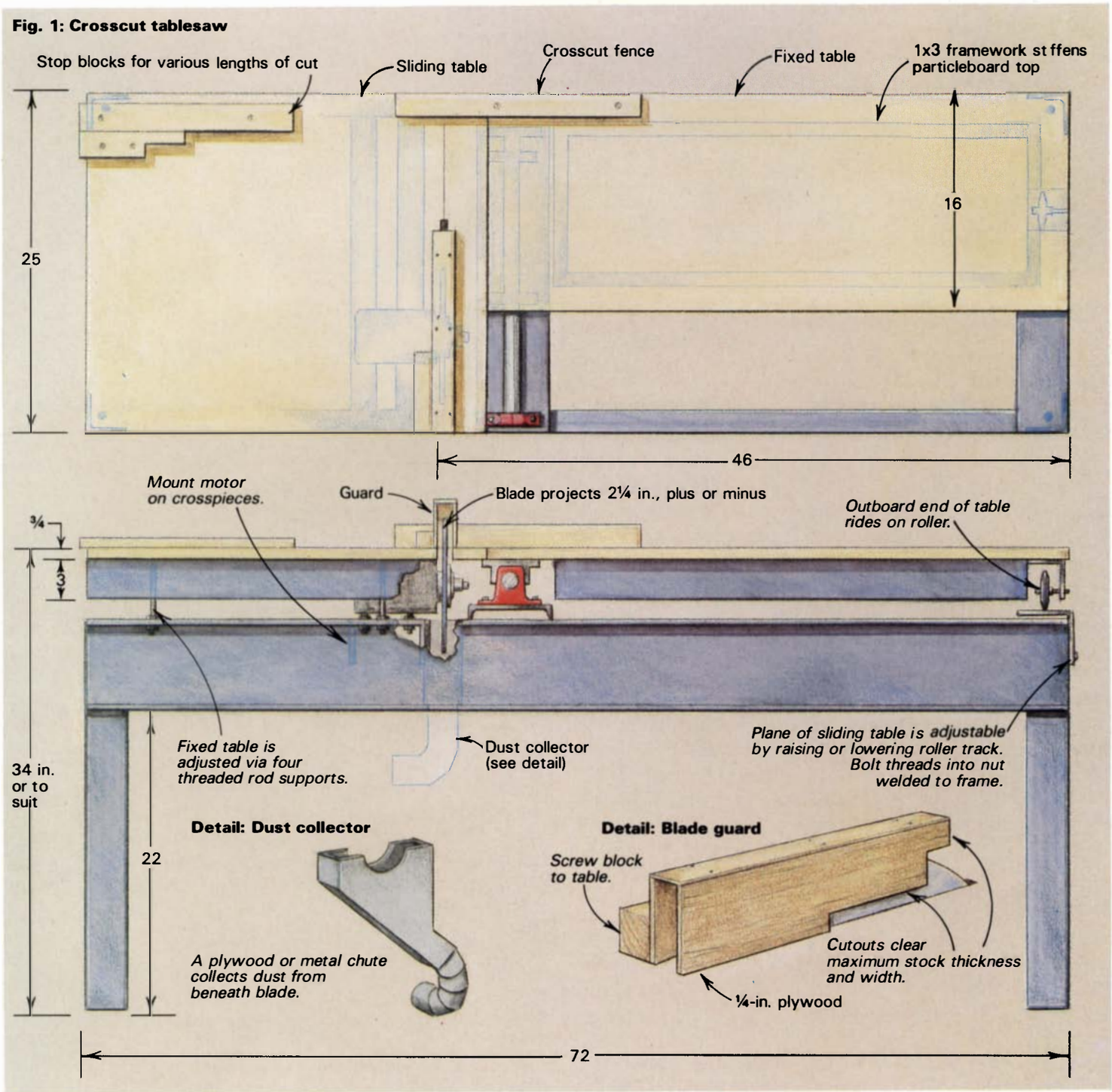
A Shop-Made Crosscut Saw

Table slides smoothly on linear-motion bearings

by T.H. Ralph

Fig. 1: Crosscut tablesaw



During the five years I've been manufacturing a wooden needlework frame holder in my shop, I've learned that the key to successful production work is accurate tooling. My frame holder has 14 wooden parts, each of which must be precisely crosscut to length to fit boring, shaping and sanding jigs, and so they'll go together correctly at assembly. Industrial tablesaws will do the job, but it seems a shame to invest in a machine best at ripping when what you really want is a crosscut tool. The sliding-table crosscut saw shown here is my solution to this dilemma. I built two—one is permanently set up to crosscut parts of five different lengths, the other to cut four lengths.

My saw design is based on two pieces of specialized hardware: linear-motion bearings and a compact direct-drive electric motor. Linear-motion bearings have been used in industry for years in applications where a cutter or tool of some kind must slide back and forth. The bearings themselves are sleeves or pillow blocks with rows of tiny ball bearings set into grooves inside the bearing's bore. The pillow blocks are fastened to the sliding member and they, in turn, ride on a precision-ground shaft. The bearings I used for my sliding table are made by Thomson Industries Inc., Channel Dr., Port Washington, N.Y. 11050, (516) 883-8000. Thomson doesn't sell direct, so you'll need to write or phone and ask for your local distributor. For my saw, which has a 9-in. travel, I used SPB 20 pillow blocks, 1¼-in. shaft and SB 20 shaft supports. The total cost was about $200. For greater travel, just buy a longer shaft.

The motor is a 2-HP, 3-phase induction motor made by a German firm, Himmel. It's ideal for this application because it is only 4¾ in. high so it fits snugly under the saw's fixed table, allowing 2¼ in. of a 12-in. blade to protrude above the table. The motor output shaft is a 1-in. threaded arbor. I bought mine from American Contex Corp., 964 Third Ave., New York, N.Y. 10155, for $290. A less expensive solution would be to mount an arbor on pillow blocks beneath the fixed table, and then belt it to a standard single-phase motor mounted on a frame under the saw.

I welded my saw frame out of heavy channel and angle iron because I happened to have it. Straight framing lumber, glued-up plywood, or lighter steel members bolted instead of welded will work just as well, as long as the frame is rigid. The fixed and sliding tables are made of ¾-in. particleboard, stiffened by 1-in. by 3-in. frames glued and screwed to their undersides. In assembling the saw, there are two critical relationships: the motor arbor must be precisely perpendicular to the linear-motion shaft and parallel to the horizontal plane of the sliding and fixed tables. To square the motor to the bearing shaft, I mounted a blade, assembled the sliding table, then used a dial indicator to position the motor relative to the table travel. Once it was perfectly square, I bolted it down. Use an accurate trysquare to adjust the tables in the horizontal plane, then, with a long straightedge, make sure they're aligned.

Once the saw is set up and aligned, it should produce reliably accurate crosscuts with only occasional adjustments. □

T.H. Ralph operates Roadrunner Woodworks in Albuquerque, New Mexico.

T.H. Ralph's sliding-table crosscut saw has 9-in. travel and will saw stock up to 2¼ in. thick. The Thomson linear-motion bearings, visible in the photo at near right, ride on a 1¼-in. precision-ground shaft mounted in a pair of steel supports. The sliding table's outboard end rolls on a wheel cannibalized from garage-door hardware. Its bearing surface (photo at far right) is a piece of heavy angle iron that can be raised or lowered to square the table to the blade in the horizontal plane.