

## Build Your Own BELT SANDER

By David W. Murphy

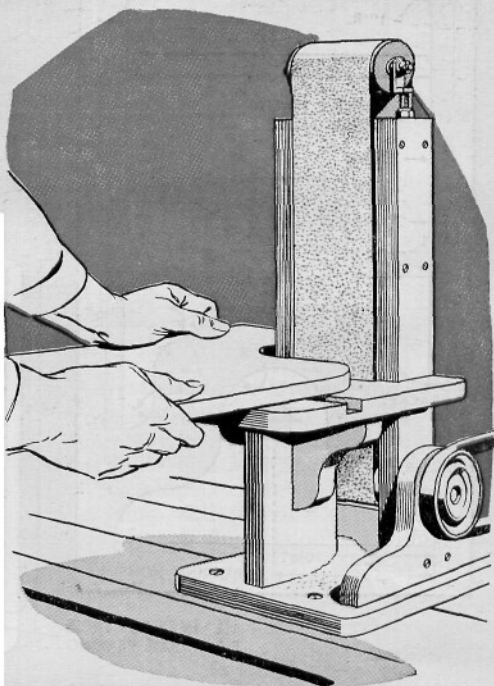
DESIGNED FOR THE MAN who likes to build his own power tools, this belt sander uses a standard 4 x 36-in. belt and has ample capacity for handling most metal or wood jobs in the average workshop. An added feature of the sander is a crosscut guide fitted into a groove cut in the table. The guide, which is borrowed from a table saw, takes the guesswork out of maintaining the correct angle on miters and square cuts being sanded. Also included in the design of the sander are adjustments to permit maintaining correct belt tension and for centering the rotating belt on the drums. Loosening the same two adjustments allows quick removal and replacement of the belt. Power is supplied by a 1/4-hp., or larger, electric motor.

### Sander Frame

Begin construction of the sander by first cutting all the frame parts from 3/4-in. plywood as detailed on page 206. Only one of each of the frame parts is required except for the table-support brackets and the 3/4 x 3/4 x 4.625-in. spacer blocks that are fitted between the belt backup pieces. Make two of each of these. When laying out the 10 x 12-in. base of the sander, locate a hole in each corner so that it can be bolted or screwed to a workbench or table top.

The 1.125-in. holes in the lower bearing housing and the left-hand drum support should be drilled slightly undersize to provide a press fit for the .375-in.-i.d., 1.125-in.-o.d. flanged ball bearings in which the shaft of the lower drum rotates. Notch the upper end of each of the drum supports 3/4 in. wide x 1/4 in. deep to accommodate the upper-drum support plate, which is a piece of flat steel, 1/4 x 3/4 x 6.125 in. Note that the upper spacer block is located 1/4 in. below the upper ends of the backup pieces so it aligns with the notches in the supports.

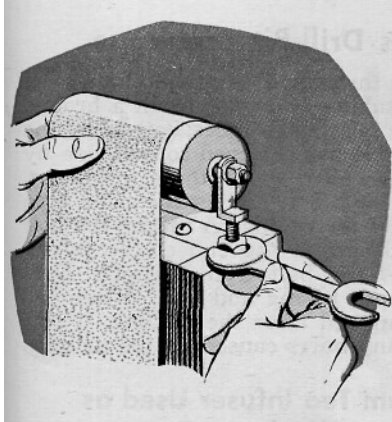
Assemble the backup pieces on the spacer blocks and screw on both vertical supports. When attaching the bearing housing A to drum support B, make sure the bearing



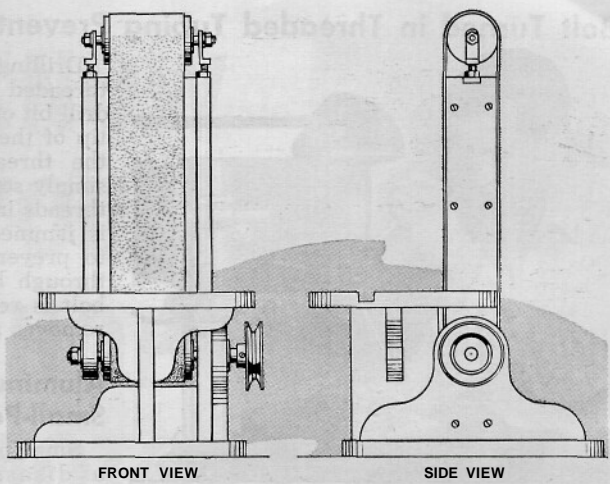
hole in the housing aligns with the bearing hole in the left-hand drum support. The drum-support assembly now can be screwed to the sander base. The detail of the base on page 206 indicates the relative positions of bearing housing A, drum support B and bracket C. Screw the table-support brackets to the table support and attach the table. The assembly now can be screwed to the sander base. Check to make sure the slot for the crosscut guide is parallel to the backup piece.

### Drum Construction

If a lathe is available, the drums for the sander can be turned from solid stock. An alternate method, when no lathe is available, is to fabricate the drums from plywood disks. Cut the disks about 2.375 in. in diameter with a circle cutter and drill a 1/4-in. hole in the center of each one. Coat the disks with glue, stack them 4 in. high and clamp them together by using a long 1/4-in. bolt and nut. Use a washer under the bolt head and nut. The bolt should project enough so that it can be chucked in a drill press. When the glue has dried, each of the two drums then can be filed and sanded to size while rotated in a drill press. Bore out the hole in the lower, or driving, drum



To install belt, lower upper-drum supports. Raising or lowering one of the supports centers rotating belt on drums



to .375 in., and the hole in the upper, or idler, drum to  $\frac{1}{2}$  in.

### Driving-Drum Assembly

The shaft for the driving drum is a length of  $\frac{1}{2}$ -in. rod 8.375 in. long. It is shouldered to .375 in diameter, leaving 1.375 at the original diameter to accommodate a 3-in. V-belt pulley that has a  $\frac{1}{2}$ -in. arbor hole. An alternate method for making this shaft is to use a .375-in. rod and fit one end with a 1.375" length of tubing having a .375" i.d. and a  $\frac{1}{2}$ -in. o.d. to accommodate the pulley. A hole is drilled through the tubing so the setscrew in the pulley will contact the shaft. One end of the shaft is threaded 3/8-24 to receive a nut. The shaft now can be slipped through the ball bearings that are press-fitted in the drum supports, and the drum and spacers fitted on it. The spacers also are cut from .375-in.-i.d. tubing. Between the drum and the bearing on the pulley end of the shaft, the spacer is 1 $\frac{1}{2}$  in. long; between the drum and the opposite bearing, the spacer is .625 in. long. The spacers bear against steel washers fitted at each end of the drum. The drum is held on the shaft by a .125" pin driven in through the side.

### Idler-Drum Assembly

Each end of the idler drum is counter-bored to a diameter of .687", deep enough to accommodate the flanged ball bearings which have a  $\frac{1}{4}$ -in. i.d. and an .687" o.d. Before fitting the bearings in the drum, a spacer 3.625" long is inserted. This spacer is cut from tubing having a  $\frac{1}{4}$ -in. i.d. and a .375" o.d. Two spacers, also cut from the tubing, then are fitted on the drum bearings and the drum supports. The idler-drum shaft is a  $\frac{1}{4}$ -in. rod 5.312" long, ends of which are threaded  $\frac{1}{4}$ -28 and fitted with nuts.

### Adjustable Idler-Drum Supports

Adjustable supports for the idler-drum shaft can be made by cutting sections from a steel angle and welding .312 bolts to them. An alternate method is to use two clevises that will provide supports when one side of each clevis is cut off to form an L-shape.

After the drum-support plate is screwed in place, drill down through the two .312" holes in it, into the spacer block, so the bolts of the drum supports can be inserted their full length. Fit the drum supports on the drum and turn on the shaft nuts until they are snug. Then insert the bolts of the supports into the holes of the support plate and tighten the shaft nuts firmly. This latter operation assures that the supports are parallel.

The completed sander now can be bolted to a bench or table and connected to a motor. A 3-in. V-belt pulley is used on both sander and motor so the sander runs at a standard 1750 r.p.m. If it is desirable to sand at slower speeds, use a 1 or 2-in. pulley on the motor. To install the belt, lower the idler-drum supports. When the belt is in place, raise the supports until the belt is snug. Start the motor and center the belt by turning the nut on one support to raise or lower one end of the drum. \* \* \*

