

On the panel, knobs control the signals and levers control the power switches

New York Central Installs Interlocking

THE New York Central has installed a modern all-relay interlocking at Crestwood, N.Y., which is on the electrified zone of the Harlem Division, 17 mi. from Grand Central Station, New York City. The new interlocking was installed to control entrance to the new suburban terminal as shown in accompanying picture.

Mostly Suburban Traffic

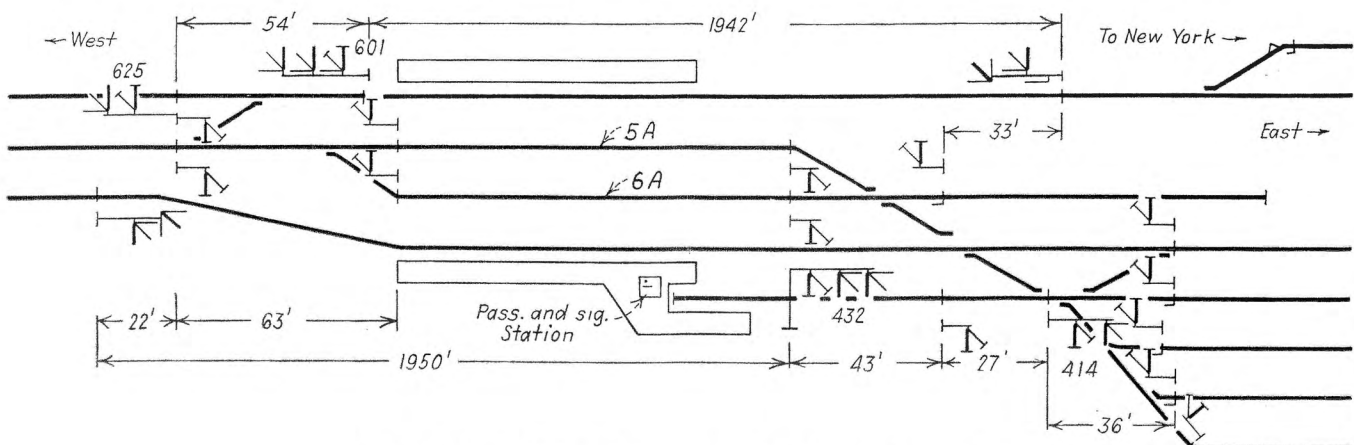
Except for a few local freights, the traffic through Crestwood consists of suburban passenger business which is handled by multiple-unit cars and trains drawn by electric locomotives, using 660-volts d.c. propulsion with third-rail power distribution. In addition to the numerous trains which run through Crestwood, certain suburban trains start, in the morning, out

New modern equipment including all-relay interlocking with a panel-type machine controls entrance to a new suburban terminal

of Crestwood for New York, and in the evening terminate at Crestwood on their run from New York. Therefore the track layout at Crestwood as shown in Fig. 1 is arranged not only for through traffic but also to cross trains over and to store them at night on the sidings 5 A and 6 A, or in the yard south of the track and east of the station. When an eastbound morning train is preparing to depart, it is backed out of the yard to the stub track C, and, when ready to go, it is routed out onto the eastward main track.

The panel of the control machine is

22 in. high and 60 in. long. On the lines representing the tracks on the diagram, there is a knob at the location corresponding with each signal. The outer rim of each knob can be rotated. Inside the ring there is a fixed transparent lens with a black arrow which points in the direction in which the signal governs. On the outer ring, as mentioned above, there is a white dot which normally is positioned at the base of the black arrow over the "track" line. The rim is rotated 90 deg. upward to control a high signal, or 90 deg. downward to control a restricted speed signal.



Track and signal plan of the new interlocking at Crestwood

When the corresponding signal clears, a lamp is lighted behind the black arrow in the face of the knob.

Each switch and crossover is controlled by a small toggle type lever. These levers are in a row on the lower portion of the panel, each lever being located directly below the symbol for the switch or crossover which it controls. These levers are normally in the lowered position, being thrown to the raised position to control a switch to the reverse position. In the track diagram switches are represented by black triangular movable-point switch indicators in the white track line which operate when a corresponding switch is thrown, so that the track lineup is shown by a continuous white line extending through the switch to indicate the route.

Above each switch lever there are two small indication lamps. The upper lamp which is white, is lighted when the corresponding switch is not over and locked in the position corresponding to that of the lever. Therefore this is known as the "out of correspondence" lamp. The lower indication lamp is red, and it is lighted whenever electric locking is in effect to prevent operation of the switch even if the lever were thrown. The circuits are designed so that operation of a switch lever, while the locking is in effect, will not result in operation of the switch after the locking is released. In order to operate the switch, the lever must first be returned to the position where it was before the electric locking went into effect.

The switch machines are the model 5A rated at 110 volts d.c. The sides of the bases of these switch machines are milled to an exact dimension, 18.255 in., \pm or $-$ 0.001 to fit exactly between the two toe plates welded on the plate on each of two ties. During construction, a switch machine is placed on the plates which are left loose on the ties until the operating rod and the lock rod connections are fitted and adjusted. Then the plates are fastened in place with $\frac{3}{4}$ in. by 7 in. lag screws. This practice expedites construction. In each switch layout there are three 1 in. by 7 in. insulated gage plates: One on the No. 0 tie, one on the No. 1 tie, and the third on the No. 3 tie. Adjustable rail braces are used on six ties. The No. 1 rod and the No. 2 rod are the vertical type-M made by Ramapo Ajax Division, of the American Brake Shoe Corporation. At each of the hand-throw switches a new Model-9 manually-operated switch-and-lock machine was installed to replace the old switch stand. A Model-10 electric lock, applied to the hand-throw lever, is included with each of

these new manual switch-and-lock machines.

The home signals for normal direction moves on main tracks are high signals; these include No. 432, No. 601 and No. 801. The remaining 17 home signals are dwarfs. Two of these dwarfs, No. 414 and No. 625, each have two operative-signal heads. All these signals are the searchlight type, operating on 10 volts d.c.

At a central location on the plant as a whole, a new one-story brick building, 16 ft. by 50 ft., was constructed to house the relays, rectifiers and main battery, as well as to serve as a shop and headquarters for the maintainer. The 110-volt battery for operating the switch machine consists of 55 cells of 160-a.h. Exide lead storage battery. This battery is on floating charge at about 150 ma. from a set of two thyatron tubes, operating full-wave. Each tube has an average rating of 6.4 amp., or a total of 12.8 amp. for both. These tubes are mounted on a special board with meters, rheostats, boxes and auto-

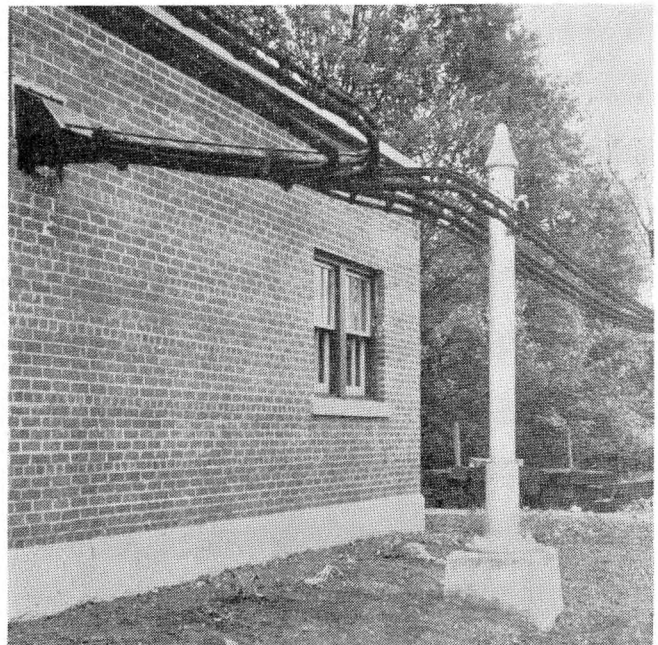
matic cut-outs, as shown in one of the pictures.

The various control relays, lock relays and searchlight signal mechanisms are all operated from 10-volt d.c. which is supplied from rectifiers. These are the type-BPA size 248, rated at 16 volts, 4.5 amp. output.

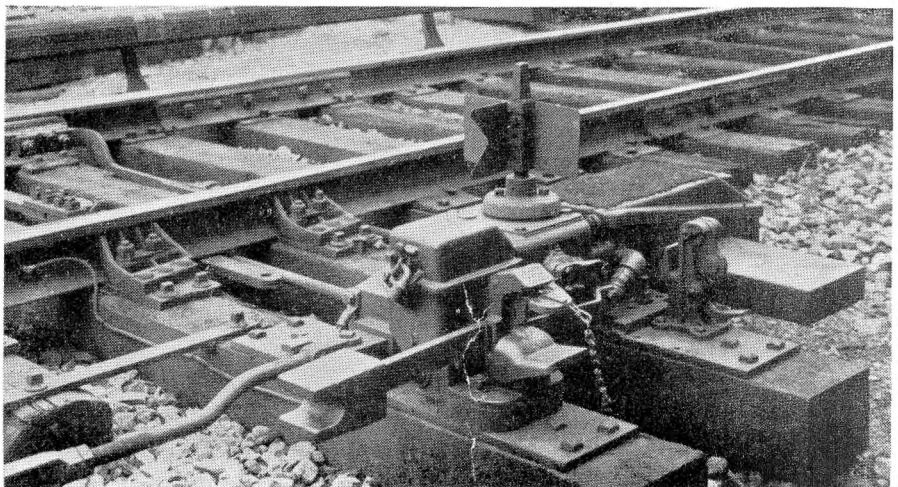


One of the two-"arm" dwarfs

Right—A view of the aerial cables and hood in wall



Below—A view of a new type hand-throw switch and lock stand with a facing-point lock and an electric lock on the lever



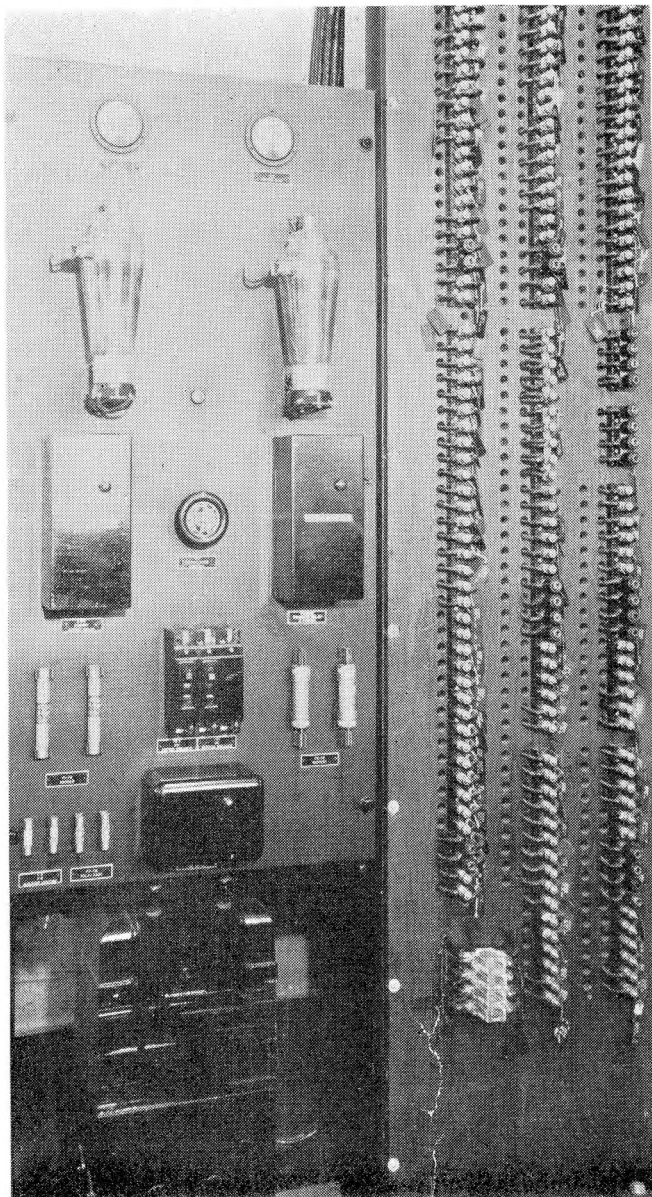
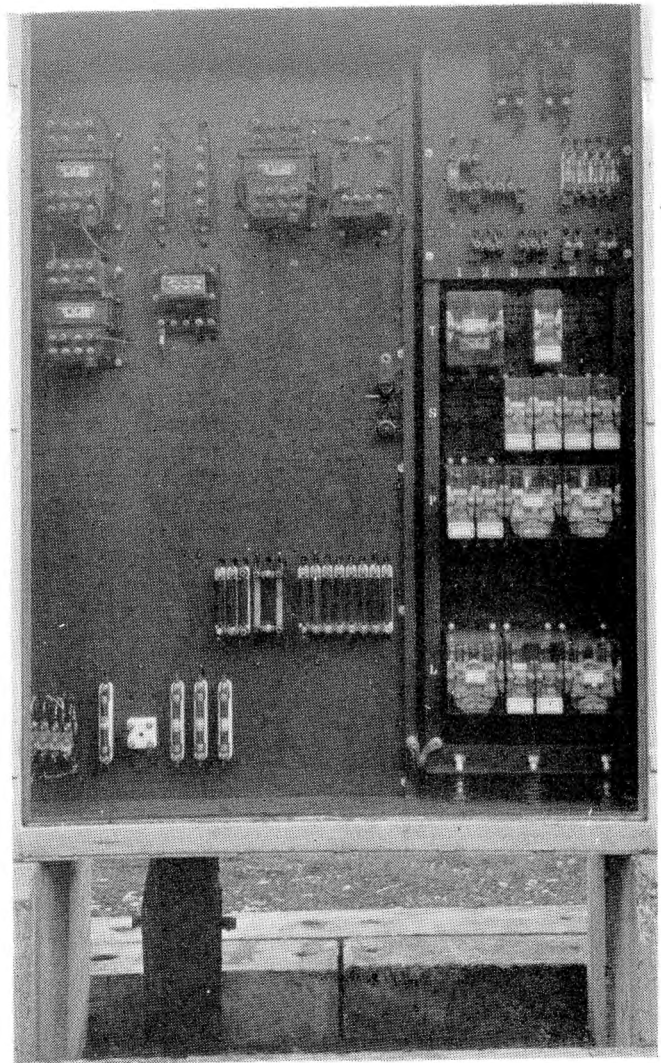
No battery standby is required for these circuits because if the power supply fails, no trains can be operated by the electric propulsion system.

On account of the d.c. propulsion in this territory the track circuits are the straight a.c. type. On the main tracks the track circuits are the two-rail type, but in the yards the single-rail track circuits are used as a means of reducing the number of insulated rail joints and impedance bonds.

An interesting feature of this new interlocking is that all the relays are the plug-in type. At certain outlying locations, sheet-metal cases are provided to house the transformers and relays, the relays being mounted in special panels on angle-iron frames which are supported on springs that absorb vibration.

Aerial cable supported by Raco cable straps attached to messengers on posts, extended from the brick instrument house to the various junction boxes. The cables enter the

Interior of sheet-metal case at signal, showing plug-in relays at the right



The batteries are charged by thyatron tubes, rated at 6.4 amp. each

building through a special hood and duct in the wall. Underground cables extend from the cases or junction boxes to the switches, signals and rail connections for track circuits. Wires and cables entering these cases are brought up into a space at the rear of the board. For a distance of a foot or more above and below the ground line, the cables are enclosed in a cast-iron pipe, which consists of two vertical halves which can be applied and bolted together after the cable is in place. The iron sleeve protects the cable where it otherwise would be damaged by changes in moisture and temperature as well as mechanical damage. From the bottom of a case to the top of the castiron sleeve the cables are wrapped with tape and covered with waterproof compound, so that no water can run down inside the sleeve.

This interlocking was planned and installed by New York Central forces, the interlocking equipment being furnished by the General Railway Signal Company, and the insulated wires and cables, in accordance with A.A.R., Signal Section Specifications, were furnished by several companies.