

of this transmission has been made. The electrical equipment of each car is divided into two units, the control of these two separate circuits can be made from either end of the car, according to the direction of travel. Each contain :—

(a) Two motors with two sets of resistances and two starting devices.

(b) One large three core transformer with high and low tension switches.

(c) Air pumps with small transformers, safety cut outs and air receiver.

(d) One current collector.

(e) A driver's stand with air pressure mechanism for working the apparatus.

All apparatus, cables and safety appliances are placed in a room in the centre of the car. The motorman's platform contains no part under electric pressure, he controls the running of the car through mechanical connections with the apparatus in the central machine room. Some place had to be found for the transformers weighing twelve tons, reducing the 10,000 volts of the line at which voltage the current is supplied from the three overhead lines to 1,150 volts, the primary tension for which the motors are built. These are placed underneath the car body in the middle section. The cooling of these transformers is made through air currents passing through two air shafts, which run from the roof of the car to the transformers in such a manner that cool air is taken through one shaft, the hot air flowing out through the other.

Concatenation control is not used, and to bring the motors up to speed, starting resistances are inserted in the secondary current circuit in the usual way. On account of the space under the flooring of the car being already taken up by the transformers and connections, and to obtain as large a cooling surface as possible and as high a degree of efficiency for the weight as possible, the metallic resistances are carried against the sides of the car. A battery of 631 lbs. furnishes the current for lighting when the car is standing with the trolley off the lines. It is out of the scope of this paper to describe in detail the working of this equipment ; it does not, however, materially differ from the description of the previous one cited.

Each car is seventy-two feet long and weighs ninety tons. The track on which these high speeds have been obtained is a nearly level line throughout its length of eighteen miles and the track is