THE BOSTON SUBWAY.

Some years ago the street car system of the city of Boston was converted, practically in its entirety, into a trolley system, and now the city is traversed in all directions by electric cars. One of the most striking scenes in the city can e witnessed in the mornings and evenings of business days, when a stream of pedestrians in one or the other direction, according to whether it is morning or evening, cross the Common obliquely, while around the Boylston and Tremont Street corner run numerous trolley cars of various lines, crowded with passengers, car almost touching car. This is noticeable especially between the corner mentioned and Park Street, where on two tracks are accommodated, or rather not accommodated, a number of different lines of cars. Tremont Street, narrow at the best, is also crowded with vehicles, so that the condition of transportation there is exceedingly unsatisfactory. Work is now in progress, as illustrated on our first page, on a subway, or underground road, which is designed to do away with this congestion, and which it is believed will take care of the traffic adequately. The idea is that by having a tunnel devoted to the railroad alone, and free from all interference of vehicles or pedestrians, schedule time will be made by the cars, which can naturally be run at much higher speed than on a crowded street. One of our views represents the crowded condition of Tremont Street, near the old Park Street church, during the busy hours in the morning and afternoon. Another view shows the manner of construction of one of the inclines, while the other shows the details of the four-track subway throughout its course, which is not always directly on the center line of the street.

The general course of the subway is shown in the map. Its southern end has two approaches, one from Boylston Street, beginning on the margin of the Public Garden, crossing Charles Street below the street level and running underground beneath the edge of the Common toward Tremont Street. Further south on Tremont Street, and near Common Street, is another incline marking the other entrance, from which incline a two-track subway runs to the corner of Boylston Street, meeting the Boylston Street line. Here the main subway is reached, a four-track tunnel running along the edge of Boston Common from Boylston Street to Park Street. At Park Street there is a loop, by which a portion of the cars can be returned on their course without the motorman changing his platform. From the Park Street corner a two-track tunnel continues to Brattle Square where the two tracks diverge into four tracks, two in the Brattle Street subway and two in the Cornhill Street subway, which subways join into one beneath Washington Street and thence run into the Union Depot. Just before the Union Depot is reached there is an incline by which two of the tracks reach the surface, while the other two are united by loops for the return of the cars. These two loops are for the return of cars going toward the Union Depot. The triangular junction in Brattle Square provides a loop for the return of cars going in the opposite direction, toward Tremont Street. These three loops increase the facility of operation of the system immensely and are one of its most characteristic features.

There are five stations in the subway. One is on the corner of Boylston and Tremont Streets; the next is at Tremont and Park Streets, at the corner opposite the famous old Park Street church; the next is in Brattle Square; the next is near Haymarket Square, and the terminal station is in Canal Street, opposite the Union Depot. From one of our views the reader may obtain a good idea of one of these subway stations and the ample facilities they will afford for the entrance and exit of passengers.

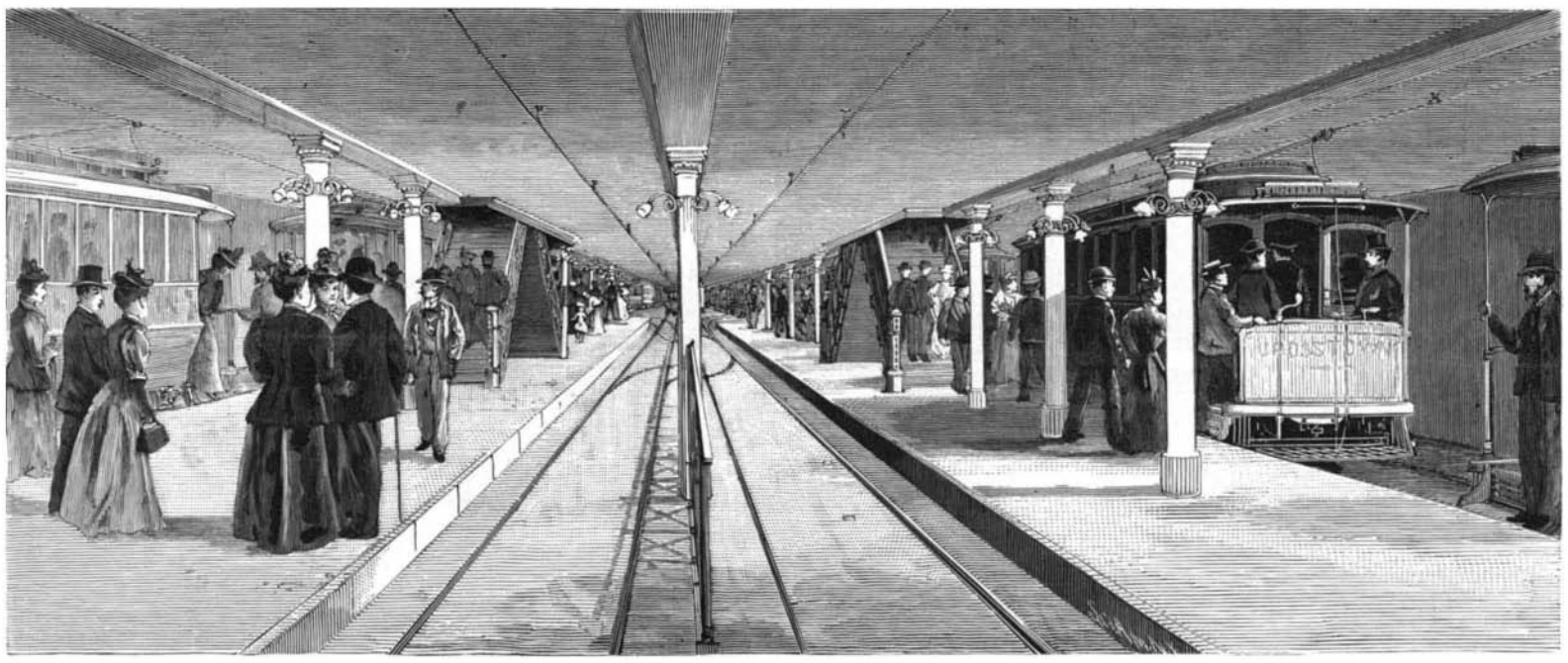
The general character of the subway differs from the type of tunnel hitherto employed for such structures. It is an object to have it near the surface and to have it independent of lateral ground support, in the sense that it can stand by itself, if earth is removed from about it. This makes it secure from disturbance by excavations in the street. Hence, for the top, steel beams, with brick or concrete arches turned between them, are employed. For its bottom, two invert arches of brick or concrete are to be used, the side walls rising from which are of masonry. A central row of pillars supporting a longitudinal girder is provided to support the center of the roof in the four-track structure. The entire structure is to be made as waterproof as possible, and electric pumps are to be installed for the drainage of water that may collect in the sumps. Its standard height is 14 feet; its standard width for two tracks is 24 feet, and for four tracks 48 feet. This will bring the top of the rail 17 feet below the surface of the street level, giving a descent of 16 feet for the passenger—a descent less than the average ascent required by the New York Elevated Railway system.

As tracks have to cross each other in the subway in two of the stations, and as it was felt that in executing a permanent work of this character anything equivalent to a grade crossing should be excluded, the necessary crossings are to be managed by sinking one track beneath the other, so that at two of the stations are to be established what are termed "undercrossings" or "sub-subway tracks."

The sides of the structure are laid in a series of arches with vertical axes each of six feet chord. They are concave inward, the intrados facing the tunnel axis. At each springing line a steel column, a 15 inch I beam, is bedded in the masonry, its base resting on an abutment three feet wide. The roof beams, 20 inch I beams, weighing eighty pounds to the foot, are spaced three feet apart and the versed sine of the arches sprung between them is nine inches. Diagonal struts run across the upper corners between the uprights and every second horizontal beam. Diagonal trussing is also applied between the central columns in the four-track structure at intervals.

The entire operations are in the hands of the Boston Transit Commission, with the following membership: George G. Crocker, chairman; Charles H. Dalton, Thomas J. Gargan, George F. Swain, Albert C. Burrage, commissioners; B. Leighton Beal, secretary; Howard A. Carson, chief engineer.

Our thanks are due to Mr. Howard A. Carson for information furnished.



THE BOSTON STREET CAR SUBWAY—ONE OF THE STATIONS.

How Butter Dishes and Clothespins are Made.

The oval, scooped-out disks of wood which have become so familiar at the grocery for doing up butter, lard and other commodities, and at the Sunday school picnic as a receptacle for pie and pickles, are manufactured in Traverse City, Mich., and the factory turning them out is the largest in the world; in fact, says the Chicago Record, it is said to be the only one except a factory in St. Louis, which operates under the patents owned by the Michigan company. The company buys the standing timber on a tract of land and works up everything on it, whether elm, ash, maple, birch or hemlock. The factory consumes about 12,000,000 feet of lumber annually.

The logs as they are cut in the forest are floated down the Boardman River to the mill booms, and as they are wanted are hoisted into the sawmill, where they are cut. For the butter dishes maple is the only wood used. The outer slabs of the maple logs are slashed off and cut to dimensions of firewood. Then a few layers are sliced off for lumber. After the slabs and lumber are cut a piece of timber about six inches in thickness and eight inches wide is left the length of the log, and this is the part reserved for the butter dishes.

The heavy timber is cut into blocks ten or twelve inches in length and boiled in huge vats until thoroughly softened. The hot blocks are placed in machines which scoop out the butter dishes at the rate of two hundred a minute. A curved knife revolving on a spindle does the work, the block being automatically advanced with each revolution of the spindle, and a knife working up and down taking off a slice just the thickness of the plate, so as to leave the surface the same as before. The dishes are scooped out of the solid wood exactly as they are found at the grocery, and all that is done to them after they leave the machine is to dry and pack them.

As the dishes fall from the machine they drop into a funnel which carries them to the dry kilns. Through the drying process they pass automatically and finally fall upon a long table, where a row of girls sort them and prepare them for packing. It takes about twenty minutes for the plates to go through the drying process, and not a hand touches them until the girls sort them for packing. Ten machines are working constantly on the oval butter dishes, and the capacity of the works is approximately six hundred thousand a day.

The most wonderful machine in the shop is that which manufactures the wire-end dishes. For these the logs are cut into bolts, boiled, and then converted into veneers the thickness of the materials used in the plates. Still hot and steaming the veneers are fed through a machine which cuts the veneer to the required shape and size, marks the folds, folds them, and sews the ends of the dish with wire, and finally delivers the dish complete at the other end. These machines turn out the wire-end dishes at the rate of one hundred a minute, and the factory facilities are for two hundred thousand a day when running at full capacity.

In making clothespins, cull lumber which cannot be used for dishes and is not suitable for high grade lumber is used. The lumber, as it comes from the saw, is cut into lengths. These blocks of wood are carried to a receptacle above and rapidly fed down upon a table where a nimble-fingered girl arranges them sidewise upon a revolving metal belt. The belt carries them to the turning machine, where the blocks are cut into the shape of clothespins without the forks. As the turned blocks drop down, another girl arranges them upon another belt which carries them to the saw which forks the pins and gives them the inner bevel on the ends. From this machine the pins drop into a carrier which takes them to the big revolving cylinders where they are dried and polished, the cylinders receiving and delivering the pins automatically.

The wooden washboards are made of thin maple boards, which can be used neither for dishes, clothespins nor lumber. The boards are given the "crimp" so familiar in washboards by a machine which works all but automatically, and the side pieces and headboard are dovetailed in the same way. One man puts the boards together, aided by a machine, and he turns out about forty dozen washboards daily. The wooden boards are sold almost entirely in the South.—Boston Jour. Com.

ON a rough average, 45,000 sovereigns pass over the Bank of England counters every day.

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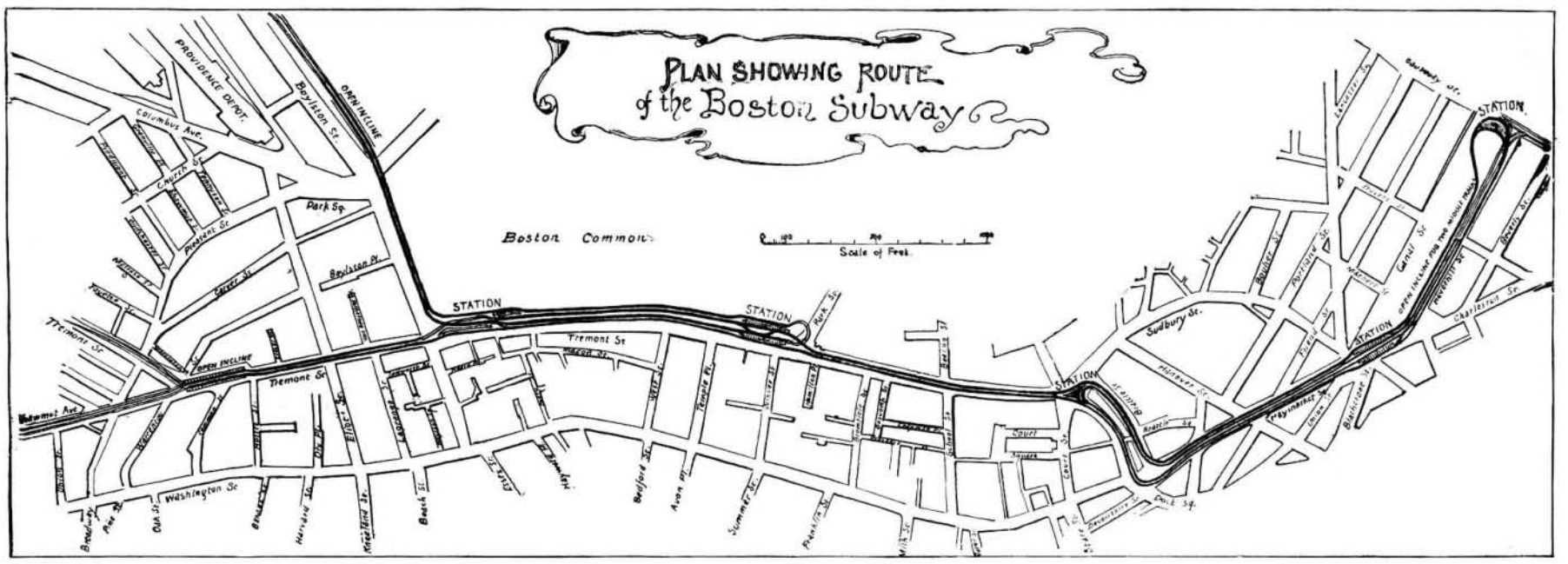

THE BOSTON SUBWAY FOR STREET CARS.—[See page 135.]