

two transferers mutually connected upon the same tracks and sets of switches upon each side thus working from cross-overs.

This system seems to be capable of being adapted to suit the varying requirements of a freight terminal. The telfers can be driven at a speed of 500 to 1,000 feet per minute and the transferers, only having short distances to travel, could move at about 100 feet per minute. Trailers might also be used with the telfers and with this system the cost of hoisting, travelling and lowering should not be very high, even for long travel distances.

Motor Trucks.—In the last few years a number of electric storage battery trucks have been put on the market by different concerns and are being quite largely installed in freight terminals. Among the first trucks of this type to be put into use were those of the New York Central at the Grand Central station and the Pennsylvania New York terminal, which were used solely for the handling of baggage. Since then, however, they have been modified and varied into different forms suitable for handling package freight. This type of truck is illustrated in Figs. 13 and 14. Fig. 13 shows trucks ready for use in a freight station, and Fig. 14 shows one loaded.

These trucks have the great advantage of their flexibility, hence their ability to pick up a load at any point in the freight shed and then take it right into the car where the load is to be stowed. This feature, together with their carrying capacity, has in many terminals where they have been installed, enabled the freight handling force to be reduced as much as 50 per cent., with consequent reductions in the terminal costs of handling the freight. The Erie Railroad has at its Jersey City transfer some 20 trucks handling 45 cars of transfer freight and 75 to 85 cars of outbound freight daily, and after an exhaustive test covering the greater part of a year it was found that they were able to reduce the cost per ton from 39 cents to 29 cents, including the cost of running repairs to the trucks.

The following table gives details of the daily average service of motor trucks on a large New York pier:—

Mileage	13.6
Tons handled	225.0
Tons per hour	20.3
Loads handled	230.0
Length of haul	1,585 ft.
Pieces per load	20.8
Weight per piece	88.5 lb.
Time per round trip	2.89 min.
Time to load	58.00 sec.
Time to unload	60.3 sec.
Men in gang	8

A very complete series of tests were made at Providence, R.I., in connection with the performance of these motor trucks, and the accompanying table gives the figures obtained. In the first row the figures refer to the results obtained at the Providence transfer platform, the second is the outbound freight house, third is the inbound freight house, and the fourth is the Providence line pier, Fox Point.

A few general dimensions of the trucks generally in use will not be out of place. Their over-all lengths are usually between 9½ and 10½ feet, with a corresponding length of platform of 6½ to 8 feet. The widths of standard trucks



Fig. 14.—Electric Truck Hauling a Heavy Load of Freight.

varies from 3 to 3½ feet, while the height of the platform above the ground is about 20 inches. The wheel base is made 52 inches and the gauge varies around 3 feet as an average. They are made with varying capacities but the standard trucks as manufactured now do not exceed 3 tons in capacity with the weight of the truck about 1 ton. They are usually designed to give a maximum speed of 10 m. per hour, with a range of intermediate speeds.

The use of these trucks is naturally only in its infancy, but where they have been installed they certainly have shown marked decreases in the cost of handling freight.

Conclusions.—In summing up and studying the relative merits of the different systems of handling freight by mechanical means, each system will be found to have its disadvantages; for instance, in the case of an overhead telferage system, the telfers are practically confined to fixed lines of travel, and the loads which they have to handle have to be

	HOURS IN SERVICE	DISTANCE (FEET)	WEIGHT (POUNDS)	AVERAGE TONS P. HOUR.	NO. OF LOADS	AVERAGE LENGTH OF HAUL (FEET)	AVERAGE NUMBER OF PIECES PER LOAD	AVERAGE WEIGHT PER PIECE (LBS.)	AVERAGE WEIGHT PER LOAD (LBS.)	TOTAL NUMBER OF PIECES.	MAXIMUM LOAD (LBS.)	AVERAGE MINS. RUNNING PER LOAD	AVERAGE TIME TO LOAD. (MINS.)	TOTAL HOURS LOADING & UNLOADING.	TOTAL HOURS RUNNING	NO. OF MEN IN GANG.	WAGES OF MEN.	COST OF LABOR P. TON INCLUDING CHALKING CLERK.	WAGES, NOT INCLUDING CHALKING CLERK.	COST OF LABOR PER TON, NOT INCLUDING CHALKING CLERK.
1	87.4	175,930	501,956	2.87	402	438	13.5	92.4	1248	5419	4500	4.40	5.30	60.53	29.50	38.4	55.70	22.191	35.77	14.251
2	105.17	67,315	630,709	3.00	527	128	15.4	77.7	1197	8086	5100	2.70	4.57	80.88	24.30	3	58.42	18.523	34.78	11.024
3	120.53	143,840	742,923	3.13	561	256	15.4	86.0	1324	8629	9000	2.75	6.30	94.78	25.77	38.4	76.13	20.495	49.22	13.250
4	55.19		717,839	6.53	467	177	10.2	150.5	6080	4767		7.10					34.03		34.03	9.482

* TOTAL FOR 13 DAYS IN *12*4.
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