

Westward home-signal bridge showing flashing-light train-order signal mounted between the top and bottom arms of each signal

Electro-Pneumatic Interlocking on the Long Island

Grade separation project at Valley Stream, involving numerous track changes, required temporary interlockings together with construction of new large plant

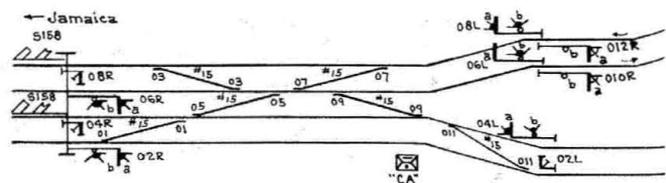
A 34-LEVER electro-pneumatic interlocking, which was recently installed on the Long Island Railroad at Valley Stream, L. I., is of interest because of the signal and interlocking changes which were necessitated by the various track changes made during the construction of the track elevation through this extensive junction layout.

On May 16, 1932, the Long Island Railroad, in conjunction with the State of New York, began a very important grade separation project at Valley Stream. The primary purpose of the separation was to complete a section of the new Sunrise highway that was laid out through the Long Island passenger-train storage-yard at Valley Stream. Since the opening of the Sunrise highway, which is one of the two main arteries along the south shore of Long Island, traffic through Valley Stream has been detoured one block south, then one block west, then back north to the highway again. This slowed up the through traffic and resulted in a general protest from motorists.

The main line of the Long Island through Valley Stream is made up of two double-track branches, over which an average of 340 trains are operated daily. Trains operating on the Montauk branch, the two tracks to the north, are not scheduled to stop at Valley Stream, and no platform is provided for these tracks. However, a platform is located between the two tracks on the south, which are the Long Beach branch tracks. Also, from these two southernmost tracks, the Far Rockaway branch double-track line turns off, making an interlocking plant necessary at this point. About 1,400 ft. west of the Far Rockaway Junction, the single-track of the West Hempstead branch turns off to the north, crossing the Montauk branch tracks. The grade separation required the raising of four tracks of the main line for a distance of approximately 7,640 ft., and the raising of the two branch tracks for a total distance of 6,500 ft. Also, by constructing a fill 800

ft. long, a local freight yard was built, which provides yardage for 20 cars.

In order to clear the way for erecting the elevated structure, temporary tracks were constructed, two of which were along the north side of the main line, and one connection for each of the branches. These tracks were signaled for traffic in either direction, and were controlled from temporary interlocking and block stations, these temporary interlockings being needed to route the heavy traffic over the temporary tracks. At



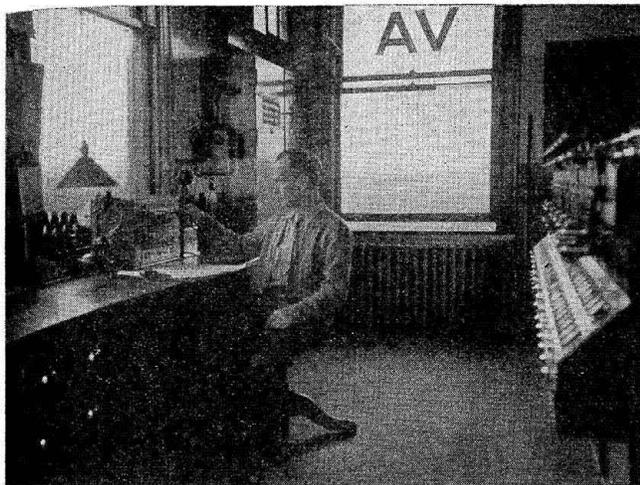
Track and signal plan of

each of these plants a Style-TC table interlocker was used. An interlocking plant, known as "CA," was located where the traffic from the four main tracks converged into the two temporary tracks. This plant had 14 working levers—6 for 16 signals, 6 for 12 switches, and 2 for traffic. Another plant was required at the point where the two temporary tracks returned to the original four tracks beyond the elevation. This plant, "HO," had 11 working levers—6 for 14 signals, 3 for 6 switches, and 2 for traffic. About midway between these two, another interlocking, "HW," was established. This plant, which was used to divert the traffic, scheduled for West Hempstead north, to the single track of the West Hempstead branch, had 11 working

Electro-Pneumatic Interlocking

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joins. Bronze-armored lead-sheath parkway cable is used for all control cables from the relay cases to the switches and signals. These cables, as well as the track wires, are buried at a depth of at least 30 in. below the tracks, being laid in and covered over with sand or clay. Then a protective covering, either of cresoted lumber or Elastite capping, was placed over the cables and the regular ballast was filled in. Elastite bootleg risers were used to bring, to the surface of the ground, the track wires and the position-light dwarf-signal control cables. The track wires are No. 6 A. W. G. copper, while, for the signal control and lighting circuits,



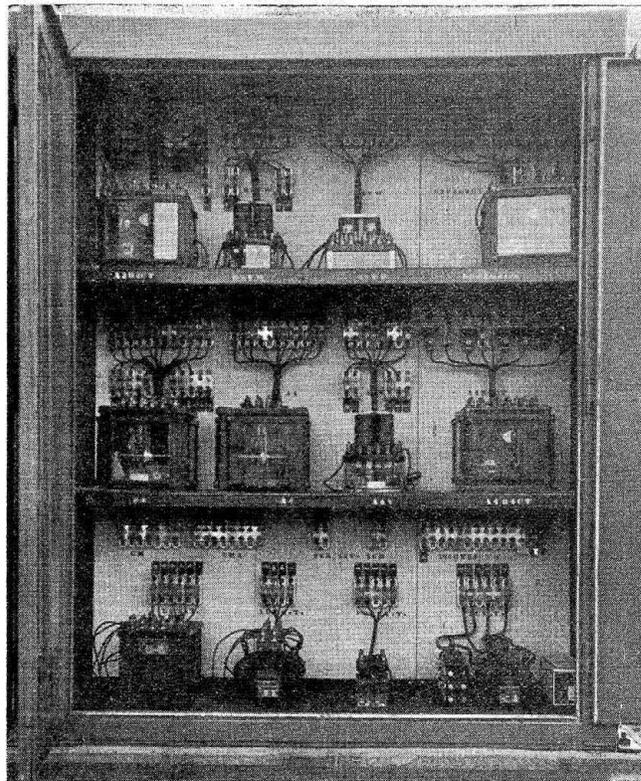
Operator's table at Valley Stream, showing concentration unit on table and the telephone and telegraph test panel in the background

No. 14 A. W. G. copper wire is used. The impedance bonds have a capacity of 1,500 amp. per rail, except at substations, where larger bonds having a capacity of 2,500 amp. per rail were used. When several connections were to be made to the neutral of the impedance bond, the neutral connection of the bond was made up of flat tinned copper strips $3\frac{1}{2}$ in. wide and ranging in thickness from $\frac{1}{32}$ in. to $2\frac{1}{2}$ in. It was found much easier to make and maintain a good connection to this rectangular cross-section than to the round cross-section formerly used.

The signal control and telephone cables are taken through the elevation in vitrified clay duct line, except for a short stretch where they are suspended on messenger under the station platform. Two duct lines extend east through the elevation from "VA" tower to the westward distant-signal bridge, and one extends west from the tower. The local cable running east is located in the parapet wall over which the distribution cases are located. The other duct line running east is a 12-way line that extends to a point approximately 1,500 ft. east of the tower where the West Hempstead branch turns off the main line. Here a 4-way duct branches off to the West Hempstead branch home signal. From the manhole on the main line an 8-way duct continues to the westward home signal. From the home signal to the distant signal, a 6-way duct was constructed, and at the distant signal the cables return to the pole line. West from the tower, one 12-way duct runs to the edge of the underpass, and is then carried on a messenger, for about 1,000 ft., under the passenger platform, where it goes into an 8-way duct as far as the eastward home signal, and then it returns to the pole line. A 48-pair lead-covered telephone and telegraph cable, along the

main line, is carried through the interlocking in the main duct line. From the tower there is also a 24-pair cable for each of the two branches. A 10-pair cable taps off the West Hempstead branch cable to furnish telephone facilities to the new freight station on the elevation, and from this point a 16-pair cable continues to the home signal. The telephone and telegraph cables terminate in a standard steel case on the first floor of the tower, and from there they are carried in conduit to the test panel on the second floor. From the test panel the wires are carried in conduit to a 20-line concentration unit located on the operators' table, the 20 lines being made up of 6 selector and 14 magneto lines. Approximately 9,125 man-hours of labor were required for the telephone and telegraph part of the grade separation.

For signal and switch control, four 61-conductor lead-encased cables run east from the tower. One goes directly to the West Hempstead Branch home signal; one straight through to the main westward home signal; one goes to the first distribution case east of the tower; and the other is the local cable that breaks in each of the distribution cases, except the first. Between the home and distant signals a 27-conductor cable is used. Four 61-conductor cables are run west of the tower; one of these terminates in the first distribution case,



Interior of outside instrument case

one breaks in each of the cases after the first, and the other two go directly to the home signal. Between the eastward home and distant signals, two 12- and one 5-conductor cables are used. From the tower to the Far Rockaway branch, one 33-conductor cable goes to the westward home signal, with a 12-conductor cable between the home and distant signals. All the 61-conductor cables are especially made of 59 No. 14 and two No. 6 B. & S. gage copper wires. The two No. 6 wires are used to distribute the 110-volt 25-cycle power through the interlocking. This power line is arranged so that it may be fed from either of the 2-kv.a. transformers at the tower.

