

A DOUBLE-DECK CAR FOR RAPID TRANSIT.

Although the double-deck car is practically unknown in this country, it is very extensively used in Europe. In a recent examination of the question of double-deck cars made for the Merchants' Association of New York, by John P. Fox, it was stated that of the 6,660 electrical cars of Great Britain and Ireland, ninety per cent are double-deck and ten per cent single-deck, while of the 3,517 new cars in cities having a hundred or more cars in use, ninety-four per cent are double-deck. The report of Mr. Fox was made after he had carried out an exhaustive investigation of the subject during a visit to Great Britain and the European cities where the double-deck car is most extensively used, and it contains expressions of opinion from managers and superintendents of the various traction companies in Europe, as to the relative advantages of cars of the single and of the double-deck type. According to the statement of the General Manager of the Liverpool Corporation Tramways, it was thought desirable, when electric traction was introduced in Liverpool in 1888, to follow the American practice of using single-deck cars. Subsequently, on introducing double-deck cars the average time consumed per passenger in getting on and off worked out at 1.9 seconds; whereas in a large American city, where the operation of the cars is similar to that in Liverpool, the length of stop per passenger averaged 2.8 seconds on an open, twelve-seated car.

As showing the great increase in capacity secured by double-decking, it was mentioned in the report that some of the Liverpool single-deck American cars had stairs and an upper deck added, and were used on trial before the double-deck car was adopted as the exclusive type for service. These cars were used on Saturdays, Sundays, and holidays, and at other times when cars of large accommodation would be required. The seating capacity was increased from forty to one hundred by the addition of sixty seats on the upper deck. The total weight of the car was only 31,360 pounds, and the two 35-horse-power motors already installed on the cars proved sufficient for the work. The largest closed cars in New York are the convertible Third Avenue cars with cross seats, which are about the same length as the Liverpool converted American car; but they weigh 3,600 pounds more, and seat only forty-eight per cent as many passengers.

As our readers are aware, the SCIENTIFIC AMERICAN has for several years advocated the introduction of the double-deck car as one of the most efficient means for reducing congestion of surface railway travel in

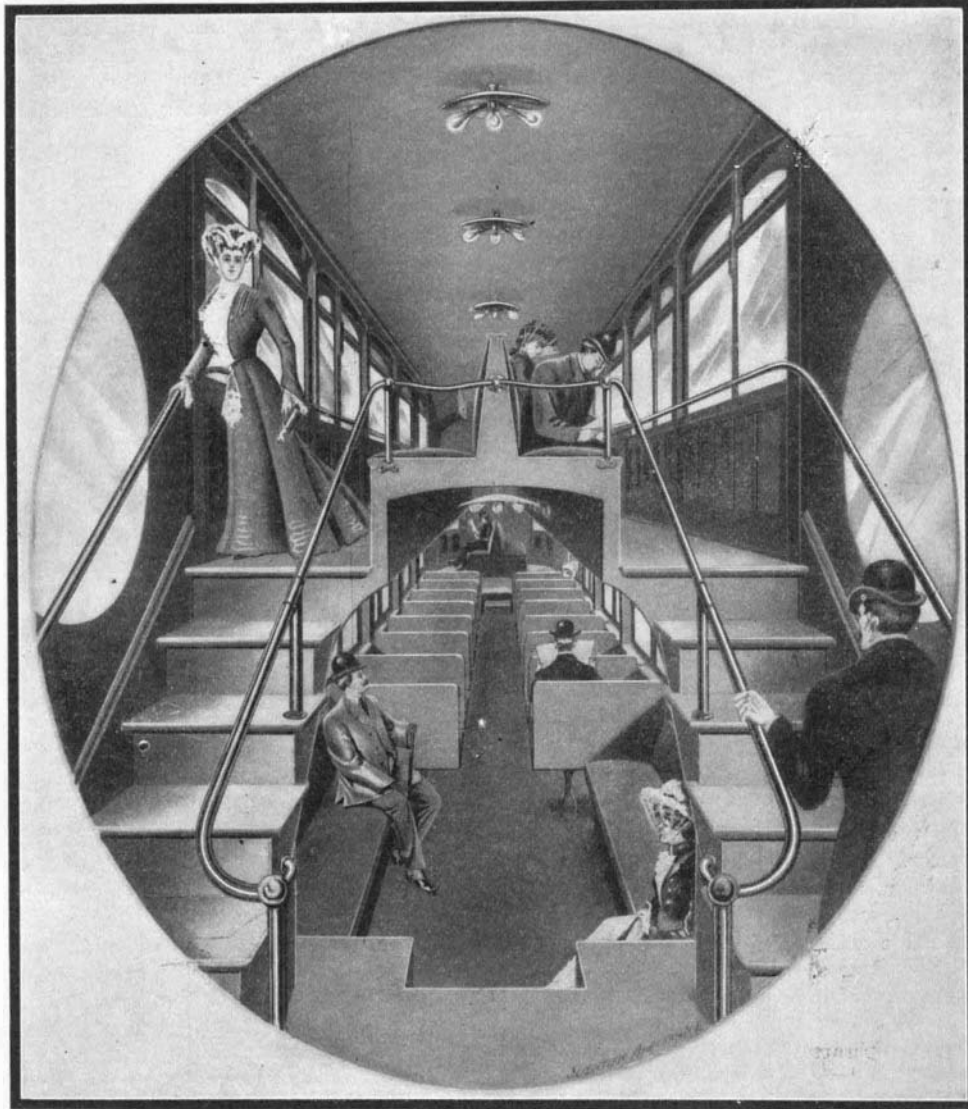
New York city. We had no idea, however, that the facts in favor of this type were as convincing as the Merchants' Association report has shown them to be; and we have yet to see any good argument advanced against the introduction of the type upon New York lines, or at least upon the Broadway line, the most congested of them all. The elevated railroad structure

motorman. To keep down the height of the car and provide good head room on both decks, the floor of the lower deck is lowered between the two trucks, access to this lower central portion being had by a couple of steps at each end. Access to the upper deck is by way of two stairways as shown, one on each side of the car, and the movement of passengers is facilitated by arranging the seats on the upper deck back to back, longitudinally down the center of the car. The side walls of the car are braced together by carrying the floor of the upper deck upon forged steel rockers, which are bent upward at the center into an inverted U, to provide increased head room for the center aisle of the lower deck, an arrangement which gives over a foot of extra head room, and assists in keeping down the total height of the car. These steel rockers are attached by stout knees to the side posts, and materially stiffen the whole structure.

This particular car is of the completely inclosed type—suitable for winter travel. For summer travel it can be built with open sides, as is done on the cars in European cities. The question of stability has been carefully considered, and the lowering of the lower deck between the trucks, coupled with the weight of the motors which would be necessary with a car of this size, has kept the center of gravity at a safe height above the tracks.

DE GLEHN COMPOUND FOR THE GREAT WESTERN RAILWAY, ENGLAND.

The French compound locomotive for express service, mention of which was made some time ago in this journal, has been delivered, and is now giving good results on the Great Western Railway, England. The compound locomotive as such has been the subject of experiment and of a great deal of practical service on English roads for many years; but it is doubtful if any of the English-designed and built compound engines have given results as good as those secured with the De Glehn engines, which are used on several French roads for hauling fast passenger trains. The success of the French type is not due so much to any one particular feature, as to the fact that the designer has studied the question of compounding the locomotive from every standpoint, giving the most careful attention to details; and their high economy and large high-speed hauling capacity are due to the perfect balance and proportion of parts, producing a general, all-round excellence in the engine hitherto unattained. Particular attention was paid to the proportioning of the cylinders, and the ratio of high to low-pressure cylinders is widely different from that adopted on the Webb com-

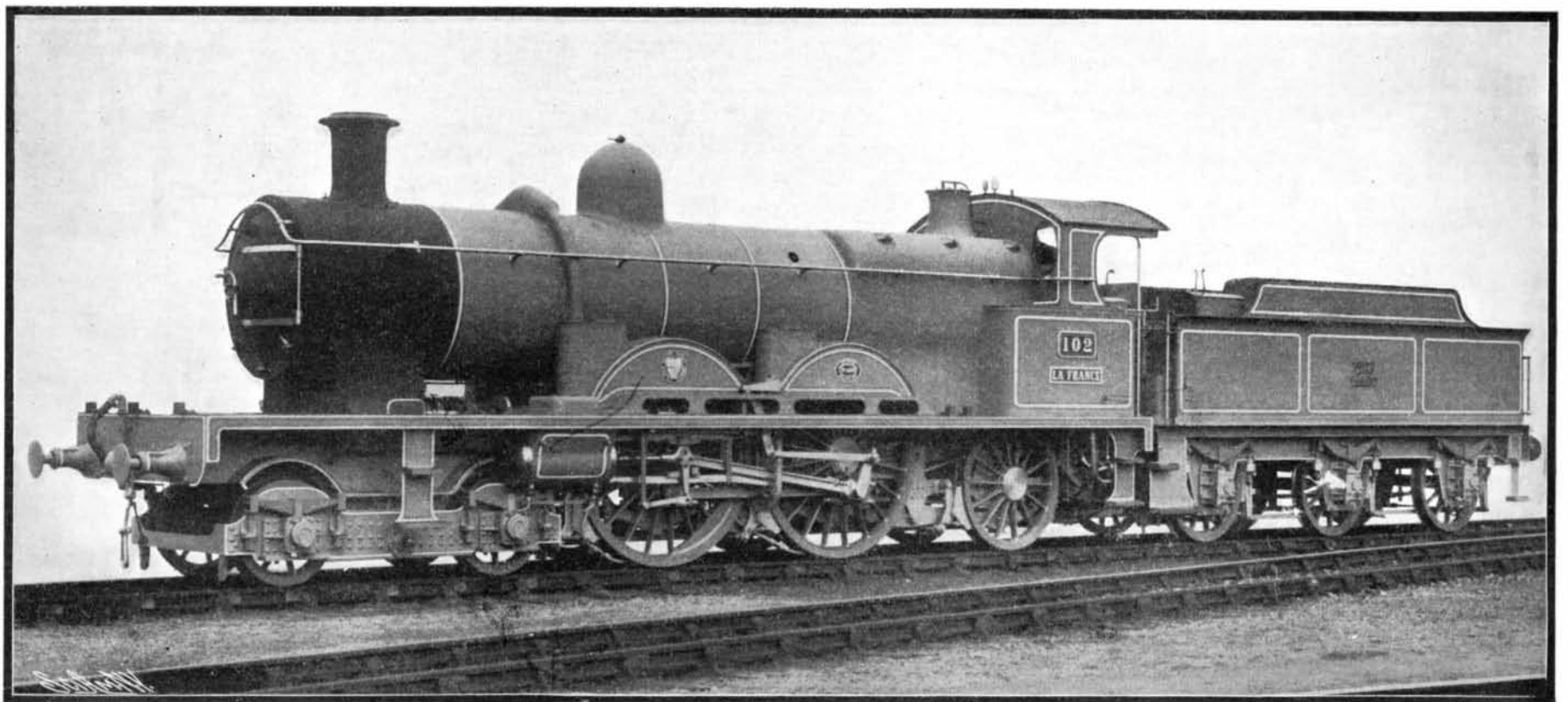


Width over all, 8 feet 10 inches. Height from top of rail to top of roof, 15 feet. Length over all, 53 feet 2 inches.

INTERIOR VIEW OF A DOUBLE-DECK CAR.

at the Thirty-third Street crossing might have to be raised slightly to provide sufficient clearance; but this could be done without any interruption of the traffic.

The double-deck car of which we herewith present an interior view was designed by James L. Getaz, Knoxville, Tenn., and is presented as being an interesting study of this problem. The car, as shown, is of larger capacity than would be used within the interior lines of city traffic, being more adapted for interurban service. It has a width over all of 8 feet 10 inches, a height from the top of the rail to the roof of the car of 15 feet. The length over all is 53 feet 2 inches. The car is vestibuled, and an entirely separate cab is provided at the front end for the



Cylinders: Two high-pressure, 13 $\frac{3}{8}$ inches in diameter; two low-pressure, 23 $\frac{1}{2}$ inches in diameter. Steam pressure, 227 pounds. Heating surface, 2,500 square feet. Tractive effort, 144 tons.

DE GLEHN COMPOUND LOCOMOTIVE NOW RUNNING ON THE GREAT WESTERN RAILWAY, ENGLAND.