

am indebted to "L'Industrie Electrique" for much of the above data and for the following :—

To start a motor car with five trailers, a total weight of ninety tons, seventy to ninety amperes are required ; at 3,000 volts this is equivalent to 415 K.V.A. Power factor of primary and secondary motors at max., torque when concatenated 70%.

When running full speed, the secondary motors being out of circuit, the current varies between fifty-two and fifty-six amperes. The power factor 80%.

To start a train weighing 250 tons on a 1.1% grade 150 amperes are required, viz : 810 K.V.A. The maximum horizontal pull is 16,000 lbs. On 4.4 feet diameter driving wheels and 20 miles an hour the H.P. developed is close to 875 H.P.

There are at present ten motor cars and two locomotives in daily service, consuming an average of 9,000 K.W. hour per day. The station equipment for this work is equal to 6,000 H.P. showing a rather small load factor.

THE BERLIN-ZOSSEN LINE.

The trials of high speed traction taking place at the present day in Germany over the Berlin-Zossen road, where speeds of 130 miles per hour have been obtained, have attracted the interest of railroad engineers all over the world. These trials and experiments have now extended over a period of two years. The first trials at high speeds were made with an electric locomotive, as it was deemed advisable to perform experiments with it rather than with a motor car.

Fig. 6 shows a general view of this locomotive, together with the motor car used now. The line voltage is 10,000, three phase, 45-50 periods per second. The underframe of the locomotive is of the double truck construction of a pair of motors, being provided for each bogey. The motors are designed to work at 10,000 volts. The wheels have a diameter of 4' 4" and the motors are geared to the axles of the driving wheel with a gear ratio of 2.

Fig. 7 shows an external view of the motor and gear case. The speed at starting is regulated by varying a resistance in the rotor or secondary circuit. Speeds of ninety miles an hour were obtained with this locomotive. It was found, however, that it was not sufficient at these high speeds on account of the velocity of the teeth being exceptionally great to fill the gear box with oil or consistent grease, but that lubricants had to be forced by compressed