

Micro-Adjustable Router Fence

Joiner's fence lets you creep up on a perfect fit

BY PAT WARNER

To get on with the business of table routing, you need a stand, a flat router-table top and an adjustable fence. The stand and top do nothing but support the work. The fence, on the other hand, is the key to precision and efficiency. The fence is almost always in play and needs constant adjustment to handle the router table's ever-changing responsibilities.

As my hair whitens, I look for less frustrating and more efficient ways of spending my time. My fence did not result from an accident or a guess but from a lot of experimentation and testing. It is a precision joiner's fence that can be made for around \$80, and it should save you countless hours of shop time for years to come. The fence can handle bits up to 2 $\frac{3}{8}$ in. dia. but can't handle the largest bits, such as panel-raisers. You can position the fence solidly and lock it anywhere in its travel in 5 or 10 seconds, and it can be adjusted by thousandths of an inch.

Once you index the bit to the edge of your workpiece, the cutting depth can be set quickly and precisely. The micro-adjustment mechanism allows you to make slight changes in a rabbet, dado, mortise or other joint while sneaking up on a tight fit. For material-hogging bits, successive passes can be made in precise increments. And climb-cutting (to prevent tearout) is safer because a very light cut is easy to produce.

The fence moves in a straight line on two $\frac{1}{4}$ -in. by 1-in. aluminum guide bars and is micro-adjusted accurately along the dial indicator's 1 in. of travel. The fence's travel is also monitored with a 3-in. Starrett rule. Two small clamp levers lock the micro-adjustment section of the fence.

The base is slotted for larger clamp levers that screw into T-nuts under a router-table top. These slots allow for another 1 $\frac{1}{2}$ in. of rough adjustment. A

second set of T-nuts in the table will double the amount of rough adjustment.

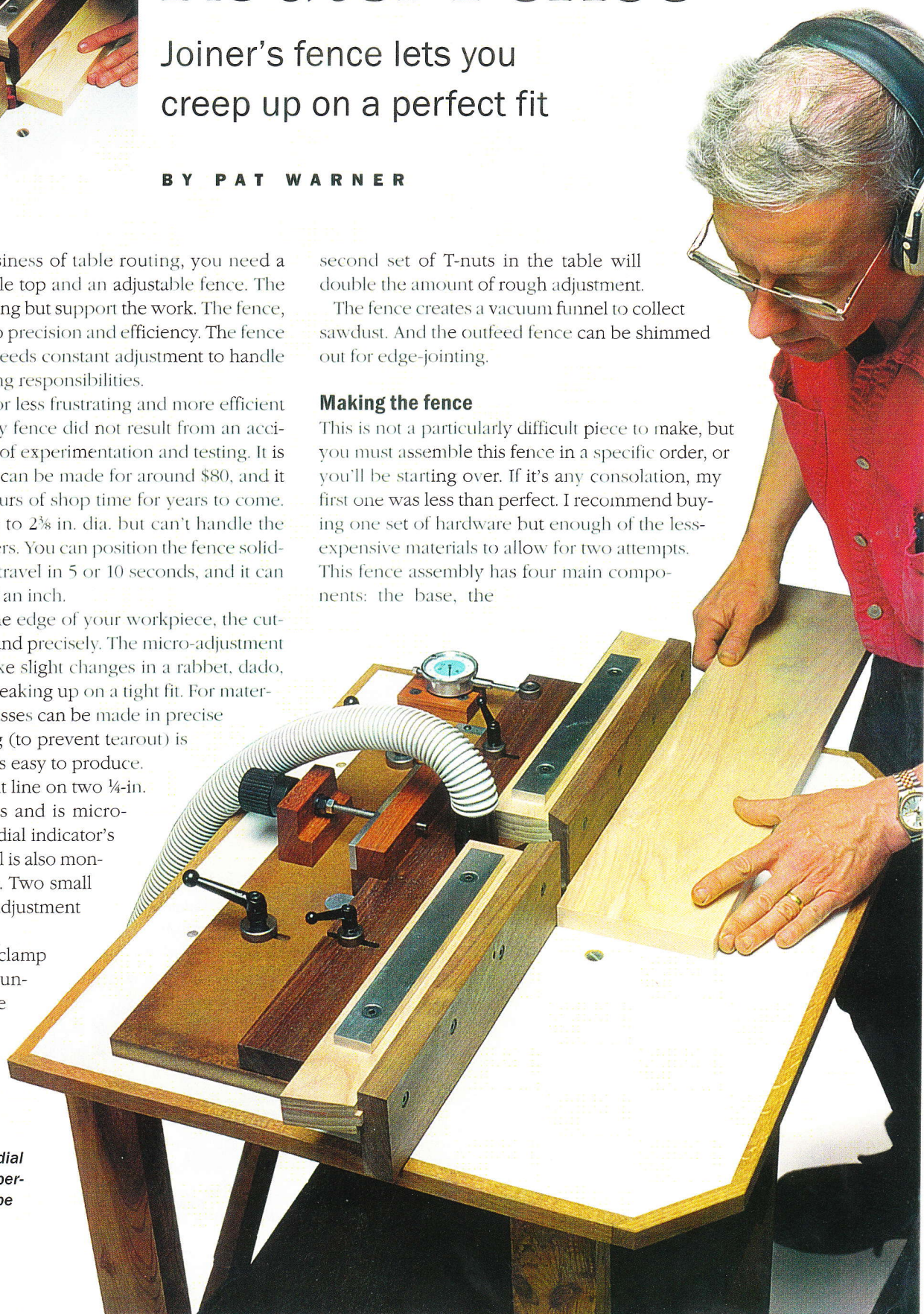
The fence creates a vacuum funnel to collect sawdust. And the outfeed fence can be shimmed out for edge-jointing.

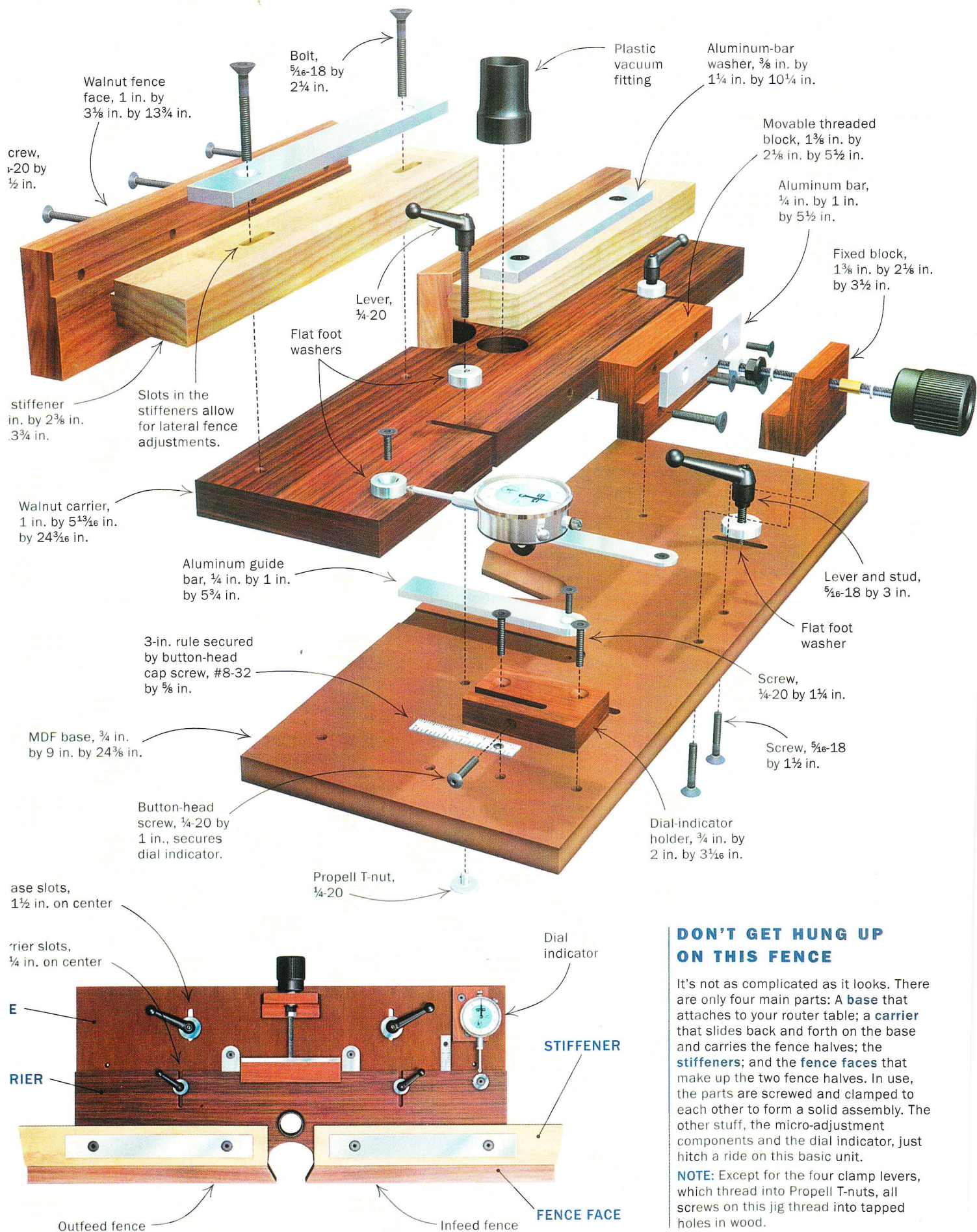
Making the fence

This is not a particularly difficult piece to make, but you must assemble this fence in a specific order, or you'll be starting over. If it's any consolation, my first one was less than perfect. I recommend buying one set of hardware but enough of the less-expensive materials to allow for two attempts. This fence assembly has four main components: the base, the

This precision router fence attaches to your router table.

A micro-adjustment screw and a dial indicator let you creep up on the perfect joint. The outfeed fence can be shimmed out for edge-jointing.





DON'T GET HUNG UP ON THIS FENCE

It's not as complicated as it looks. There are only four main parts: A **base** that attaches to your router table; a **carrier** that slides back and forth on the base and carries the fence halves; the **stiffeners**; and the **fence faces** that make up the two fence halves. In use, the parts are screwed and clamped to each other to form a solid assembly. The other stuff, the micro-adjustment components and the dial indicator, just hitch a ride on this basic unit.

NOTE: Except for the four clamp levers, which thread into Propell T-nuts, all screws on this jig thread into tapped holes in wood.

carrier, the fence faces and the fence stiffeners. Add the micro-adjustment system and the dial indicator, and you are basically there.

Begin with the MDF base—Use a router or bandsaw to cut out the V-shaped cutter/vacuum path in the medium-density-fiberboard (MDF) base. Bevel the walls of this channel 60° to facilitate chip extraction.

Plunge-route the two slots for the clamp levers. Next come the shallow dados that will hold the aluminum guide bars. Use your router table to make the template for these 1-in.-wide, 1/8-in.-deep dados. To create parallel dados, run the same side of the template against the fence each time.

Center the template along the length of the base and line it up with the edge. Use a bearing-guided bit to cut the dados. Drill the two holes for the fixed end of the micro-adjustment assembly. The rest of the holes in this base will be located from the components you'll make next.

Use a straight-grained piece of walnut for the carrier—I chose walnut for the carrier because the wood is relatively stable and can be resurfaced easily.

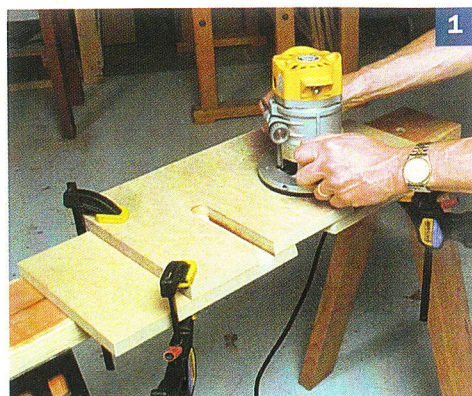
Rout two matching dados with the same template you used on the base. For clearance, cut them 0.005 in. to 0.010 in. deeper than the dados in the base. Next cut the two stopped slots into the back of the carrier for the small clamp levers, spaced 12 1/4 in. on center. Drill the 1 1/2-in. hole for the vacuum port (on the centerline, 2 5/8 in. from the front edge). Now cut the deep semicircle into the front edge, where the cutter will reside. For a better chip pathway to the vacuum port, relieve the underside with a 3/8-in. cove

cutter. Finally, cut the stopped dado for the Starrett rule. I have seen the widths of these rules vary by up to 1/4 in., so match the dado width to your own rule.

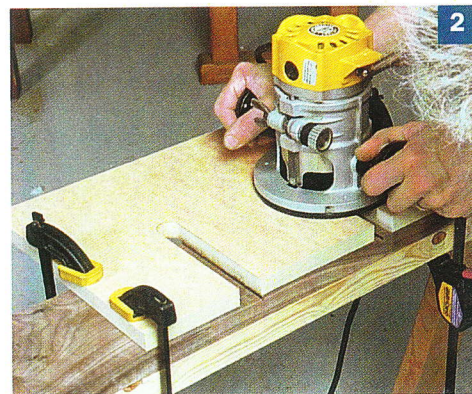
Fence faces are screwed to the stiffeners—I used 1-in.-thick walnut for the fence faces, more for the wood's stability than for its durability. It's a good idea to make some spares because these parts will wear out. Cut a 60° bevel on the ends that will be near the router bit. Drill and countersink them for the 1/4-20 screws. Cut a groove in the back of each fence face (7/16 in. wide by 3/16 in. deep) centered along the screw-hole line. These grooves will mate with tongues in the ash stiffeners, locating the fence faces just off the surface of your router table, to allow for sawdust clearance.

The stiffeners can be cut 12 in. long to square off with the end of the fence faces, but I make them longer than the faces for decorative purposes. Plunge-route the two 3/8-in.-wide stopped slots in the outfeed stiffener. Cut 1/16-in.-wide slots in the infeed stiffener. Screws will pass through the aluminum-bar washers and these

Routing the matching dados



1 A template ensures accuracy. A 3/4-in. MDF template makes it easy to rout the matching shallow dados (1). To rout the stopped dados in the base, center the template along the front edge of the base and clamp it. Use a top-bearing-guided (or pattern maker's) bit to cut the shallow dados. Do the same thing in the walnut carrier (2). This time, however, the dados run completely across this narrower component. Make these dados a bit deeper than 1/8 in. for clearance. With the aluminum guide bars in place, the carrier and base should fit together and slide easily (3).



slots to hold the two fence halves to the carrier. The outfeed slots are wider to allow the outfeed side to be shimmed out approximately 1/2 in. for edge-jointing.

Next, machine centered tongues to fit the grooves in the fence faces. Make them a tight fit. For chip clearance, position the height of the tongues so that the bottoms of the fence faces will be just above the surface of your router table. Fit the faces to the stiffeners, and transfer the centers of the holes in the faces through to the stiffeners. A transfer punch does this job more precisely than any improvised solution, such as a brad-point drill, and a cheap set of punches will make a handy addition to your shop. Drill the 1 3/4-in. pilot holes in the tongues of the stiffeners and tap them for the

SOURCES OF SUPPLY

REID TOOL SUPPLY (800-253-0421)

Clamp levers, knob, dial indicator and other assorted hardware

BRUSS FASTENERS (800-536-0009)

Propell T-nuts

DEWALT (800-433-9258)

Plastic vacuum fitting (1 1/2 in., part No. 328592-00)

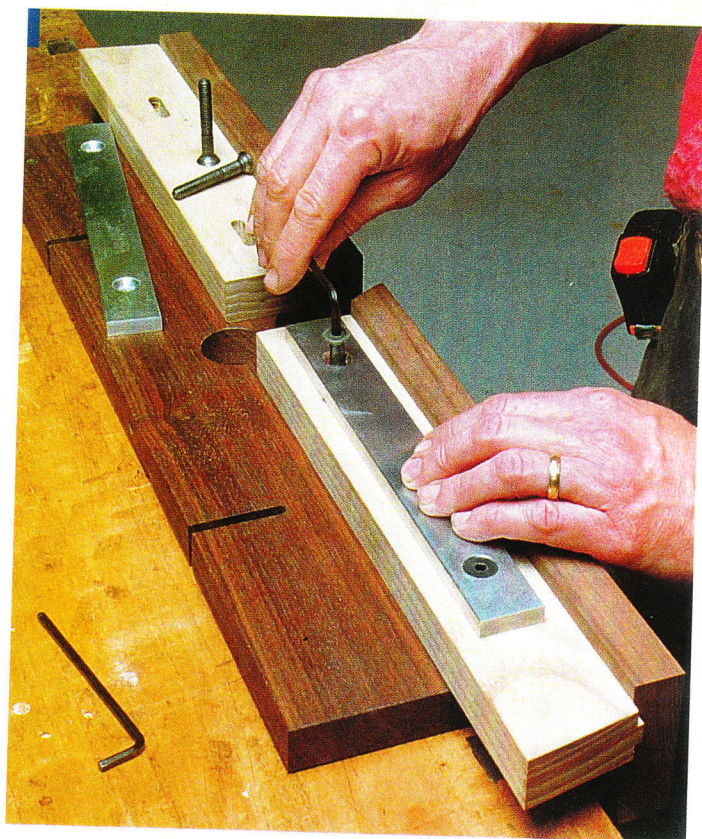
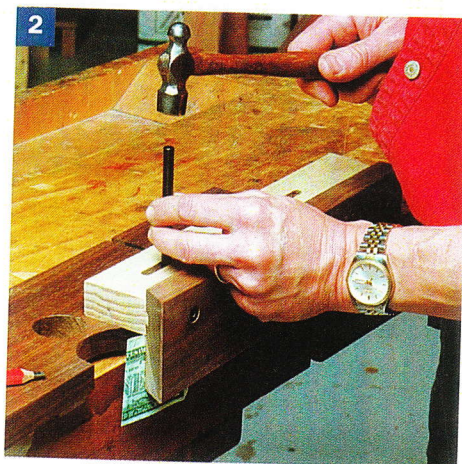
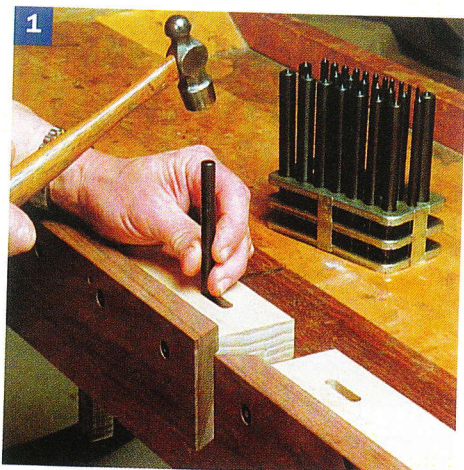
L.S. STARRETT (978-249-3551)

3-in. Starrett rule, part No. C604R-3

A complete parts list, with all Reid part numbers, is available on our web site: www.finewoodworking.com

osition the fence halves

low room for adjustment. With the fence faces about 1 in. apart, butt the outfeed fence against the carrier and transfer-punch through the outer side of each slot in the stiffener to locate the tapped holes below (1). Note that the outfeed slots are wider to allow the side to be offset for edge-jointing. Do the same with the infeed fence, but shim it away from the carrier 0.006 in. to 0.008 in. Next, to allow room for height adjustment later. A folded dollar bill makes the perfect shim at each end. Drill the tapped holes in the carrier, cut and drill the aluminum-bar washers, and fasten the fence halves in place (3).



$\frac{1}{4}$ -20 screws (for more on tapping threads in wood, see my article in *FWW* #126, p. 63). Screw together the fence faces and stiffeners.

Position the infeed and outfeed fences—Center the assembled fence parts, 1 in. apart, on the front of the carrier. Butt the outfeed fence against the carrier and clamp it down. Shim the infeed fence 0.006 in. to 0.008 in. away from the carrier and clamp it (a dollar bill makes a handy 0.004-in.-thick shim). The extra play will make it easier to align the infeed side with the outfeed side. I put $\frac{3}{8}$ -in. and $\frac{5}{16}$ -in. transfer punches through the respective slots in the stiffeners to locate the tapped holes in the carrier. Transfer the centers through the outside ends of all four slots, to allow each half to be slid outward for larger router bits when you use the fence. Remove the fence halves, and drill and tap the carrier.

Assemble the micro-adjustment system—The micro-adjustment assembly consists of a fixed hardwood block with a bearing in it and a movable hardwood block faced with a bar of aluminum for more thread purchase. Any chunk of steel or aluminum will suffice; for the blocks I used jatoba, but any hardwood will work. The aluminum bar is bolted to a rabbet in the movable block, but the threaded hole will be located later, after the fence has been assembled. Center and fasten this block to the carrier. Now fasten the fixed block to the base.

Attach the dial indicator—The dial indicator for this fence measures 1 in. of travel. The indicator is attached to a hardwood block, which serves as a holder. Form a slot in the block for the bracket on the rear of this particular indicator. Drill a $\frac{13}{64}$ -in. hole through the slot for the $\frac{1}{4}$ -20 by 1-in. button-head screw. Tap 1 in. of threads, then bore out the thinner side of the slot to $\frac{1}{4}$ in. for clearance. Drill and countersink the block in two places so that you can fasten it to the base. Locate the rule and the dial indicator after the assembly has been completed. The stop for the plunger is a thick, machined washer. Drill and tap for its cap screw and attach it.

Finishing up

Transfer the centers of the $\frac{5}{16}$ -in. fence bolt holes in the carrier to the aluminum-bar washers, centering each bar over its pair of bolt holes. Drill and countersink $\frac{23}{64}$ -in. holes in the aluminum. Now assemble and fasten the fence halves to the carrier.

Round the ends of the aluminum guide bars to fit the stopped ends of the slots in the base, as I do, or leave the ends square and square off the end of each slot. Drill and countersink the guides for the machine screws that fasten them to the base. Drill and tap the base for these screws and attach the guide bars.

Now drop the fence assembly onto the guide bars and slide the backs of the fences against the base. Use the ends of the slots in the walnut carrier to mark the holes in the base for the two T-nut inserts. The smaller lever clamps will reside in these slots. Remove the fence assembly and drill small holes through the base to the bottom side for location. Flip the base, and drill and counterbore the bottom for the T-nuts.

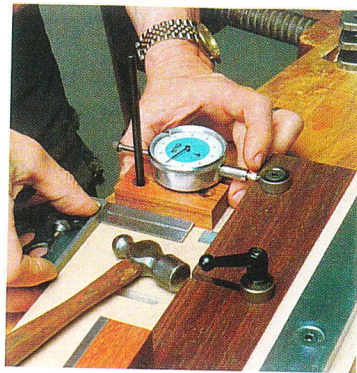
Reattach the fence assembly to the base, again butting the fence faces against the base. Insert the small clamp levers and lock down the assembly. You can now locate the holes for both the Starrett rule and the dial-indicator holder.

Drill a $\frac{5}{32}$ -in. hole in the Starrett rule on the first $\frac{1}{2}$ -in. mark. You'll

Add the rule, the dial and the micro-adjustment assembly

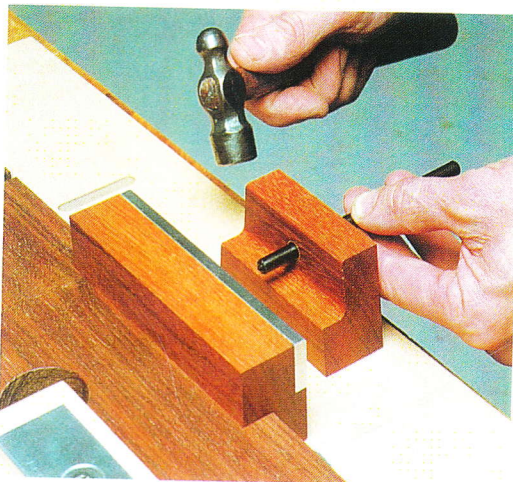


Slide the rule into the slot in the carrier up to its 1-in. mark. Use the hole you drilled in the rule to lay out the tapped hole in the base.



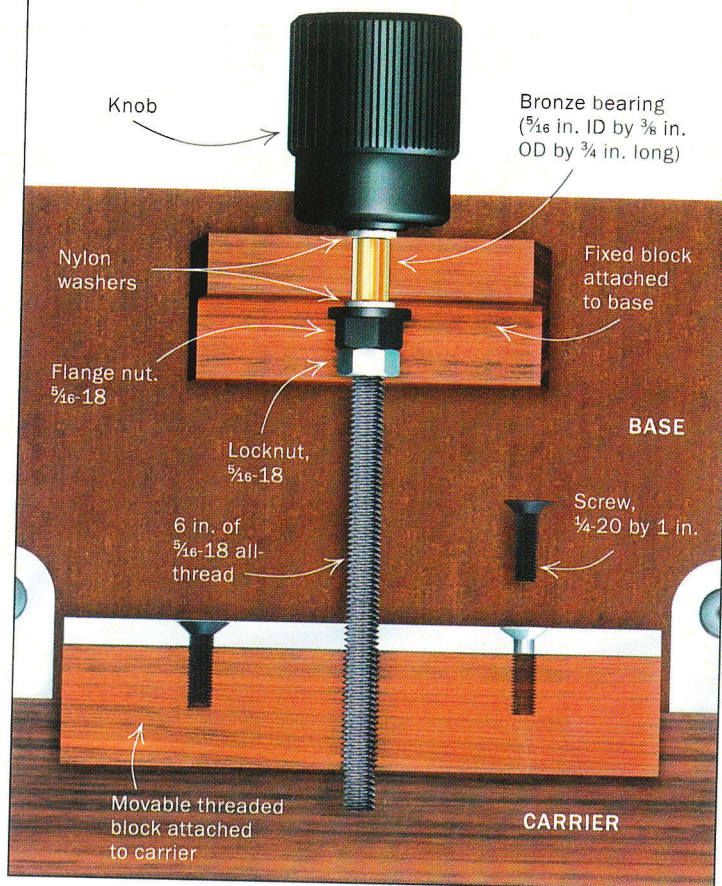
Align the dial indicator with its stop on the carrier. Push the unit forward until 0.020 in. to 0.040 in. of travel is left. Transfer its holes with a center punch and drill and tap the base.

Locate the micro-adjustment assembly. Transfer the hole in the fixed block on the base to the movable block on the carrier. Drill and tap the movable block.



MICRO-ADJUSTMENT ASSEMBLY

The knob-and-spindle assembly runs through a bronze bearing in the fixed block and screws into threads that are tapped into the aluminum and wood of the movable block.



need carbide to get through the tempered steel. Slide the rule under the carrier to the 1-in. mark and locate the hole for the button-head screw. If you don't have a $\frac{5}{32}$ -in. carbide bit, you can hold down the rule with double-faced tape.

With the dial indicator fastened to its holder, locate the unit so that the indicator's plunger is centered on the stop (you attached it earlier) and only 0.020 in. to 0.040 in. of travel is left in the indicator. Transfer the holes in the holder to the base and drill and tap the base for the rule and the dial indicator.

With the fence reassembled, insert the bronze bearing in the fixed block and transfer its center through to the aluminum bar in the movable block. Drill ($\frac{1}{4}$ in.) and tap the movable block for the adjustment screw.

Screw the knob onto its threaded rod with a drop of Loctite or other glue to hold it in place. Insert the knob screw through the fixed block with a nylon washer on both sides. Spin down the flange nut and locknut; allow no slop. With the carrier riding on its guides, thread the screw into the movable block. Drive the fence all the way to the 1-in. mark on the rule and lock it down. Last, press-fit the plastic vacuum fitting into its $1\frac{1}{2}$ -in. opening.

To attach the entire assembly to your router table, center the fence opening on your router table and clamp down the base. Lo-

cate and drill the holes in the tabletop for the larger T-nuts, which are for the larger set of clamp levers.

Using the fence

To get up and routing, lock the base to your router table, attach your vacuum hose and insert your chosen cutter.

Loosen the aluminum-bar washers and align the fence halves with a long straightedge, moving their inside edges close to your router bit. Then tighten down each side.

Release the smaller clamp levers for micro-adjustments and lock them down before cutting. Make some test cuts. If the fences aren't exactly perpendicular to your tabletop, square them up by placing paper shims under the stiffeners.

There are few frills on this tool. All components work together, with clamps and washers designed to flatten the parts and create a stable assembly. The drive mechanism is relatively inexpensive, and you can save another \$30 if you decide to omit the dial indicator and 3-in. rule.

If you encounter difficulty building this jig, you can e-mail Pat Warner for advice: pat@patwarner.com. John White, Fine Woodworking's shop manager, helped with this article.