

automatics, but this engine was brought out to fill a demand for which they have previously been obliged to import the best and highest priced American engines. The engine was designed by E. J. Armstrong, who is now with the Ames Iron Works, Oswego, N.Y.

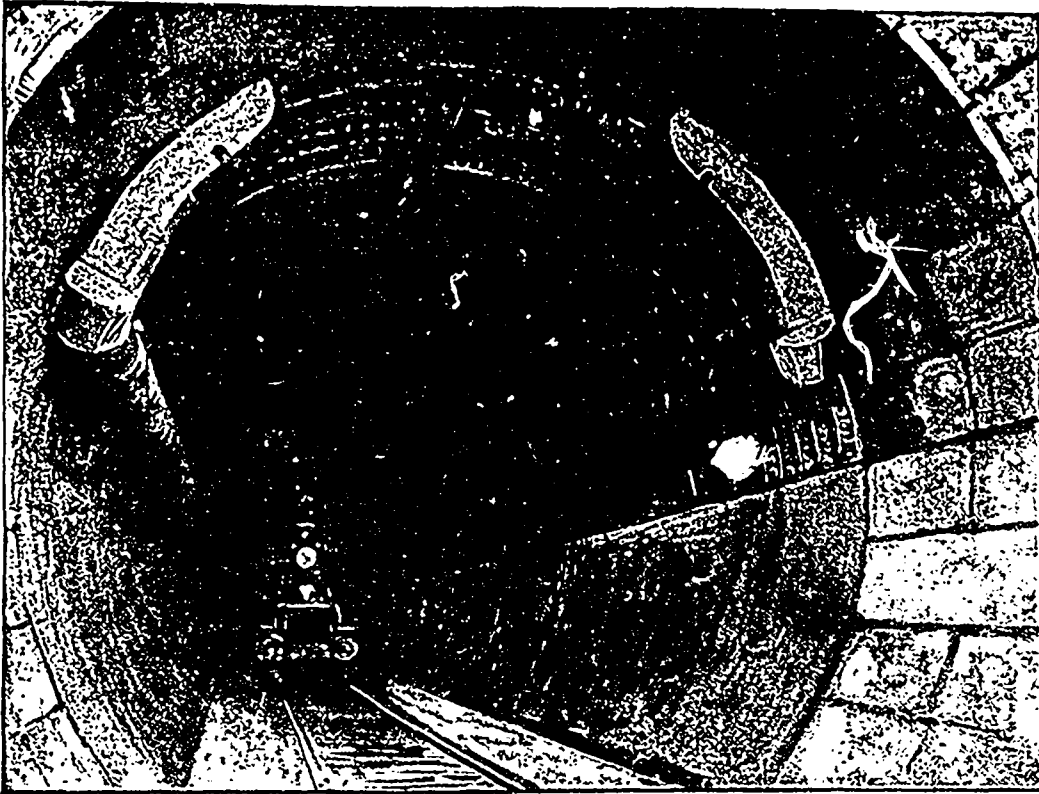
THE ST. CLAIR TUNNEL.

The Grand Trunk Railway, in order to establish communication between Sarnia and Port Huron, constructed an immense tunnel under the St. Clair River, which is one of the finest examples of engineering work in this country at the present day. The length of

One of the accompanying illustrations gives some idea of the course of the tunnel and the steep grades on either end.

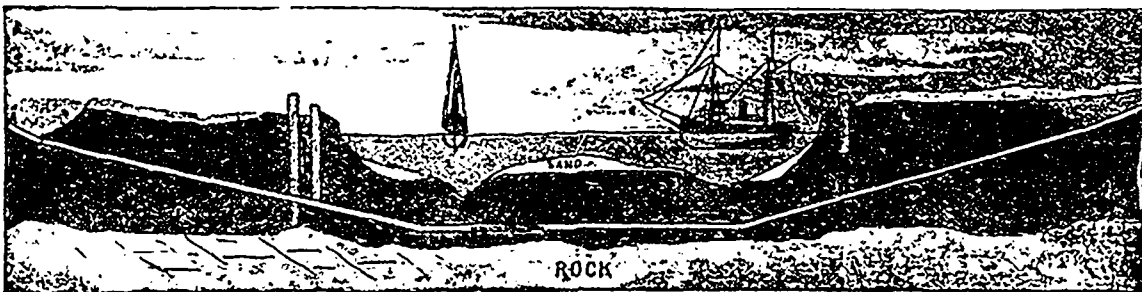
The rails of the track rest on a bed of brick and concrete, filling the bottom of the tubing. The engines used to pull trains through the tunnel and up the steep grade are the largest in the world, having ten driving wheels and weighing nearly 200,000 pounds, with cylinders 22 inches in diameter, with 28-inch stroke.

The cost of the tunnel was \$2,700,000. Four thousand cars can be daily moved through it, which shows its immense superiority over the old ferry. The



the tunnel proper is 6,025 feet, and of the portals that form the approaches 5,605 feet in addition, or more than two miles in all, being the longest submarine tunnel in the world. It is a continuous iron tube 19 feet 10 inches in diameter, put together in sections as the work of boring proceeded, and firmly bolted together, the total weight of iron aggregating 56,000 pounds. The tunnel commenced in September, 1888, was opened for freight traffic in October, 1891, and passenger trains

enterprise was promoted by Sir Henry Tyler, of England, president of the Grand Trunk Railway, assisted by Sir Joseph Hickson, late general manager. The engineers were Joseph Hobson, chief; T. E. Hillman, first assistant, and M. S. Blakelock, secretary. We are indebted for the above particulars and for our illustrations to the *Electrical World* of New York.



began running Dec. 7th, 1891. Work was commenced at both ends, the two sections meeting in mid river with perfect accuracy. The tunnel passes through blue clay, except an occasional pocket of quicksand and water and a few boulders. Borings were made by cylindrical steel shells, with cutting edges driven forward by hydraulic rams.

SPECIAL TRIPLE GEARED LATHE.

This lathe has been specially designed by a Glasgow firm for turning marine propeller shafts and heavy general work. We are indebted to the *Engineer*, London, for our illustration and the following particulars: The height of the centers is 30 in., and it admits 40 ft.