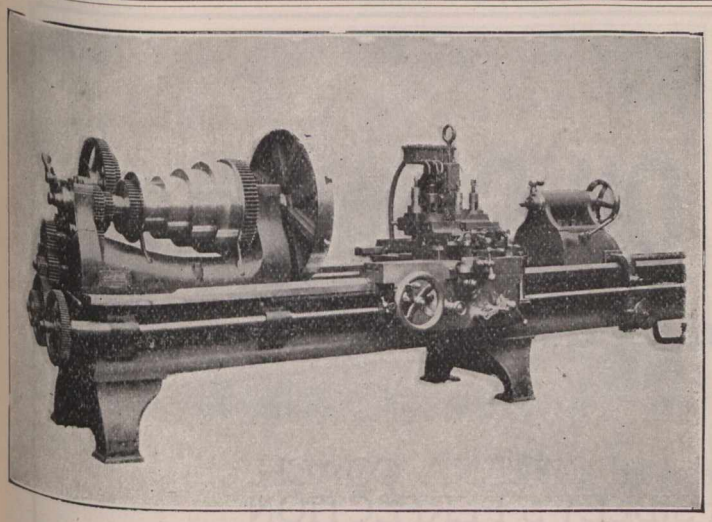

Fig. 3. Standard Engine Lathe.

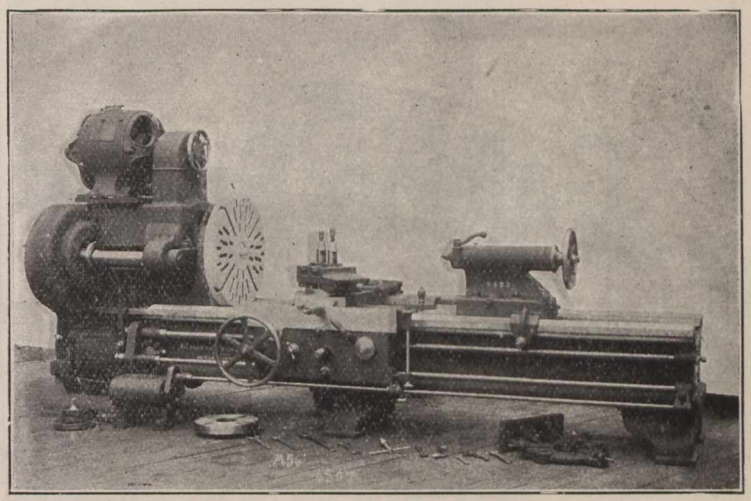

Fig. 4. Motor Driven Lathe.

lathe as manufactured by one of the United States builders. In this design it will be noted that the saddle and tailstock have separate bearings on inverted V's. This construction is favored for lathes of small size, but many leading United States builders favor a flat bearing for the tailstock, which, when provided with proper adjustment for maintaining its alignment, is much more easily kept clear of cuttings.

Fig. 4 illustrates one size of motor-driven lathe as built by the Bertram Co. today. In order to economize in the manufacture of this machine, the construction is such that any stock machines may be converted from belt to motor, or vice versa, as required, and for that reason it is termed the convertible type. The gear and cone ratio is such as to permit of the use of standard motors of variable speed, as made by all the electric companies, and when so arranged with motor drive attached to the running gear, the lathe head loses all semblance to that of the original machine, but it is fast superseding the cone-driven lathe in many of the leading machine shops. This is particularly so in the sizes running from a 30 in. swing and up.

There are many strong arguments favoring the motor-driven lathe. Several of the minor advantages may be noticed. First, the use of the motor does away with the overhead line-shaft and its maintenance. From the fact that belting and the line-shaft have been done away with, the machine may be placed to greater advantage in a shop, and in this way space may be economized. The range of speeds which are obtained by the variable speed motor through the drum type controllers enables the operator to arrange the cutting speeds to suit the material being machined. This arrangement of speeds is made possible by the fact that the operator, by moving the handle shown at the right-hand of the carriage, instantly controls the spindle speeds. This, of course, is a decided advantage over changing the belt on the steps of the cone-driven lathe. Again, in this, as in all motor-driven machines, the cutting speeds and feeds are very much increased, as the power delivered at the cut by the motor is from 50 to 100% greater than the power obtainable in a belt-driven machine, and the absence of belt pull on the cone gives a greater degree of accuracy to the work produced from the same lathe. In consequence, with the use of high-speed cutting steel, the output of the motor-driven lathe has been increased from 30 to 50%. It may be remarked that the tremendous increase in power in the running head has necessitated the re-designing of the lathe, making all the parts throughout proportionately heavier than the same sized lathe of ten years ago.

Fig. 5 shows another form of motor-driven lathe known as the "all-geared" type, driven by constant-speed motor or single pulley drive by countershaft. In this machine all changes of speed are effected by clutches, and no changes of belt, as on a cone, are necessary. For lathes of very large size this construction will commend itself to the user, although there are arguments against the number of gears made necessary to give the desired changes. On all large lathes of this type, separate motor for quick traverse of the saddle along the bed is provided. Movement of the tailstock by the same means gives greater efficiency or quicker adjustment of the tools to the cut.

The foregoing covers in a general way the advance in construction of the engine lathe. Another type of lathe which in recent years has received considerable attention, namely, those for locomotive and coach wheel turning, will now be considered. Fig. 6 shows this machine as originally designed by the Pond Tool Company, of Plainfield, N.J. As first built it was belt driven, having about 9 horse power, and a capacity of from 4 to 6 pairs of wheels per day of 10 hours. The special features of this machine are:

1. The central drive. It is known as the worm drive. The power is transmitted direct from the cone shaft, or as the machine is built today, from the motor, to a worm and a worm wheel, which is mounted on the end of the driving shaft. The end of this main driving shaft is a worm which in turn engages a large worm wheel in the centre of the machine. Both worms

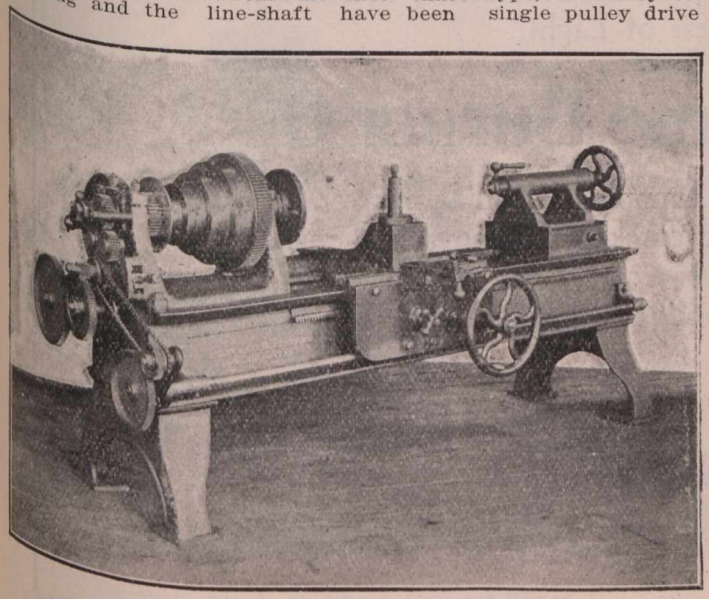

Fig. 2. Flat Shear Engine Lathe.

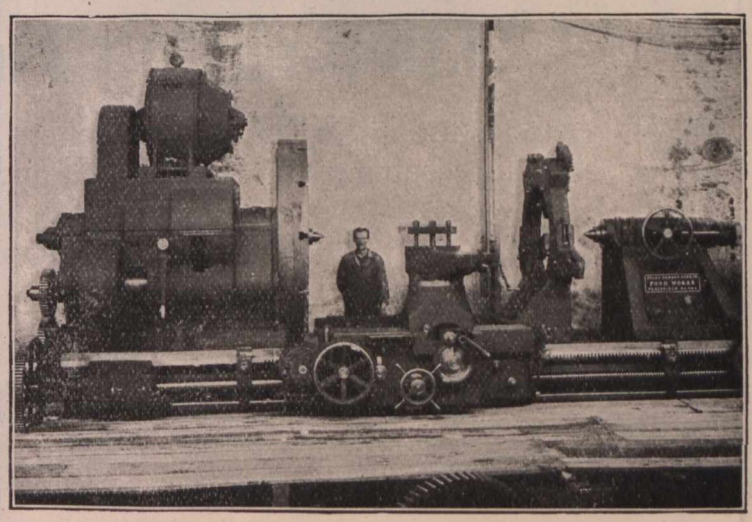

Fig. 5. All Geared Motor Driven Lathe.