wheels of which are set in motion by it, constitutes the electrical locomotive. Thus we have the first dynamo-electric machine set in motion by the steam engine at the terminus, the electricity generated by it is conveyed by the rails, or by some special conductor, to the second dynamo-electric machine, which it sets in motion, and actuates the locomotive. These are the essential parts of the electric railway. The details of Dr. Siemen's system are as follows: Fig. 1 represents a front view of his locomotive, and Fig. 2 a longitudinal section. The motion of the electrical machine is communicated by suitable gearing to the wheels of the vehicle on which it is mounted, and these are placed on rails of the ordinary construction. The electricity from the driving electrical machine at the station is conveyed to the locomotive through a special insulated central rail (seen in Fig. 1), the current being taken from the insulated rail by a metallic brush, and returned to the first machine through the ordinary uninsulated rails, thus completing the circuit. The stationary machine, it should have been stated, has one of its poles connected with the track rails and the other with the insulated centre rail. The current, therefore, comes through the insulated centre rail, traverses the metallic brushes in contact with the centre rail, passes through the wires of the locomotive, and returns through the wheels and track rails.

Fig. 3 shows a perspective view of the locomotive drawing three cars, each containing six passengers. The current is thrown on or off by the driver, who sits astride of the motor and controls its motion. The performance of the locomotive were described, and which was capable of developing 3½ horse-power, attained a maximum of 7½ miles per hour, carrying 18 passengers.

Dr. Siemens' novel experiment attracted so much attention, that the suggestion was subsequently made to construct an elevated electrical railway in the city of Berlin for the transfer of passengers, which, we are informed, has been received with favor by the municipal authorities. He also developed the idea of employing the same system as a substitute for the pneumatic postal service, in use in that and other European capitals, between central and outlying postal stations, to facilitate the collection and distribution of the mails.

We give below illustrations and a brief description of these suggestions, which seem to be in a fair way to be realized. It is proposed to construct the columns of the elevated electrical railway of wrought iron, placed on the edge of the sidewalks at distances of 10 meters apart. The longitudinal supports T T (Fig. 4), on which the rails S S (insulated from each other) rest on sleepers of hard wood, are firmly fastened to the columns. The passenger coaches are to be constructed as lightly as is compatible with safety, and are designed to seat 15 persons. Each wheel is carried on an independent axle, and the axle boxes of each side are electrically connected. The two driving-wheels R R receive their motion from the dynamo-electric machine, which is placed under the bottom of the vehicle. The central rail in this plan is dispensed with, and the track itself is made the conductor, the plan being similar if not identical with that of Mr Edison's, described in the June number of this journal.

Fig. 5 represents a special arrangement designed for postal service, by the same inventor. The road is purposed to be carried on short iron columns S. On these rest the wooden sleepers, to which are attached sheet metal pieces b_1 b_3, formimg the side walls of an inclosed railway. Between these sheets metal strips, at suitable distances apart, are placed light wooden cross-ties, on which rests the light rails a_1 a_2. Of these rails, one is placed at frequent intervals in electrical connection with the side sheets, which are covered above with a removable sheet-metal cover d, while the other is connected with all the iron columns. It is designed to run small four-wheeled wagons on this road by suitable electrical connections.

We are thus in a fair way to see this interesting branch of electrical invention speedily developed.

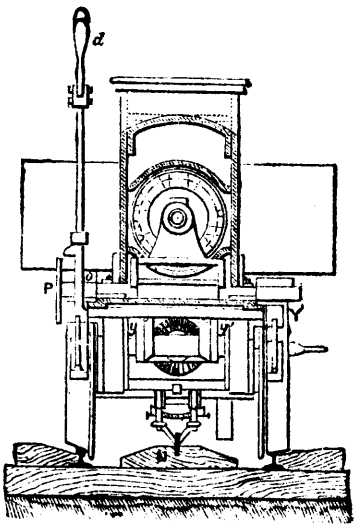

FIG. 1.—FRONT VIEW OF MOTOR

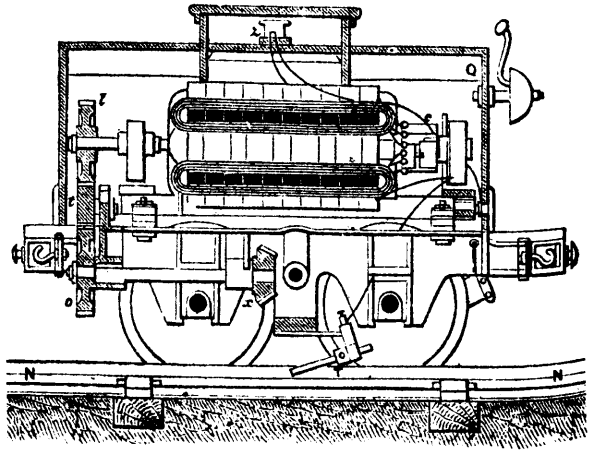

FIG. 2.—LONGITUDINAL SECTION OF MOTOR.

—THE first engineer of the Rhenish railway, which has the longest experience in steel rails, and made a calculation, according to which the average duration of steel rails, when 24 trains pass over them every day, is 30 years, while that of iron rails, with a traffic of 17 trains, is 11 years. Steel rails, according to this calculation, lasts four times as long as iron rails, although they are but one-third more expensive.

WELDING HORN.—Pieces of horn may be joined by heating the edges until they are quite soft, and pressing them together until they are cold.

A CAPE COD SHIP CANAL.—A joint committee of the Massachusetts Legislature was appointed early in the spring of 1860 to consider the project of cutting through the Isthmus of Cape Cod, for the purpose of navigation, connecting Buzzard Bay with Barnstable bay by a ship canal. The matter was reported favorably, but nothing was done until the last few months, when A. G. Fisher a commission merchant and ship broker, of Boston, became interested in the scheme, and found little difficulty in enlisting New York capital. A company was formed, and $8,000,000 of capital subscribed, of which sum $1,500,000 has has already been paid in. The contract for building the canal has been given to Adam Drisbach and John Cameron, of New Jersey. The proposed route of the canal has already been surveyed and fixed by the engineer in chief, George H. Titcomb. The new company has secured a strip of land 1000 ft. in width along the whole distance through which the canal is to run. The starting point of the canal will be near the little village of Sandwich, and it is expected that 2,000 men will be put to work immediately. The canal will be 7¾ miles long. It will shorten the route between New York and Boston 90 miles, and will secure an in-shore route between these cities practicable for such passenger and freight boats as now ply on Long Island sound. It is estimated that there is an average annual loss of 6,066 tons of vessel property, and from 30 to 40 lives caused by ship-wrecks, occurring around Cape Cod. The canal will be 141 ft. wide at the top, and 6 ft. wide at the bottom. It will have an average depth of 30 ft.

—IT is stated that R. Hoe & Co., the New York press builders, have paid the widow of William Bullock $2,000,000 for the patents he took out on printing machinery.