INTERLOCKING PLANTS OF THE METROPOLITAN ELEVATED RAILWAY, CHICAGO.

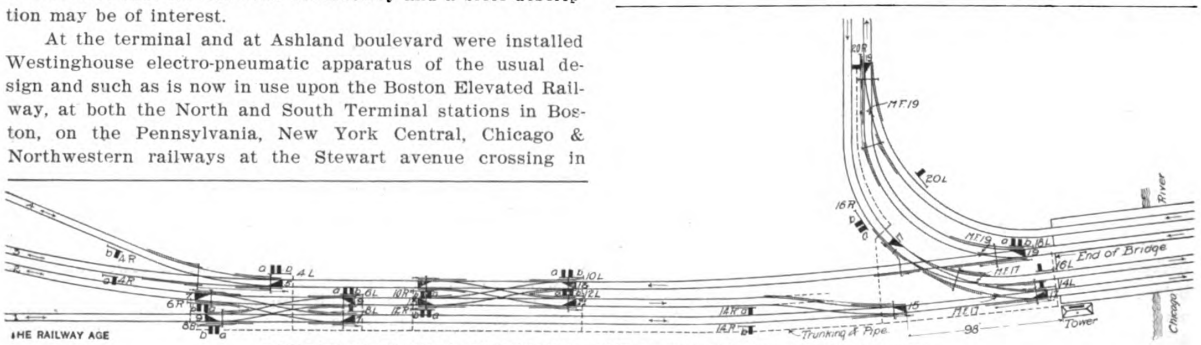
When the new terminal of the Metropolitan West Side Elevated Railway, Chicago, was put in service on the first of October last, there were also put into operation the first two power interlocking plants in elevated service in that city. The service thus far has been satisfactory and a brief description may be of interest.

At the terminal and at Ashland boulevard were installed Westinghouse electro-pneumatic apparatus of the usual design and such as is now in use upon the Boston Elevated Railway, at both the North and South Terminal stations in Boston, on the Pennsylvania, New York Central, Chicago & Northwestern railways at the Stewart avenue crossing in Chicago and at the Saint Louis Terminal station, many of which plants have been described in previous issues of The Railway Age. A ground plan of each of these installations is given herewith in the accompanying engravings which contain most of the information necessary to a comprehension of the work accomplished. The machine for operating the Ashland boulevard installation is located at Marshfield avenue in a tower which is about 500 feet from the switches and signals operated.

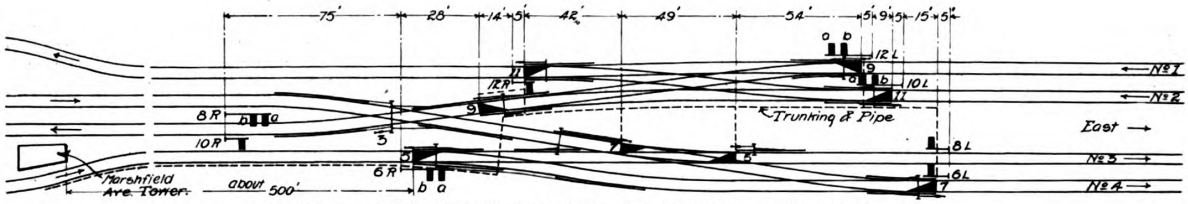
There are no unusual features connected with these installations that have not been met with and successfully taken care of in other places where this class of apparatus has been installed. Two requirements were, however, especially prominent here—safety and quick action. Owing to the volume of traffic it was decided that the apparatus in question was specially adapted to the conditions under which this elevated railway operates.

The machine at Fifth avenue and the Chicago River is a 23-lever machine and includes the following: Eight levers for 14 switches, four pairs of movable frogs and nine fouling bars, nine levers for 29 signals, making a total of 17 levers, in addition to which six spare spaces are afforded. The machine for the plant east of Ashland boulevard is a 15-lever machine having four levers for six switches and one slip, one lever for four fouling bars and four levers for 12 signals, making nine working levers with six spare spaces. In all but exceptional instances bars are 40 feet long.

Compressed air at about 75 pounds pressure is furnished by an ordinary motor compressor such as is used upon each motor car for air brake service. Current is taken from the third rail and automatically cut, in and out. The compressor is capable of furnishing 35 cubic feet of free air per minute

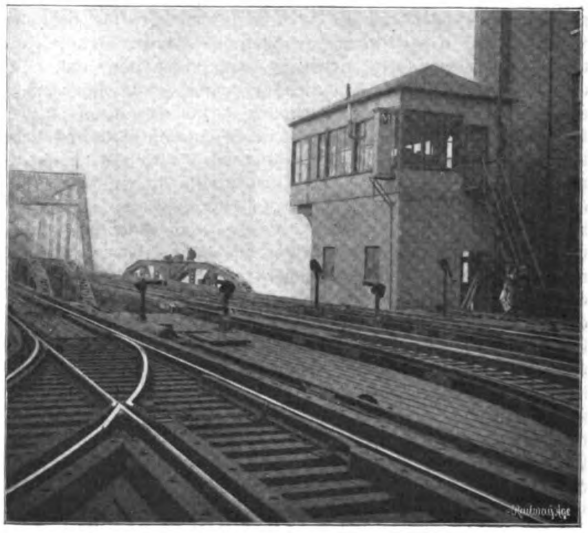


METROPOLITAN ELEVATED INTERLOCKING—INSTALLATION AT FIFTH AVENUE TERMINAL.



METROPOLITAN ELEVATED INTERLOCKING—INSTALLATION EAST OF ASHLAND BOULEVARD.

METROPOLITAN ELEVATED INTERLOCKING—INTERIOR OF TOWER.



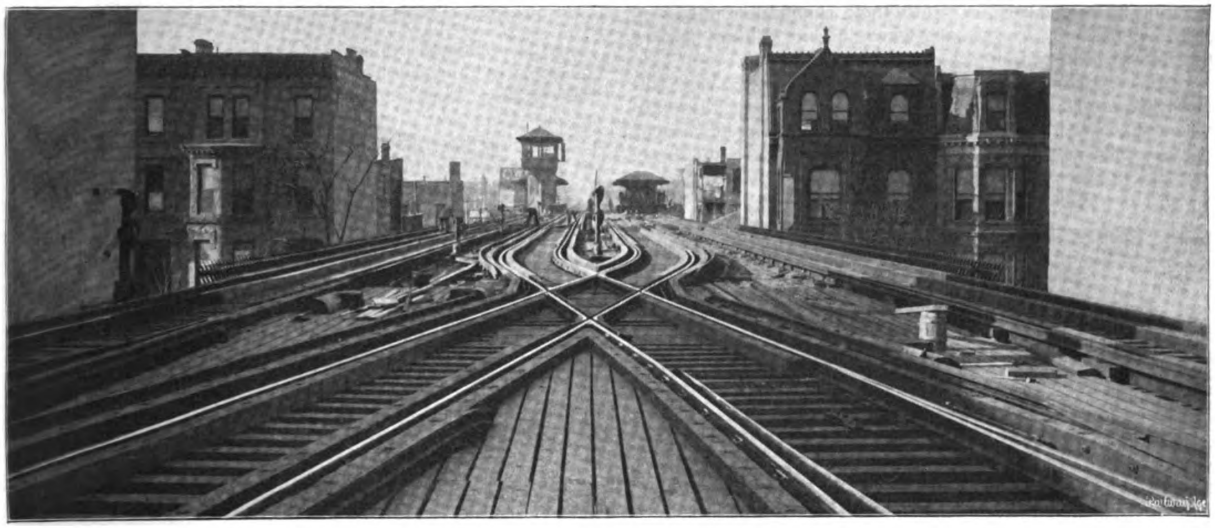
METROPOLITAN ELEVATED INTERLOCKING—FIFTH AVENUE TERMINAL.

and the plant at Fifth avenue and the Chicago River is calculated to use less than 29 cubic feet under the most strenuous conditions. The electric current for operating switch and signal movements is about 16 volts and is taken from the third rail also, reduced to low potential and led to the interlocking machine. The use of standard air motor-pumps and the electric current which operates the line—factors which are a regular part of the system—in the interlocking apparatus, presents an attractive feature in the interlocking system which is here adopted, as it eliminates the usual power house with its various paraphernalia necessary where no such facilities occur.

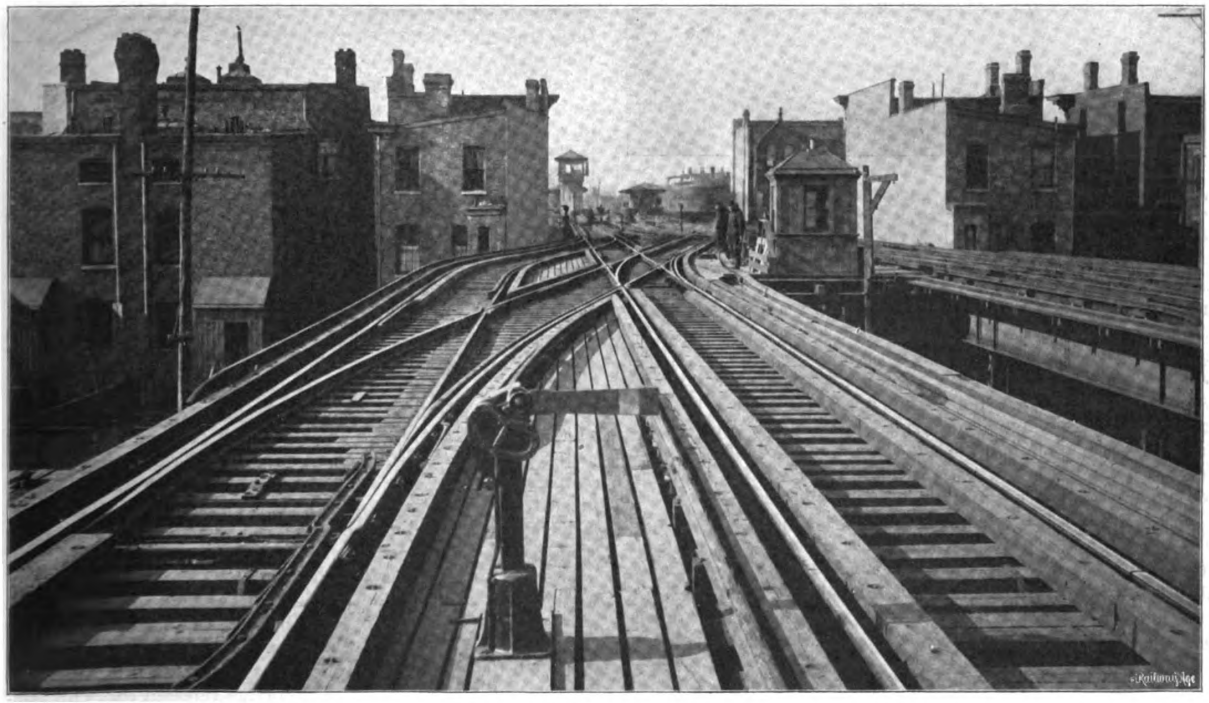
All electric wires are of Hazard make and are placed in stout pine conduits thoroughly treated with insulating and preserving compound and installed to conform with every possible requirement such as those imposed by the board of underwriters for similar work in buildings.

The signals are of the particular pattern adopted by the Metropolitan Elevated as standard and are similar to those in use on the Boston Elevated. They are fitted with electric lights.

The details of design and construction of the Westinghouse apparatus have been described heretofore and are well understood by all signal engineers and those who have in charge the installation of signaling plants. One of the peculiarly advantageous features for which the manufacturers claim approval is the quick and accurate action of the apparatus irrespective of the distance between the operating tower



METROPOLITAN ELEVATED INTERLOCKING—WEST FROM ASHLAND BOULEVARD.

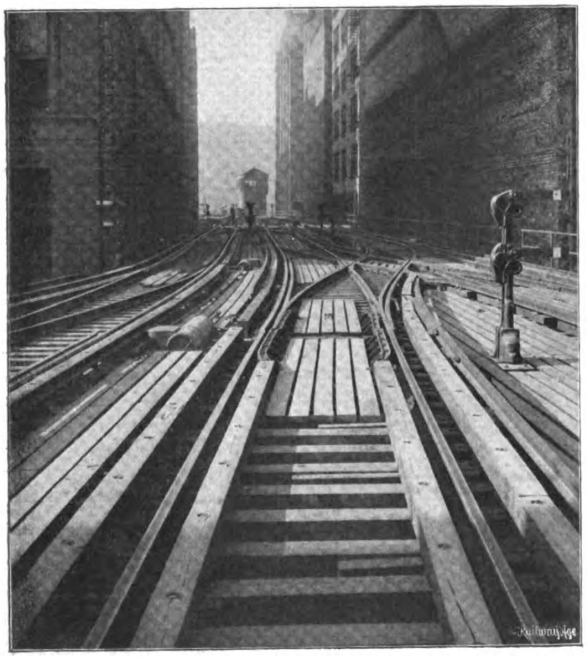


METROPOLITAN ELEVATED INTERLOCKING—WEST FROM LAFLIN STREET.

and the point where its functions are carried out, with the result that a switch or signal located 500 or 5,000 feet from the lever responds as quickly as one a few feet away.

With all of their new electrical equipment the interlocking plants in question have been made by the Union Switch & Signal Company, and it is of interest to note that in order to fulfill promised results as to their completion, the company delivered by express the machines and a great part of the signals.

The accompanying engravings from photographs will show some of the chief features of interest. Among these are the new fireproof tower built by the railroad company, under the direction of Mr. W. S. Menden, chief engineer. This tower contains the mechanical levers which operate the locking and



METROPOLITAN ELEVATED INTERLOCKING—WEST FROM FRANKLIN STREET.

signals of the bridge itself and the bridge operating mechanism. It also contains the Westinghouse electro-pneumatic interlocking apparatus which operates all the switches, locks and signals of the terminal and junction of the loop connection. An interior view of the Chicago River tower, or terminal tower, is also given. At some later day the manual levers will be removed and the bridge locks, etc., operated by the electro-pneumatic machine. The operator seated at the electro-pneumatic machine operates the switches and signals for all trains from and to the loop and the Fifth avenue terminal. Another view is from the terminal station platform, looking west, with the terminal tower in the distance.

The interior of Marshfield avenue interlocking towér is similar to that at Fifth avenue, and contains the bank of levers operating the switches and signals of the junction of the Logan Square, Douglas Park and Garfield Park lines. A small electro-pneumatic interlocking frame operates crossover switches and signals located 500 feet east of this point.

Low Rate on Household Effects to the Northwest.—In order to encourage immigration to the Northwest, the Oregon Railroad & Navigation Company has announced a rate of 50 cents a hundred pounds on household movables from the eastern terminals of the Union Pacific to any place in eastern Washington and northern Idaho, effective from February 15 to May 15. This is a reduction of one-third. The rate will be applicable to a minimum carload of 20,000 pounds. The concession is concurred in by the Northern Pacific and Great Northern.

THE CARE OF LOCOMOTIVE BOILERS.

BY M. E. WELLS.

V.

Instruction of Enginemen, Firemen and Hostlers as to the Proper Handling of Feed Water to Prevent Leaky Tubes.

It is somewhat difficult to present this subject of inequalities of temperatures in a boiler to enginemen and hostlers to have them fully appreciate and realize what it all means. It is not a difficult thing for them to understand, but it is so easy to drop back in the old rut of filling up the boilers at stations and when standing still, that we find it necessary to check some of them up pretty often.

One of the best ways to impress enginemen with the difference in the density of hot and cold water is to call their attention to the fact that when a boiler is cold there is, say, 2 inches of water in the glass. When the boiler is heated up the water in the water glass is found to raise 2 inches. There is the same amount of water in the boiler in both cases. The cold water, occupying less space, is, of course, heavier than the hot water, occupying the increased space. This is a very practical proof that there is a difference in the density of hot and cold water. Then, again, this fact of the cold or heavier water going to the bottom can be demonstrated in any bath tub. It is only necessary to stand knee deep in comparatively hot water in a bath tub and turn on the cold water. You feel the cold water at once on your feet and you can get quite a difference in the temperature, top and bottom, of your bath tub, by continuing this. This is exactly what takes place in a boiler when water is injected in the ordinary manner.

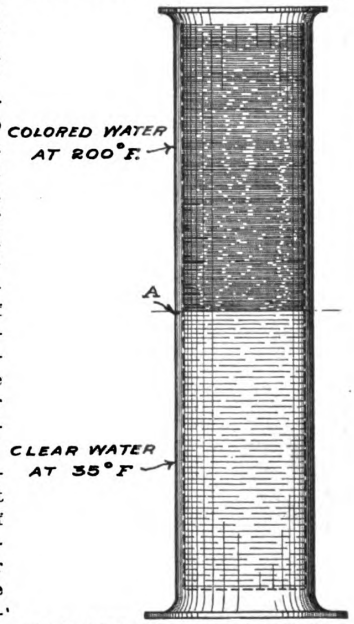


FIG. 5. CARE OF LOCOMOTIVE BOILERS.

Another very interesting example of hot water staying on top of cold is the ocean currents of warm water that flow on the surface of the ocean for thousands of miles and at the same time hold sufficient heat actually to change the climatic conditions of large areas of land. Examples: The Japan current in the Pacific Ocean and the gulf stream in the Atlantic Ocean. I mentioned in a former paper some temperature tests made by Mr. Max H. Wickhorst. One of these tests is reproduced here in graphic form. Fig. No. 4 is a representation of the boiler on which the experiment of injecting feed water was tried. Four thermometers were placed in the boiler on the lines A, B, C and D. The water was just in sight in the bottom of the water glass. There was a fire in the firebox, the blower was put on and the steam raised to about 160 pounds. The temperature of the four thermometers after raising steam is recorded in the first column of figures in the engraving referred to. The temperature of the boiler on line A is 370 degrees, on the line B 372 degrees, on the line C 370 degrees and on the line D 375 degrees. Below the four lines referred to in each column you will find the steam pressure corresponding to the temperature given above the line. When the boiler was in the condition shown in column 1 the left injector was applied. After working two minutes the reduction on line A was 4 degrees, the reduction on line B 3 degrees, the