mits compressed air alternately to the opposite end of the cylinder, and by regulating the velocity of admission the speed of reverse can be nicely gauged. In the cutting motion the jockey pulley J_2 tightens the belt on the pulley P_2, driving the machine through the pinion in one direction. The belt on P_1 consequently runs loose, and has a clearance of about a quarter of an inch, the clearance gradually increasing with the speed of the table. At the end of

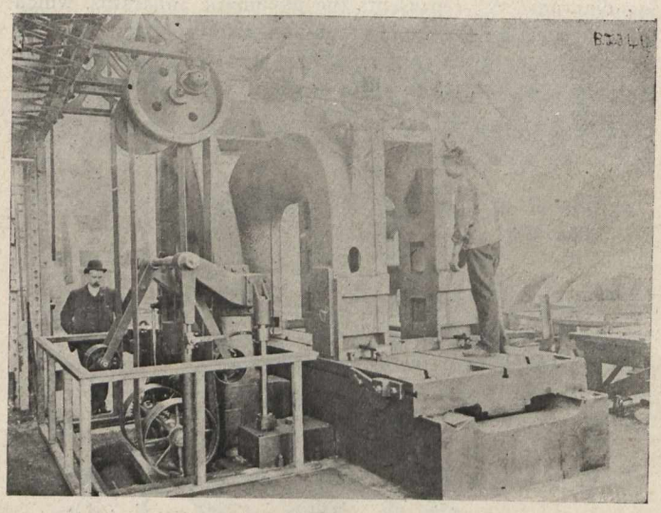

Fig. 4.

stroke the jockey pulley J_2 is disengaged, and J_1 is thrown into action, thus tightening the belt on pulley P_1, which revolves in the opposite direction to P_2. The return speed is thus considerably accelerated, and the mechanism is so designed that in case of mishaps (for example, excessive load on cutting tool or accidental contact of the work with the housings or cross rails), no damage can be done, as only what is considered a safe working stress can be transmitted

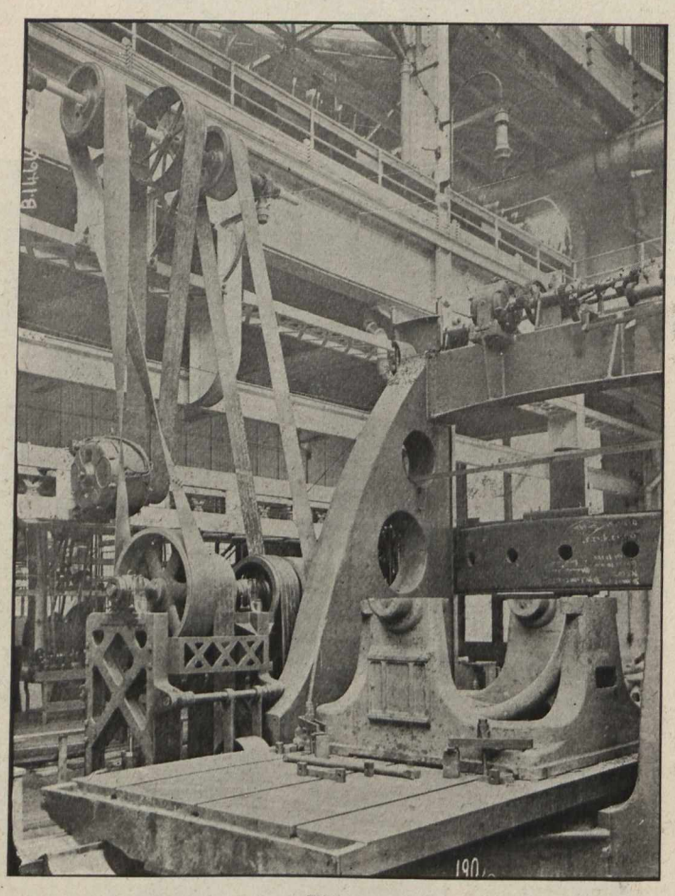

Fig. 5.

to any of the gears, thus eliminating any deleterious effects on the machine. Further, it disposes with a long succession of reducing and reversing gears, and provides a maximum amount of work with minimum expenditure of energy. A

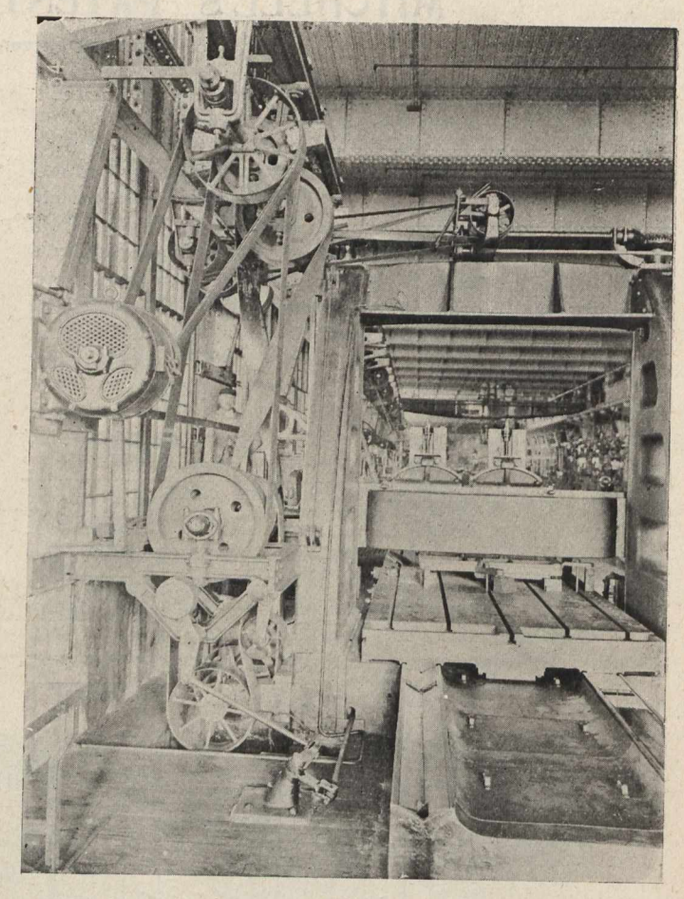

Fig. 6.

25-h.p. motor mounted on an 8-ft. planer gives a cutting speed of 75 feet per minute, and a return speed of 188 feet per minute for a 10-ton load.

This unique invention is patented in Canada, Great Britain, United States, and Germany. And since it meets a universal need, owing to the introduction of independent electric drives in machine shops; giving increased efficiency at low first cost, it is destined to become widely popular; especially as it is suitable not only for planers of magnitude, but for elevators and other machines operating in two directions.

STORAGE BATTERY ELECTRIC LOCOMOTIVE.

Through the courtesy of Messrs. Hurst, Nelson & Co., of Motherwell, near Glasgow, Scotland, we are able to illustrate the first important application of the storage battery in electric traction. This locomotive is one of the two built by the above-named company, for the Great Northern Piccadilly & Brompton Railway: one of the Yerkes underground electric railways now in course of installation in London.

Each locomotive is attached to eight bogie wagons, primarily designed for the purpose of removing excavating material, and taking in iron tunnel segments, sleepers, rails, and other material required in the construction of the "Tube" line.

The locomotive body over buffers is 50 feet 6 inches, and its width is 8 feet.

The main floor-frame covered with Jarrah wood, is built of steel channels 9 x 3½ x ½ with side sills 8 x 4 x ½ I beams, and intermediate sills 7⅞ x 3 x ⅜ channels, and the whole trussed by two side truss rods placed under each side sill, and I beams carried across at each truss post. Upon this substantial framework is erected a casing made up of ¼-in steel plates riveted to side sills at bottom, and to steel angle and flat at top, and where the storage battery is located are lined with Jarrah wood. The batteries were supplied by the Chloride Electrical Storage Company, and consist of eighty chloride cells each containing twenty-one plates and weigh-