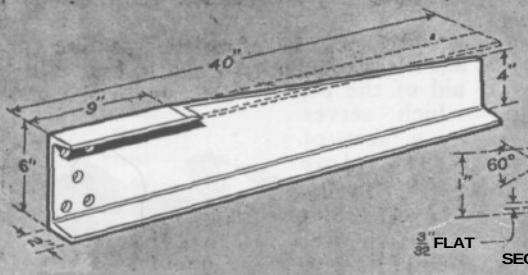
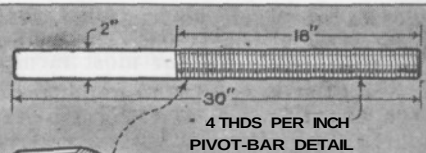
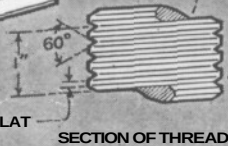


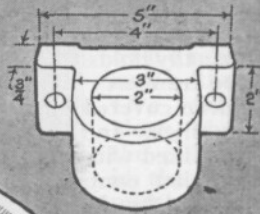

DETAIL OF ARM



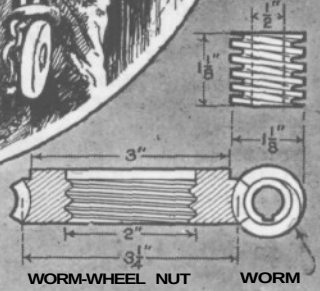

4 THDS PER INCH
PIVOT-BAR DETAIL



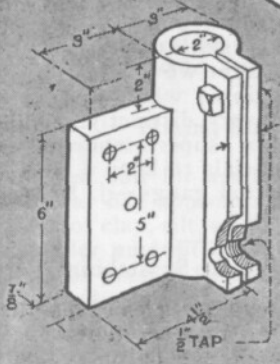

SECTION OF THREAD



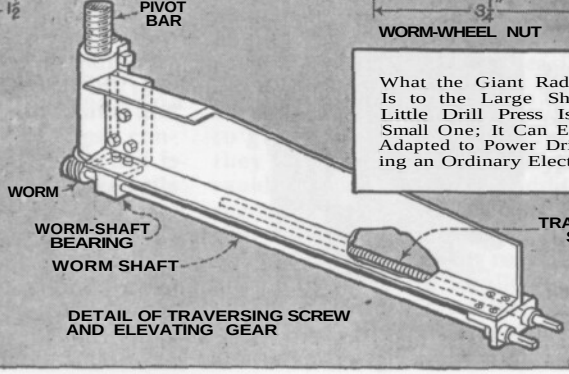

PIVOT BEARING,
CAST IRON, 2
REQUIRED




WORM-WHEEL NUT WORM



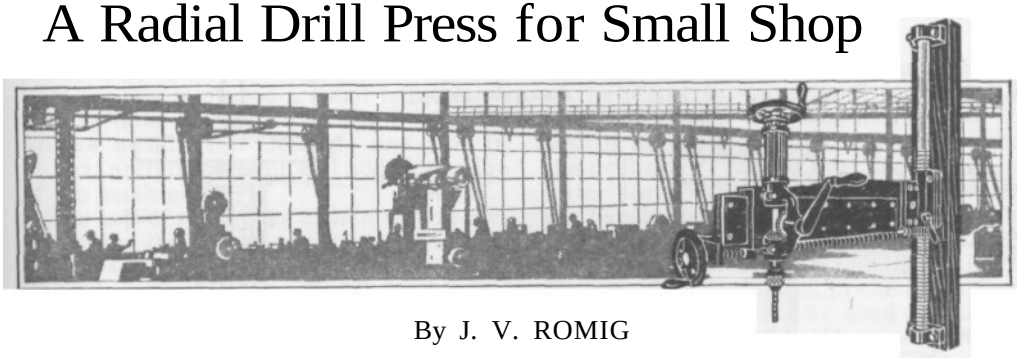

ARM BEARING
CAST IRON




DETAIL OF TRAVERSING SCREW
AND ELEVATING GEAR

What the Giant Radial Drill Is to the Large Shop This Little Drill Press Is to the Small One; It Can Easily Be Adapted to Power Drive, Using an Ordinary Electric Drill

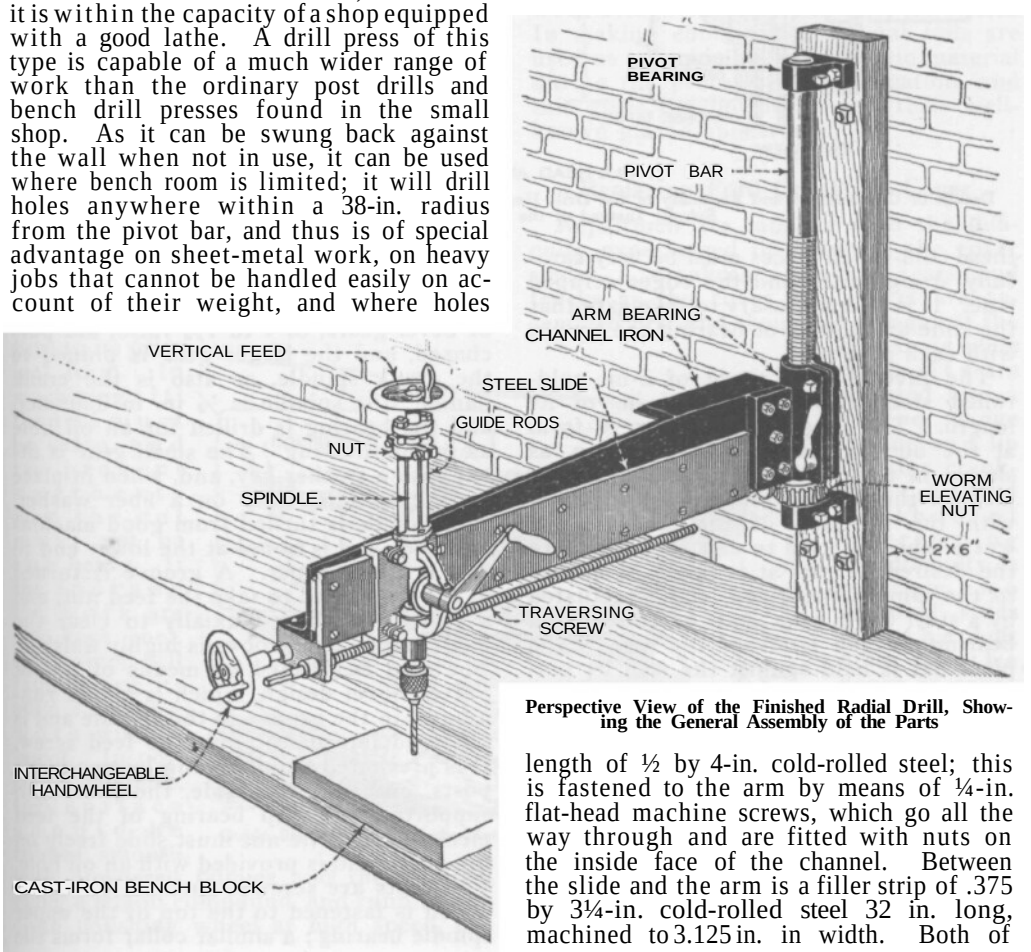
# A Radial Drill Press for Small Shop



By J. V. ROMIG

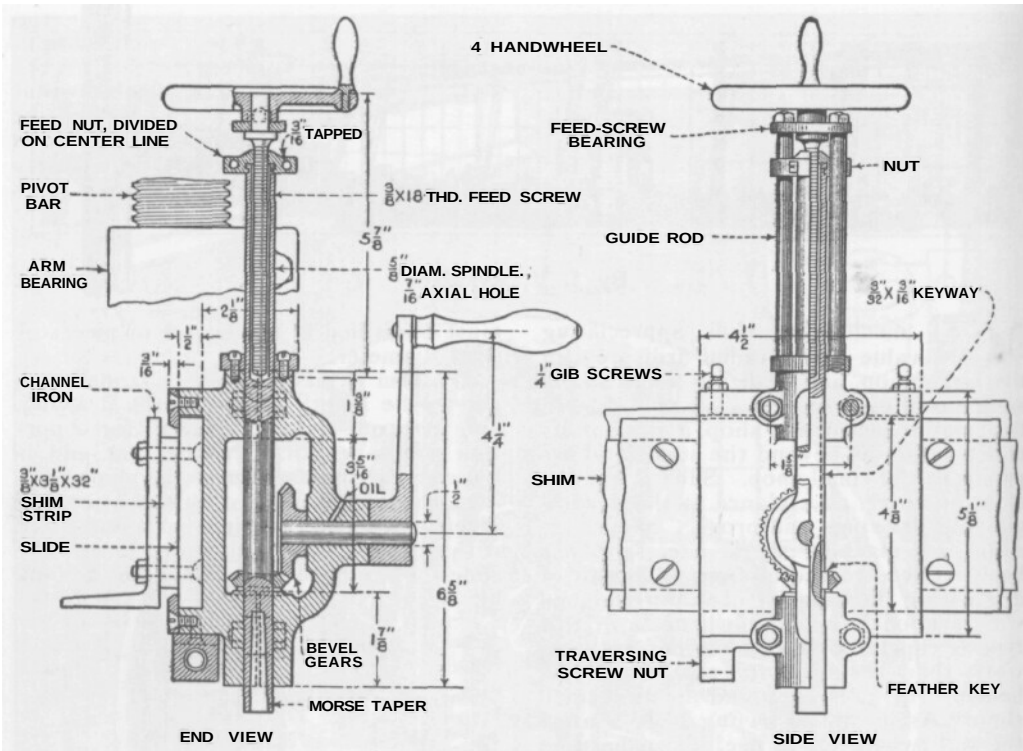
MOST mechanics, while appreciating the value of the radial drill press in the large shop, and realizing what a help such a tool on a smaller scale would be in the small experimental shop, look upon its construction as beyond the scope and capacity of the small shop. Such is not the case, however, as a glance at the accompanying drawings will prove. In this design, the machine work necessary has been reduced to the minimum, and all of it is within the capacity of a shop equipped with a good lathe. A drill press of this type is capable of a much wider range of work than the ordinary post drills and bench drill presses found in the small shop. As it can be swung back against the wall when not in use, it can be used where bench room is limited; it will drill holes anywhere within a 38-in. radius from the pivot bar, and thus is of special advantage on sheet-metal work, on heavy jobs that cannot be handled easily on account of their weight, and where holes must be drilled in the center of pieces of large diameter.

The arm is made of 6-in. channel iron., cut to the length shown in the drawing, and with one flange cut away for a portion of its length. To the rear end is bolted a casting that forms the pivot bearing: the dimensions of this bearing are given in a detail, and it is split and fitted with capscrews and a clamping lever. The slide for the drill head is made of a 36-in.




**Perspective View of the Finished Radial Drill, Showing the General Assembly of the Parts**

length of ½ by 4-in. cold-rolled steel; this is fastened to the arm by means of ¼-in. flat-head machine screws, which go all the way through and are fitted with nuts on the inside face of the channel. Between the slide and the arm is a filler strip of .375 by 3¼-in. cold-rolled steel 32 in. long, machined to 3.125 in. in width. Both of




**DRILL-HEAD AND SADDLE DETAILS**

**Details of Construction and Assembly of the Drill Head or Saddle; Bronze Bushings May Be Fitted to the Spindle Instead of the Plain Bearings Shown**

these cold-rolled pieces must be very carefully straightened and the edges scraped true. It is also necessary to take care that the slide and the pivot bearing are square with each other.

The pivot bar is made of 2-in. cold-rolled steel, threaded for 18 in. of its length. The thread is of sharp V-form at the bottom, but flattened on top, as shown in the detail; this provides a surface for the bearing, while not interfering with the function of the screw. The worm wheel is used to elevate the arm to the desired height; it is made of bronze to the dimensions given, and is actuated by a steel worm on a shaft extending to a bearing on the front of the arm. The pivot bar is held against the wall by pinning it in bearings at each end, which, in turn, are bolted to a stout stringer fastened to the wall by lagscrews or expansion bolts. A plumb bob is used to set the bar exactly vertical on the wall. When in use, the arm may be held fast in any position on the pivot bar by means of the clamp screws.

The drill head, or saddle, is a casting, machined to fit on the slide and drilled and bored for the drill and hand-crank spindles. The bearings are split; the front half of the casting also has the bearing for the crank spindle. A suitable pair of bevel gears, of 1 to1½ ratio, are purchased, and the larger gear is pinned to the crank spindle, as also is the crank handle; the spindle is ½ in. in diameter, and the bearing is drilled for an oil hole as in the drawing. The small gear is fitted with a feather key, and, when in place on the spindle, rides on a fiber washer. The spindle is turned from good machinery steel, and is bored at the lower end to No. 1 Morse taper. A groove is turned in the upper end to take the feed nut, and a .437-in. hole bored axially to clear the feed screw. The groove is highly finished. The feed is effected by means of a split nut of novel design, which is a nice running fit in the groove in the spindle and is threaded internally to fit the feed screw. It is prevented from turning by two guide posts, one on either side, the posts also supporting the top bearing of the feed mechanism. The nut must slide freely on the posts, and is provided with an oil hole. The posts are screwed into a steel collar which is fastened to the top of the upper spindle bearing; a similar collar forms the

upper feed-screw bearing, and to the top of the screw is pinned a small handwheel. The spindle bearings can be fitted with bronze bushings if desired; and this is, in fact, preferable, as it will add to the life of the machine.

The top of the upper saddle slide, bearing on the rail, is tapped for two ¼-in. setscrews, which are used to adjust the gib to the slide. The gib is made of sheet brass, bent up at each end to prevent it from coming out, and both the upper slide and the gib should be drilled for oil holes. A brass or bronze nut for the traversing screw is screwed to the lower surface of the saddle, and a bearing for the screw and the worm shaft is fastened to the front of the arm. The ends of both the screw and shaft are squared to fit an interchangeable handwheel.

A good table or faceplate can be made from an iron bench plate, and care should be taken to see that the press and the top of the plate are square with each other in every direction. The best location for the drill is near the end of the bench, so that the drill can be swung over the end of the latter for work that cannot be raised to the bench. A drill chuck of ½-in. capacity is fitted to the spindle; although the gears are strong enough to drive drills larger than ½ in., it is seldom, in the small shop, that larger drills will be used in the machine. Larger holes, however, may be bored with a boring bar held in the chuck.

The head may be modified with very little trouble to make the tool power-driven, by using an electric drill and mounting it on a saddle designed on the same lines as the one shown, but modified to suit the drill. If this is done, the tool would be an ideal one for the garage or woodworking shop as well as the small machine shop.