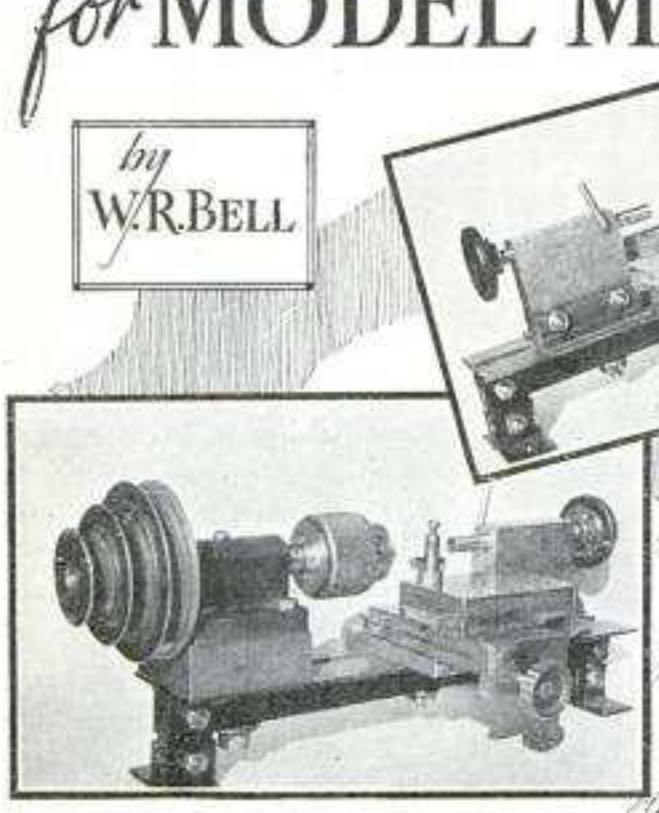
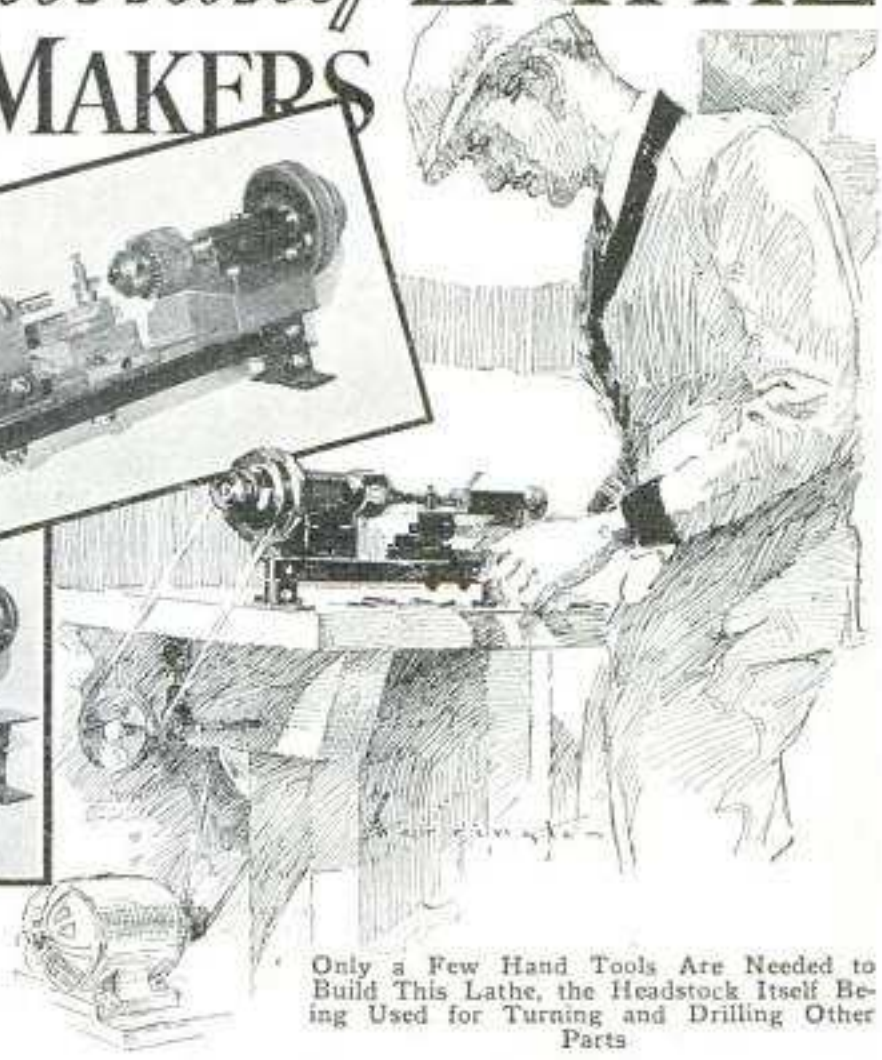
A Metal-Turning LATHE for MODEL MAKERS

by W. R. BELL



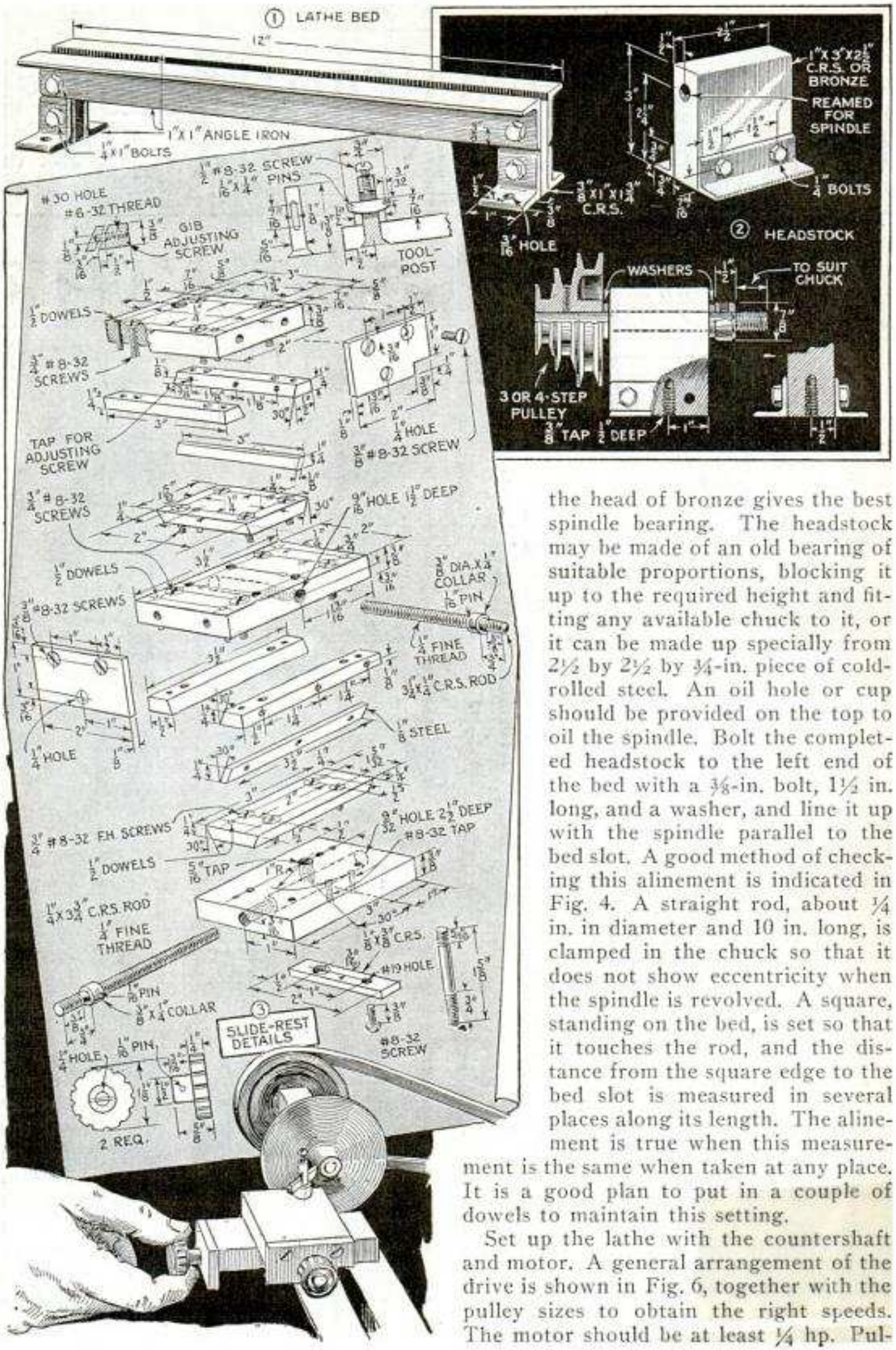


Only a Few Hand Tools Are Needed to Build This Lathe, the Headstock Itself Being Used for Turning and Drilling Other Parts

PART I

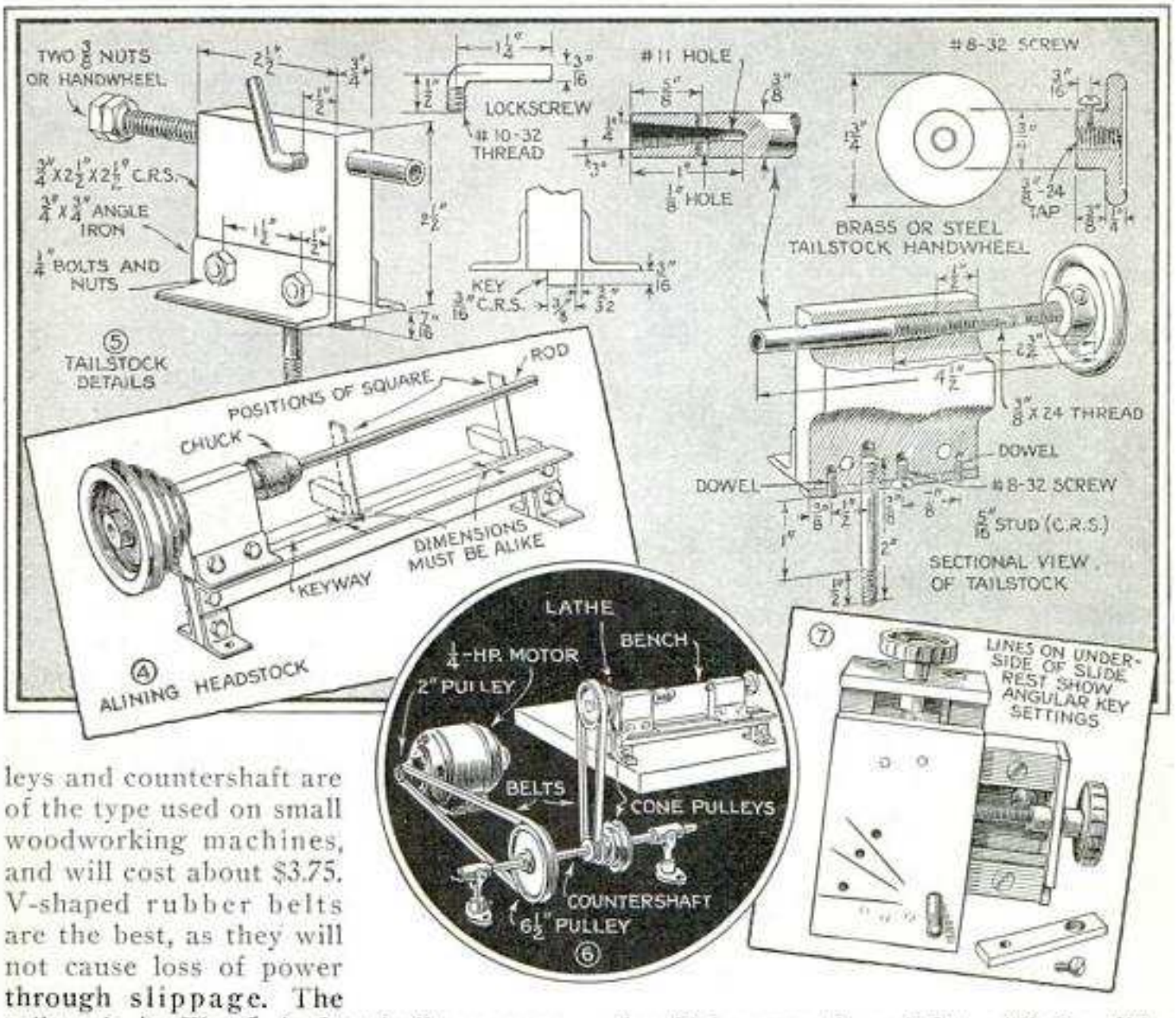
THIS metal-turning lathe, the front and rear views of which are shown in the photos above, has a capacity of diameters up to 4½ in. and a maximum distance between centers of about 5½ in. The tools required to build it are a hacksaw, breastdrill, files, clamps and a few drills, taps and dies.

Assemble the legs and feet of the bed, shown in Fig. 1, and then assemble these to the top angles, with the whole in an inverted position on a good flat surface. Clamp together and drill the bolt holes through the three pieces at one time, bolting before removing the clamps. Have the holes a snug fit for the bolts. This procedure will insure the bed top being true and flat. The cone pulley and a chuck, of about ½-in. capacity, can be purchased from the stores selling the small popular woodworking machines and accessories. If you build the headstock shown in Fig. 2, it will be well to buy one of the small polishing-head spindles that are already threaded with the special thread to fit the chuck, together with a collar to fit. The spindle is cut off to the required length. Be sure that the spindle hole is parallel to the bottom surface, and ream it to fit the spindle without shake. The washers shown should be of brass if the head is steel, and steel if the head is bronze. They may be left off until you can turn them up yourself after completing the machine. Making



the head of bronze gives the best spindle bearing. The headstock may be made of an old bearing of suitable proportions, blocking it up to the required height and fitting any available chuck to it, or it can be made up specially from 2½ by 2½ by ¾-in. piece of cold-rolled steel. An oil hole or cup should be provided on the top to oil the spindle. Bolt the completed headstock to the left end of the bed with a ⅜-in. bolt, 1½ in. long, and a washer, and line it up with the spindle parallel to the bed slot. A good method of checking this alinement is indicated in Fig. 4. A straight rod, about ¼ in. in diameter and 10 in. long, is clamped in the chuck so that it does not show eccentricity when the spindle is revolved. A square, standing on the bed, is set so that it touches the rod, and the distance from the square edge to the bed slot is measured in several places along its length. The alinement is true when this measurement is the same when taken at any place. It is a good plan to put in a couple of dowels to maintain this setting.

Set up the lathe with the countershaft and motor. A general arrangement of the drive is shown in Fig. 6, together with the pulley sizes to obtain the right speeds. The motor should be at least ¼ hp. Pul-



leys and countershaft are of the type used on small woodworking machines, and will cost about $3.75. V-shaped rubber belts are the best, as they will not cause loss of power through slippage. The tailstock, in Fig. 5, is first built up complete, but the spindle hole is not drilled until later. The dowel sizes are not given in any of the drawings, as these can be made to suit materials at hand. To bore the tailstock, place it on the machine, with the stud nut just tight enough to prevent shake and still permit sliding forward onto the drill. A temporary screw feed is rigged up to slide the tailstock forward by clamping a piece, with a long screw in it, to the bed end with the screw end pushing against the tailstock. Thread the spindle hole from the front, using the larger bore as a guide for the tap to keep the threads in line. After the spindle is fitted, lock two nuts on the back as a temporary handle, or fit on a handwheel, and bore the hole in the front end of the spindle. The taper is reamed with a ¼-in. drill or reamer ground to the required angle.

The slide rest is shown in Fig. 3. The angular faces of the parts composing the dovetail slides are beveled with a file and should be smooth and flat. All the slide-rest screw and dowel holes can be drilled, using the lathe and tailstock as a drill-press. The outside beveled pieces are attached to the undersides of the respective plates, and these, with the gibs and adjusting screws in place, are used as gauges for the mating inner parts. The sides of the inner dovetail parts are filed parallel, which is determined when these pieces will slide through the gauge with the same feel all the way. Blue paint will aid, used in the manner of fitting bearings. The assembly of the lower slide is completed first, and the inner dovetail part of the upper, or cross, slide is fastened on at 90°, using a square to set it and omitting the dowels at this time. Complete the upper-slide assembly, and, as in the case of the tailstock, the handwheels can be temporarily omitted by locking two nuts as a substitute, until the wheels can be turned up on the completed lathe.

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