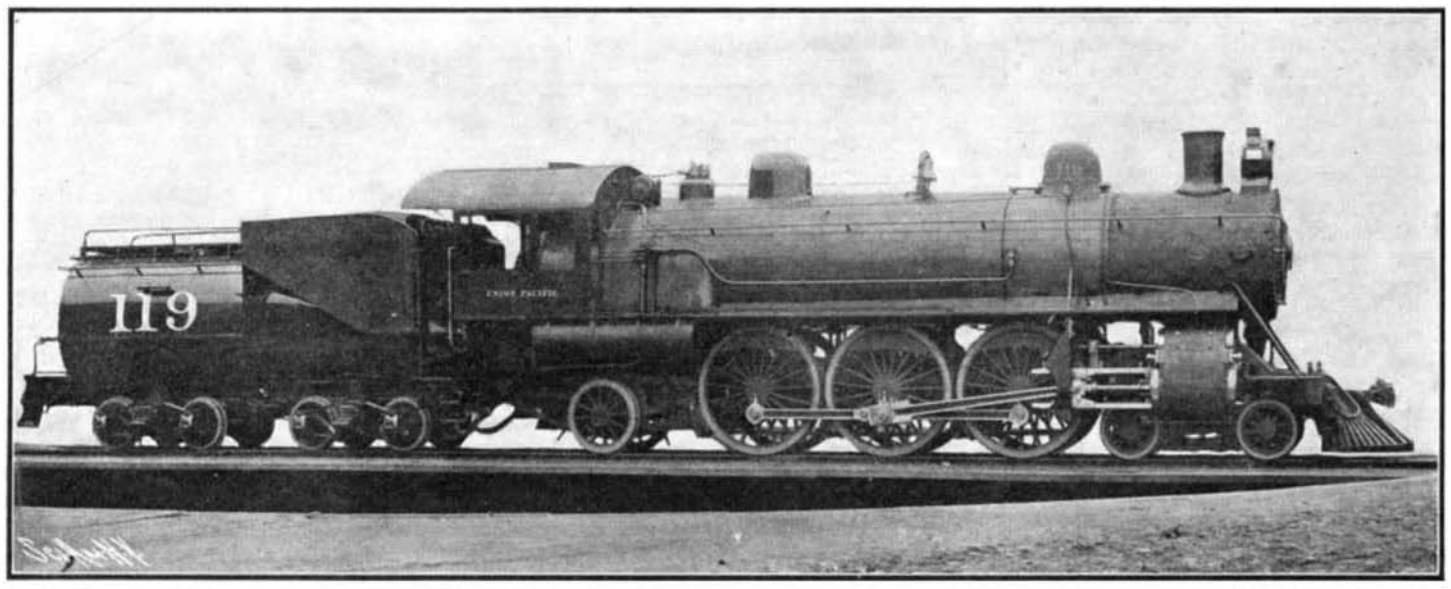
PASSENGER LOCOMOTIVE WITH VANDERBILT TENDER.

One of the novel features that arrested immediate attention in the Transportation Building at the World's Fair, was the new type of locomotive tender, designed by Cornelius Vanderbilt, which was shown on several fine locomotives of modern design. The one herewith selected for illustration was built by the Baldwin Locomotive Company for the Union Pacific Railroad Company, and is known as the Pacific type. The locomotive has cylinders 22 inches in diameter by 28 inches stroke, connected to the middle pair of the six-coupled driving wheels, 77 inches in diameter. The total weight of the engine is 222,520 pounds. It is carried as follows: 141,290 pounds on the driving wheels, 37,330 pounds on the front truck, and 43,900 pounds on the trailers. The boiler is of the straight type, with a diameter of 70 inches and a working pressure of 200 pounds to the square inch. The total heating surface is 3,053 square feet, and the grate area 49.5 square feet.



For the same capacity there is a saving of 7⅛ tons on a Standard 73-ton tender.

PASSENGER LOCOMOTIVE WITH THE VANDERBILT CYLINDRICAL TENDER.

It will be seen from this description that the engine is of a standard type. The tender, however, departs very broadly from the old lines with which we are familiar. The water tank, instead of being of the rectangular pattern, is cylindrical. It is built of ¼-inch steel, and measures 8 feet in diameter by 23 feet in length. It is carried on a narrow frame, which for reasons given below is much lighter than that of the ordinary type of tender. The length over bumpers is 26 feet 3¾ inches. At about the mid-length of the tank there is a plate-steel saddle, which serves to support the rear end of the coal hopper. The latter occupies the space above the forward half of the tender, and it is of a general rectangular form, with a sloping bottom arranged at the proper pitch to give a free delivery of the coal to the foot-plate. The trucks are of the arch-bar, simplex bolster type, with cast-iron, steel-tired wheels, 33½ inches in diameter, the journals measuring 5½ inches by 10 inches. In a light condition the tender weighs 46,740 pounds. Fully loaded with coal and water, its weight is 136,450 pounds, or 68 tons, which, by the way, was the weight of a good-sized locomotive not so very many years ago. The water capacity is 7,000 gallons, and the coal capacity 14 tons.

The advantages of the Vanderbilt tender are many. For its capacity and weight the cylindrical form is the strongest that can be used. Its transverse strength is so great that, in spite of its length of over 26 feet, the tank is quite capable of carrying its load of 29 tons of water without any center support, and, consequently, the underframe can be made very much lighter than would be necessary in a tender of the same capacity but of the rectangular shape. The frame need only be made strong enough to withstand the pulling and pushing stresses of the engine, and, as compared with the standard type of frame, it is remarkably narrow and light. In a comparison of two tenders, one rectangular and the other cylindrical, and each carrying 7,000 gallons of water and 14 tons of coal, there is a saving of about 7½ tons of weight in favor of the Vanderbilt type. A further advantage is that the fuel is located at the forward end of the tank, immediately at the back of the foot-plate, and, therefore, in the most convenient position for the firemen.

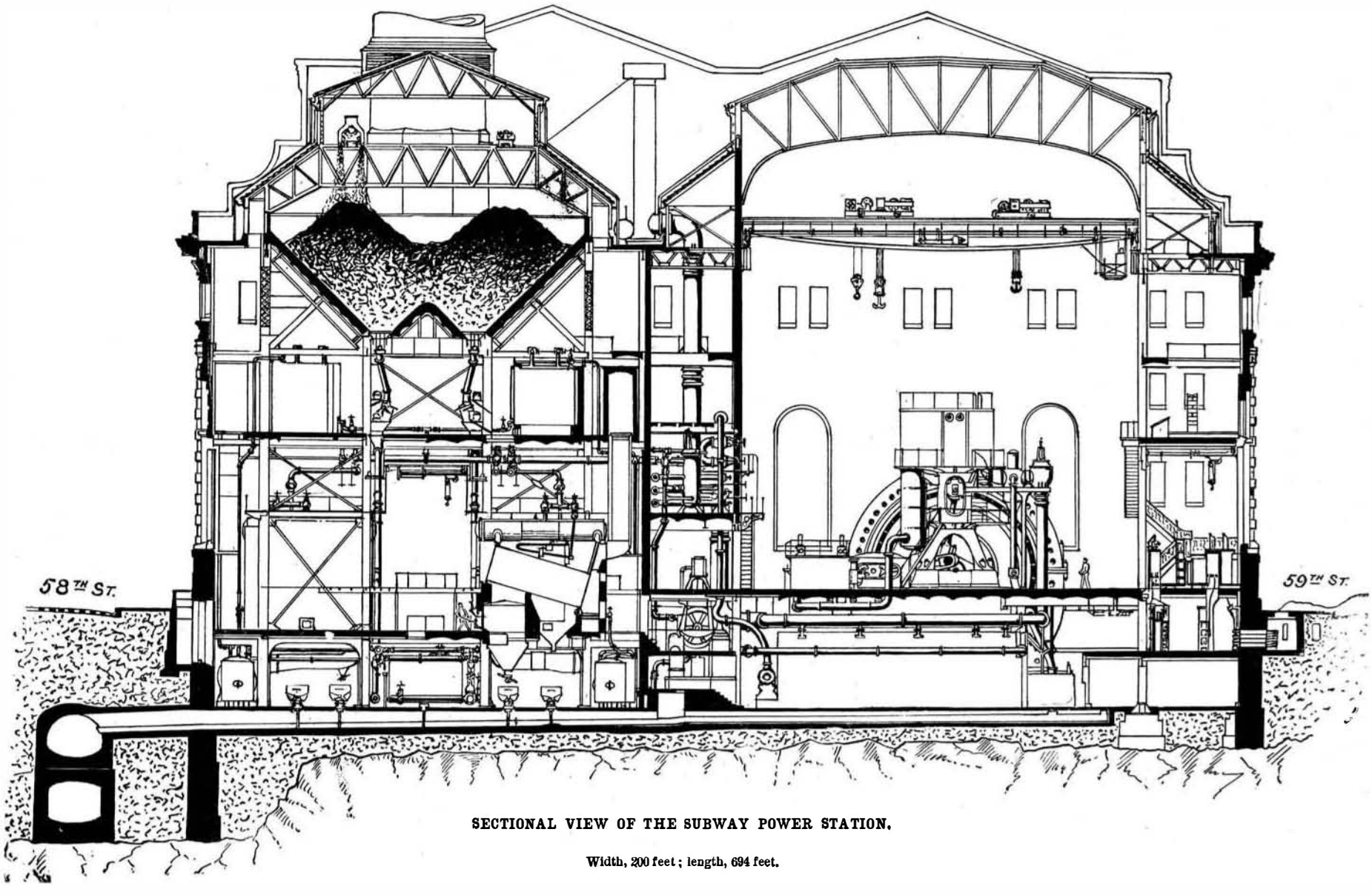
The British consul at Bahia states that ropes made from the fiber of the caroá plant will soon rival the best manila.

OPENING OF THE NEW YORK RAPID TRANSIT SUBWAY.

On October 27 the Rapid Transit Subway of this city was formally opened with simple but dignified ceremonies that took place in the City Hall. Mr. Alexander E. Orr, representing the Rapid Transit Commission, formally handed over the road to the Mayor, and after a party of invited guests had made a trip over the system, the sale of tickets commenced at seven o'clock in the evening, and the citizens of New York were thus placed in possession of this splendid addition to its traveling facilities. In our issue of September 10 we gave an illustrated description, dealing with the general features of the road, its route, construction, equipment, and method of operation, and to that article reference is now made for the fuller details which it is not necessary to elaborate here.

In no city of the world is there an underground railroad that can compare in size, capacity, and speed with this. The total length of the line is 24.7 miles, of which 19 miles is underground and 5.7 miles is carried on an elevated structure. It includes 6.7 miles of four-track, 7.4 miles of three-track, and 10.6 miles of two-track road. If we include 5 miles of switches and sidings, there is a total track mileage of 70 miles. The contract was let four years ago for $35,000,000, this being the amount necessary for the construction of the road. The equipment, power station, etc., cost $12,000,000 more, making the total cost $47,000,000.

There are two classes of service, express and local; the former using the two inside tracks, and the latter the two outside tracks of the four-track road. Express trains, which will run at a speed of about 25 miles an hour including stops, are made up of eight cars, of which five are motor cars. The local trains, which will have a speed of about 16 miles an hour, including stops, are made up of six cars, four of which



SECTIONAL VIEW OF THE SUBWAY POWER STATION.

Width, 200 feet; length, 694 feet.