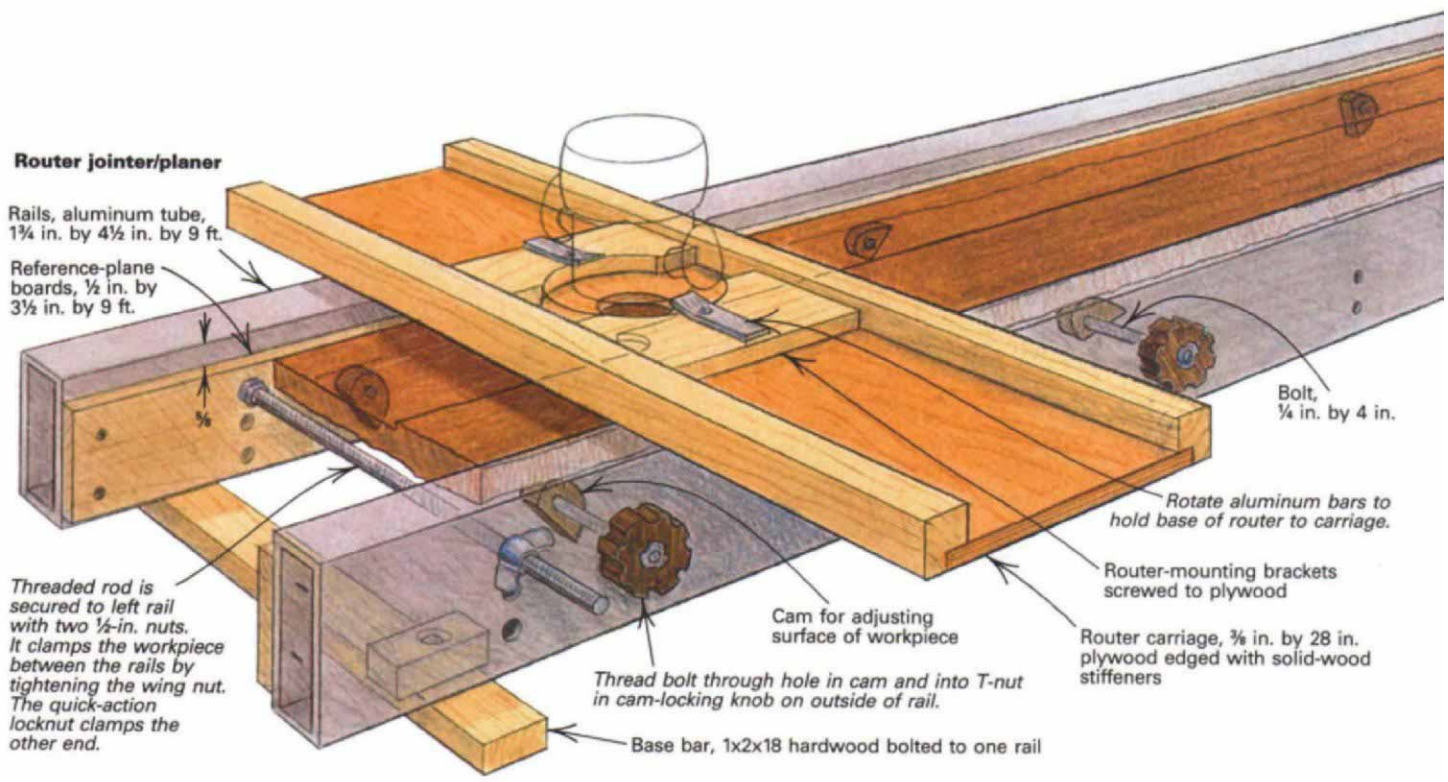
Surfacing Stock with a Router

How a simple fixture can true up wide boards

by Tim Hanson



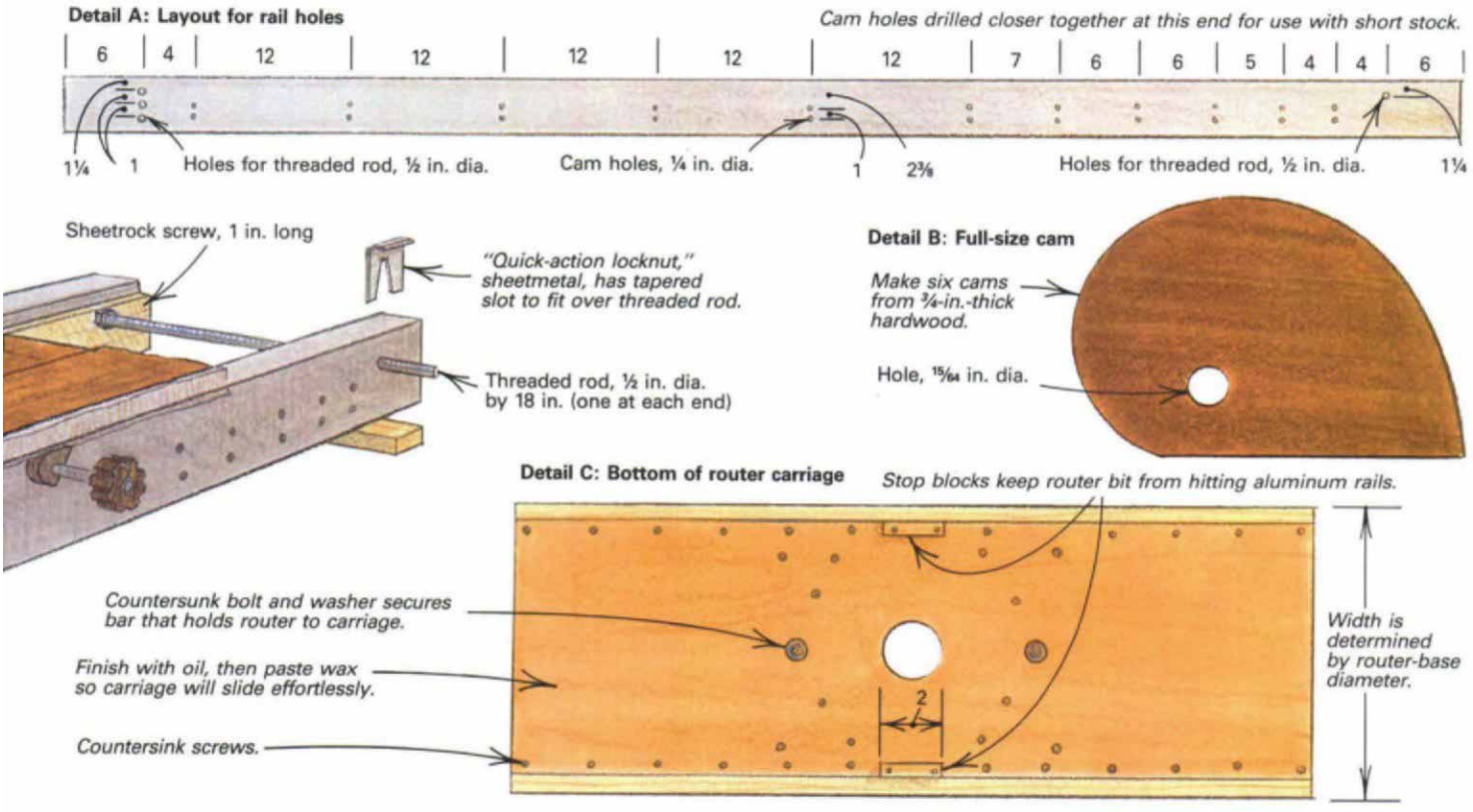
Did you ever get a good deal on a load of lumber, only to notice while unloading it at home that the rough boards were all twisted, bowed or cupped? Then, as the stack of 8- and 12-in.-wide boards began to dwarf your narrow jointer, and it became clear that it would take forever to process the lumber, did the flush of a great deal give way to disappointment? I know the feeling. I put off using 500 bd. ft. of roughsawn walnut for more than two years because of the limitations of my 5-in.-wide combination jointer/planer.

Finally, I decided to set up a router to flatten the boards. I mounted my router on a bridge that would slide on my workbench while straddling one of the rough boards clamped to the bench. Oh, I got a smooth face, but when I removed the clamps, the bow and twist were still there. I needed to hold the board without clamping out its twists or bends, then pass the router over the board in a straight, flat plane—and I needed to know where that plane was in relation to the board. The router jointer/planer in the drawing above solved these problems better than I hoped. It consists of two aluminum rails with "reference-plane" boards screwed to their inside faces, six cams with locking knobs for aligning the workpiece's top surface with the reference plane boards, some all-thread rod to clamp the rails to the workpiece and a carriage for my 1½-HP Black & Decker router. For "planing" with the router, I use a 1¼-in.-dia. carbide mortising bit with a ¼-in.-dia. shank made by W.K.W Wisconsin. The bit is available from Edwin B. Mueller Co. Inc., 3940 S. Keystone Ave., Indianapolis, Ind. 46277; (317) 783-2040.

How to surface stock—The two 9-ft. rails are the backbone of the rig. They provide a flat and true plane for the router carriage to slide on. The rough or twisted workpiece is supported between the rails on the adjustable wood cams. By adjusting the cams, you can raise or lower one end, or even one corner of the workpiece until its entire top surface is level with or higher than the reference-plane boards. The reference-plane boards are also used to set the depth of the router bit, therefore defining the plane in which the cutter will pass over the surface of the workpiece. After the top surface of the workpiece is set, the rails are "clamped" to the edges of the workpiece with an all-thread rod at each end of the rails. Then the carriage-mounted router is switched on and slid along the rails, "planing" the board fiat.

The cutting passes are made in a continuous motion and at a moderate speed along the grain of the wood from one end of the board to the other. The cutter should be in motion at all times to avoid scorching a circle into the work. To thickness-plane the flattened board, set a combination square for the desired thickness and use it to set all six cams the proper dimension from the tops of the reference-plane boards. Lay the workpiece on the cams, flattened side down. When the router carriage is passed over the board, the result will be a flat, planed board.

I can surface both sides of a 1-ft. by 8-ft. board in a matter of minutes. Short boards, only 6 in. or 8 in. long, can be surfaced just as easily. I wouldn't cut a ¼-in.-deep pass with a planer, yet I think nothing of making such heavy cuts with one pass of the rout-



er. If I want a super-fine finish, I raise the cutter 1/64 in. above the reference plane for the first cut, then lower the cutter to just clear the plane and make the final cut. I end up with a smoother finish than the planer gives me, with no little waves in the surface. In addition, the shearing action of the router bit leaves a nice finish on curly maple with no chip-out. Even if you have a thickness planer, this rig will come in handy as a 12-in.-wide jointer for flattening one side of a wide board in preparation for planing.

Jointing edges—I've had the router jointer/planer for about three months, and I'm still finding new tricks it can do. By removing the cams and clamping the rails to both faces of a board, you can "joint" edges for a straight glue joint. Using the same method, you can plane the faces of a 12-in. by 12-in. timber, or any other piece too thick to fit through a normal planer. Going to the other extreme, I've planed stock to 3/32 in. thick for my son's dulcimer. First, I surfaced two sides of a ¾-in.-thick board and resawed it in half on the bandsaw. Then, with double-faced tape, I stuck the finished side of the resawn board to the finished side of a thicker board and used the rig to plane the resawn board to 3/32 in. thick. No other tool in my shop would have handled such thin stock.

Building the fixture—The aluminum rails are light, rigid and perfectly straight. I got them free of charge from the owner of a glass company who salvaged them from a remodeled storefront. New, they would cost about $80. Drill the holes for the cams and the threaded rods, as shown in detail A of the drawing above, in one rail with a drill press. Then clamp the two rails together and use the holes in the first rail as guides for boring into the second rail.

After all the holes are drilled, attach the reference-plane boards to the rails. Make sure both boards are straight and true, then clamp them to the insides of the rails using a 5/8-in. spacer to check their distance from the tops of the rails. Don't forget, you want to end up with a left and right rail. Attach the boards to the aluminum rails with 1-in. drywall screws by drilling slightly undersize pilot holes through the wood and the aluminum. This way the screws will act like sheet-metal screws and will cut their own threads in the 1/8-in.-thick side wall of the rails. After the reference-plane boards are secured, drill the holes in the rails on through the boards with a portable electric drill.

The cams, shown in detail B of the drawing above, and the cam locking-knobs are bandsawn from ¾-in.-thick hardwood. A ¼-in.-dia. bolt is threaded through a 15/64-in.-dia. hole in each of the cams. The bolts pass through the rails and thread into T-nuts in the center of each knob. To make a knob, draw a 2-in.-dia. circle on the wood and then draw diameters to divide the circle into eight equal parts. Drill a 5/16-in.-dia. hole at each point where the diameters cross the circle, then bandsaw out the original circle. Sand the rough edges and you have a nice knob with good finger grips.

The two walnut "base bars," shown above, provide a flat surface for the rails to sit on and ensure that both rails are aligned in the same plane. The bars are attached to a single rail with one bolt so they can pivot "closed" when not in use.

The all-thread rods are secured to one of the rails with a nut on each side of the rail. A wing nut on one of the rods and a shop-made, sheet-metal, "quick-action locknut" on the other clamp the rails to the workpiece.

Build the router carriage as shown in the drawing and in detail C above. Glue and screw the solid-wood stiffeners and the mounting brackets to the plywood. The router is held in place by two aluminum bars bolted to the carriage. Two small blocks screwed to the underside of the carriage restrict its sideways movement so the router bit can't contact the aluminum rails (see detail C). I finished all the wood with two coats of Watco Danish Oil and waxed the bottom of the carriage so it slides easily along the rails. □

Tim Hanson is a retired general contractor who still enjoys woodworking as a hobby in his shop in Indianapolis, Ind.