are set in position and the roughing tool made to take a cut across the tread and top of the flange. The tread and flange tool is then forced in, taking a broad smooth cut, and leaving the surface in excellent condition, already noted. Then comes a similar tool for cutting the taper at the outer edge of the taper and round the corner of the rim. This done, the wheels are finished.

The car wheel is driven by a motor set down on the extension of the bed. The lathe is an example of the application of individual motor drive to machine tools. Exhaustive tests have been made so that the machine tool builder has now no difficulty in selecting the proper power of motor for machining various materials for various combinations of speeds, feeds,

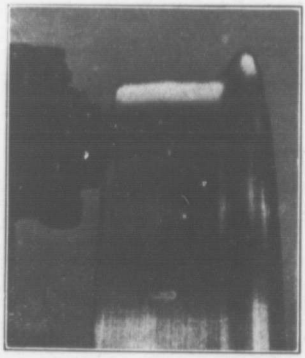

FIG 8

and depth of cut. Individual motor drive has been adopted in a large number of railway shops, machines of smaller capacity being arranged in groups and driven from a line shaft by one motor.

The high power wheel turning lathe for locomotive driving wheels shown in Fig. 9 is a result of the makers of machine tools trying to raise their capacities up to the cutting possibilities of high-speed steel. The lathe shown has a swing of 90 inches. It is estimated that when the tool is cutting $\frac{3}{8}$-in. deep with $\frac{1}{2}$-in. feed, the pressure at the point is about 55,000 lbs. Such a cut is readily made at a speed of 16 feet per minute, which requires 880,000 ft. lbs. per minute or nearly 27 h.p. at the point of the tool. To do this and avoid chattering the machine has been rigidly constructed. The device is obtained by means of dogs fastened at the rim or tire. The dog has a gripping shoe "A" shown in Fig. 11, and the pointed