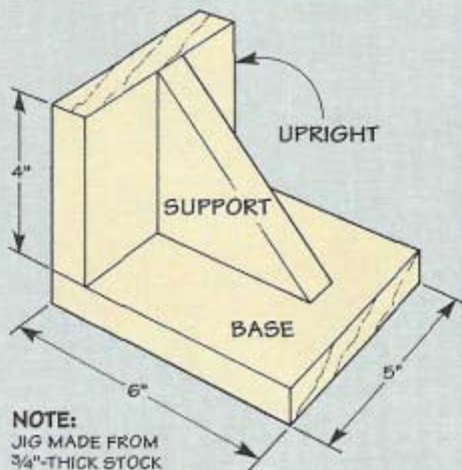
All that's left is to drill a counterbored shank hole in the fence, see Fig. 7a. Then install a carriage bolt, washer, and knob as before.

## Vertical Drilling Jig

Holding a long workpiece (like the box joint jig) steady when drilling holes in end grain can be a challenge. So when I drilled the holes for the adjusting rods, I used a simple jig, see photo.

It's just a couple of pieces of wood held together at a right angle and a triangular support piece, see Drawing.

To center the hole on the bit, the base is clamped to the drill press table so the upright extends over the edge. Then, with the work clamped to the upright, loosen the table and swing the workpiece under the bit.



A vertical drilling jig holds long workpieces securely in place when drilling holes in end grain.

# Micro-Adjustment System

The most unique feature of the box joint jig is the micro-adjustment system. This system lets you "fine tune" the key to the desired size and spacing of the slots.

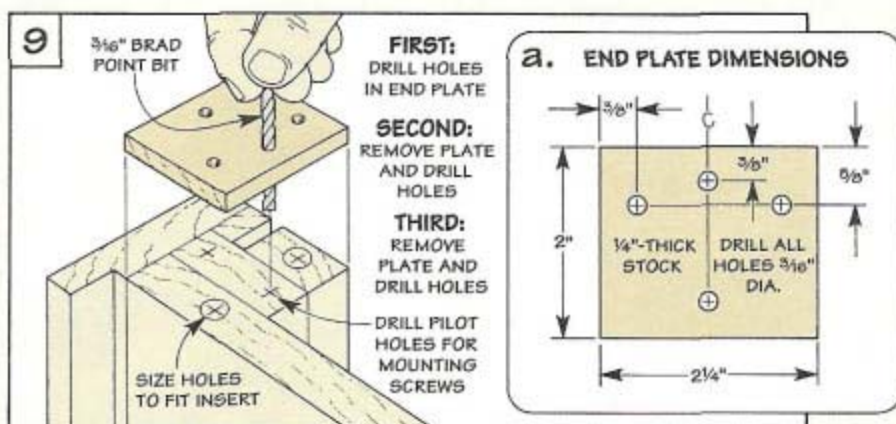
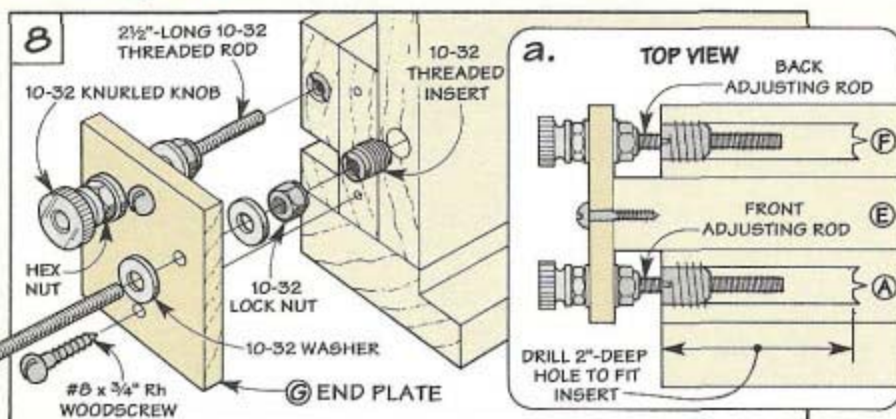
**ADJUSTING RODS.** The secret is a pair of adjusting rods. One rod threads into the end of the back block, and the other into the fence, see Fig. 8. By turning the adjusting rods you slide the blocks from side to side which positions the key.

(For more on using the micro-adjustment system, see page 12.)

**ADJUSTMENT ASSEMBLY.** To make this work, an adjustment assembly is attached to the front block (E), see Fig. 8. This assembly consists of a thin wood plate and several pieces of hardware.

**END PLATE.** Before installing the hardware, I made the *end plate* (G) from a piece of 1/4"-thick hardwood, see Fig. 9a. After drilling holes for the adjusting rods and two mounting screws, the plate can be used as a template to mark the corresponding holes in the end of the jig, see Fig. 9.

**DRILLING JIG.** Marking the holes is easy. The trick is holding the jig steady to drill the holes. To do this, I used a simple drilling jig, see box on page 10. Once the



holes are drilled, the micro-adjustment system can be assembled.

The 2 1/2"-long adjusting rods are cut from a piece of threaded rod. To accept the rods, threaded inserts are installed in the fence (A) and back block (F). The actual

adjusting pressure is created by a "stop" on each side of the plate.

The stop on the inside of the plate is a washer and lock nut. Another washer and a knurled knob that's tightened against a nut forms the outside stop.

## MITER GAUGE

The last step is to attach the jig to the miter gauge. The idea is to position the jig so you can cut the largest possible slot without cutting into the material rest.

This requires mounting your widest dado blade (or largest bit). In my case, this was a 1 3/16" dado blade, see Fig. 10. Note: Since I don't like to remove that much material with a router, the largest router bit I use is a 1/2" straight bit.

To complete the jig, check that the miter gauge is square to the blade. Then position the fixed rest against the blade and screw the gauge to the fence, see Fig. 10a.

