Making a Light Ball-Bearing Column Grinder

By RAY F. KUNS

HAVING need of a grinder for light work, such as sharpening drill bits, bearing scrapers, punches and chisels, and roughing down light fittings for engine stands, etc., the scrap pile was looked over for parts that might lend themselves to the building of such a machine. A column was located and this was brought up to proper height by fittinga brake drum under it. It was desired to have the motor mounted with the head so that the machine might be set as a unit and moved on occasion without a great deal of trouble in re-alining parts.

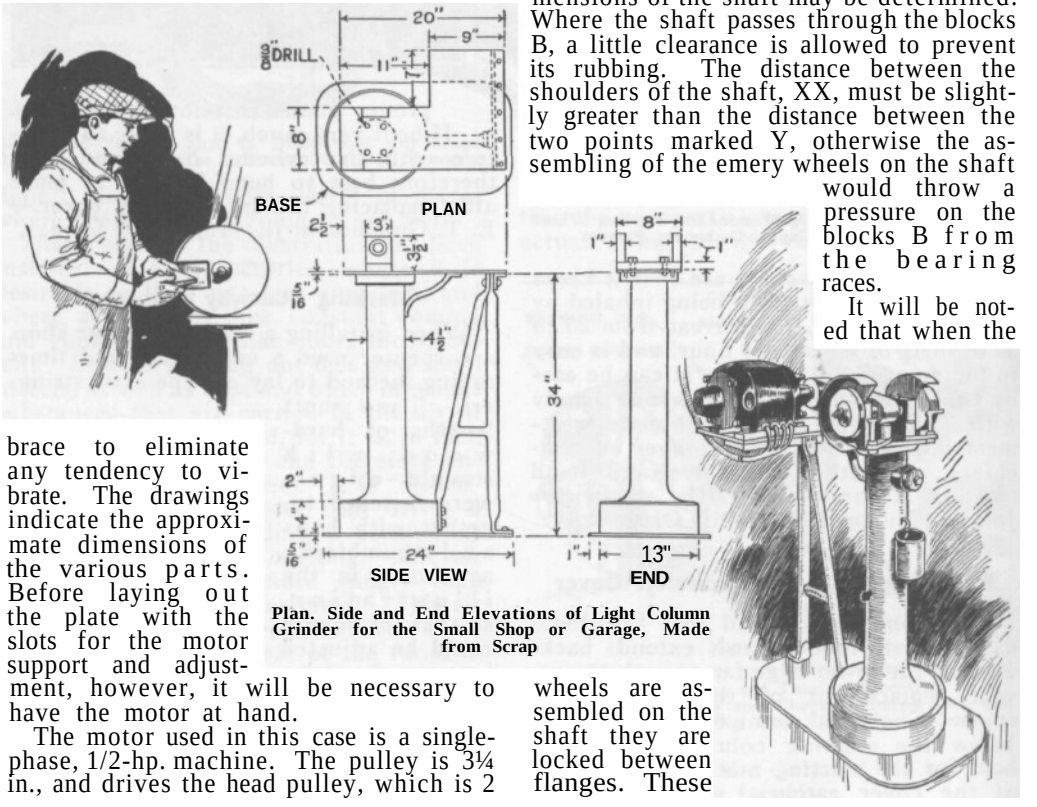
A piece of 5/16-in. boiler plate was obtained and from it a base for the brake drum and column was cut. Another piece of the plate was shaped for the top plate on which the grinder head and the motor might be mounted. As a support between base and top, several lengths of gas pipe were formed, and riveted and bolted in place as indicated in the drawing. A crossbar was welded into this brace to eliminate any tendency to vibrate. The drawings indicate the approximate dimensions of the various parts. Before laying out the plate with the slots for the motor support and adjustment, however, it will be necessary to have the motor at hand.

The motor used in this case is a single-phase, 1/2-hp. machine. The pulley is 3¼ in., and drives the head pulley, which is 2 in. in diameter, at about 3,000 r.p.m., since the motor speed is 1,800 r.p.m. A 2-in. light single leather belt with a glued splice is used to drive the grinder head. This gives a drive free from any disturbing vibration.

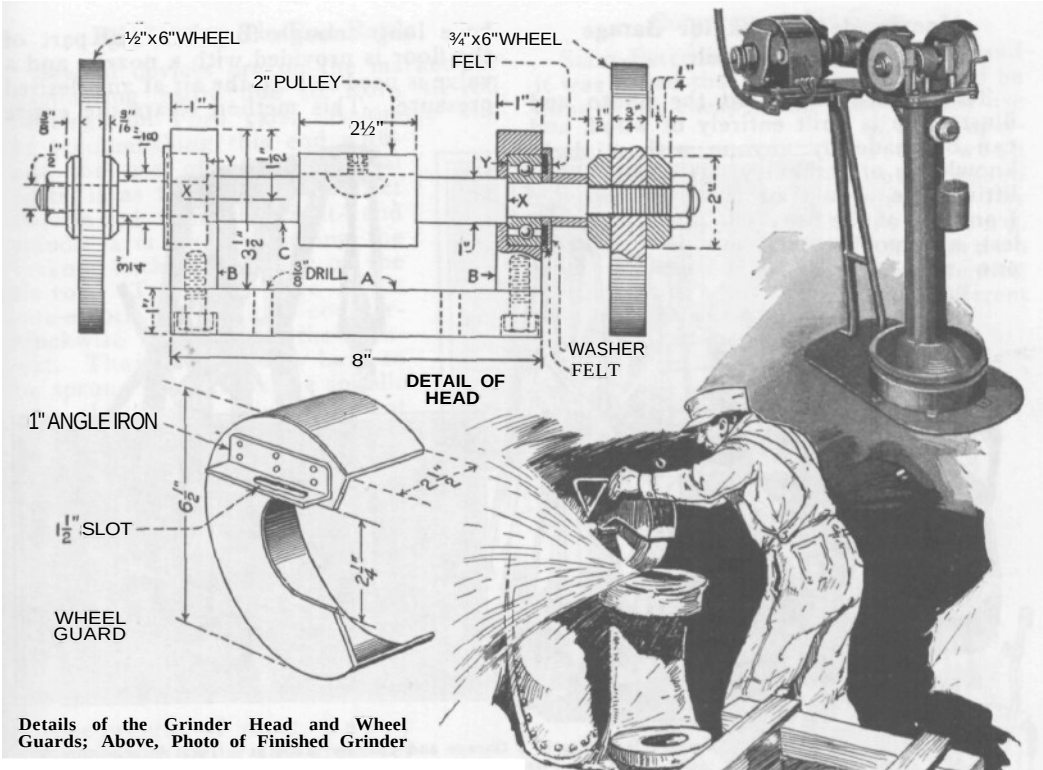
The construction of the head is rather simple. The first consideration is the bearings. Those used in this case were salvaged from a worn-out motor generator. After the bearings are at hand some dimensions may have to be varied to accommodate them. Dimensions of shaft diameters are given here in order to indicate the approximate size desirable.

The blocks B, which are 1 in. thick and 3 in. wide, are chucked in the lathe and bored out to accommodate the bearings selected. Sufficient stock should be provided at the bottom of the blocks so they can be bolted to the plate A as indicated. After the supporting yoke, formed by the parts A and B, has been bolted together and the bearings installed, the exact dimensions of the shaft may be determined. Where the shaft passes through the blocks B, a little clearance is allowed to prevent its rubbing. The distance between the shoulders of the shaft, XX, must be slightly greater than the distance between the two points marked Y, otherwise the assembling of the emery wheels on the shaft would throw a pressure on the blocks B from the bearing races.

It will be noted that when the wheels are assembled on the shaft they are locked between flanges. These



Plan. Side and End Elevations of Light Column Grinder for the Small Shop or Garage, Made from Scrap



Details of the Grinder Head and Wheel Guards; Above, Photo of Finished Grinder

force the 1.125-in. collars against recessed washers, which are in turn forced against the inner bearing races. This arrangement locks the parts together in such fashion that there is no end play other than that previously mentioned at X and Y. Since the races of the ball bearings are free at Y and rest against the felt washers on their outer faces, they are left free to properly aline themselves and, in case of need, will float in their housings a slight amount in either direction. When mounting well-fitted ball bearings, it is essential that this provision be made. Otherwise the heat generated in the shaft when the machine is in operation may be great enough to expand the shaft and throw an undue strain on the bearings. The washers are recessed on one side to provide for felt rings, which are depended on to prevent dirt and grit from entering the bearings.

The shaft C may be made with the pulley integral from a 2¼-in. round machine-steel bar, or an old axle or propeller shaft may be used and the pulley made and secured on it as indicated. When assembling the shaft, it is necessary to remove one of the end blocks B. The threads are cut to run tight, as the load comes on the wheel. This means that right-hand threads are cut on the right end and left-hand threads on the left end of the shaft.

When mounting the head on the column, reasonable care must be used to see that it is not cramped or warped in such a fashion that the alignment of the bearings will be affected. The head is mounted 2½ in. from the front edge of the top plate of the column. This space may be used to accommodate the rests. These are made from machine steel. A bar of .625-in. steel has one end forged flat and bent over at right angles: the other end is threaded. This forms the rest for the work being ground and it is supported in a machine-steel plate ¼ by 1½ by 4 in., having a hole in each end. Knurled thumbscrews are used to lock the supporting plates in position.

The guards for the grinder wheels are made from 16-gauge sheet iron, fitted so as to be centered when the wheels are new. They are supported on the blocks B by means of an angle plate riveted to the guard and fastened to the block with a capscrew. Adjustment of the guard is effected by means of a slot in the angle plate.

No special provision is made for greasing or oiling the bearings.