

uneven, but it is intersected by rails, and these irregularities are detrimental to electric storage batteries. The speed of such tractors is generally about 4 to 5 miles per hour. They can be handled with much dexterity, and can negotiate sinuous curves with a line of six, eight, or even more trailers behind them. The trailers can be dropped in sequence as they reach respective points of destination.

On some coastal lines at New York, a further step has been taken in developing the use of the trailer. Recently several lines, notably one of those on the Hudson River, have been using tractors and trailers, both for pier distribution and for cargo transference, with the marked difference that the trailers are left on board the vessel and taken off only at destination, where they are drawn off by the same means, unloaded, reloaded, and drawn on board for shipment to New York. This is an advanced development of the tractor and trailer system which is not generally applicable, though it may have advantages in particular cases.

#### BATTERIES AND CHARGING.

Two types of batteries are commonly in use for motor trucks: the lead (chloride or oxide) type and the nickel iron-alkaline (Edison) type. The former are weighty, but the latter require more current. Each has advantages for special cases. The number of lead cells is usually 12, 18, or 24, and of Edison cells, 24, 30, 36, or 48. Direct current is used for charging. If the supply is alternating current, it may be converted into direct current by a mercury arc rectifier, a motor generator set or a rotary converter. Of these, the motor generator set method is generally considered the best. If the correct voltage is not available, the current is passed through a battery charging resistance, or a motor generator.

The charging station should be located conveniently at hand, say, within 500 yards of the centre of operations. For obtaining a charge for a full day's run of 20 to 30 miles, about five to seven hours will be required.