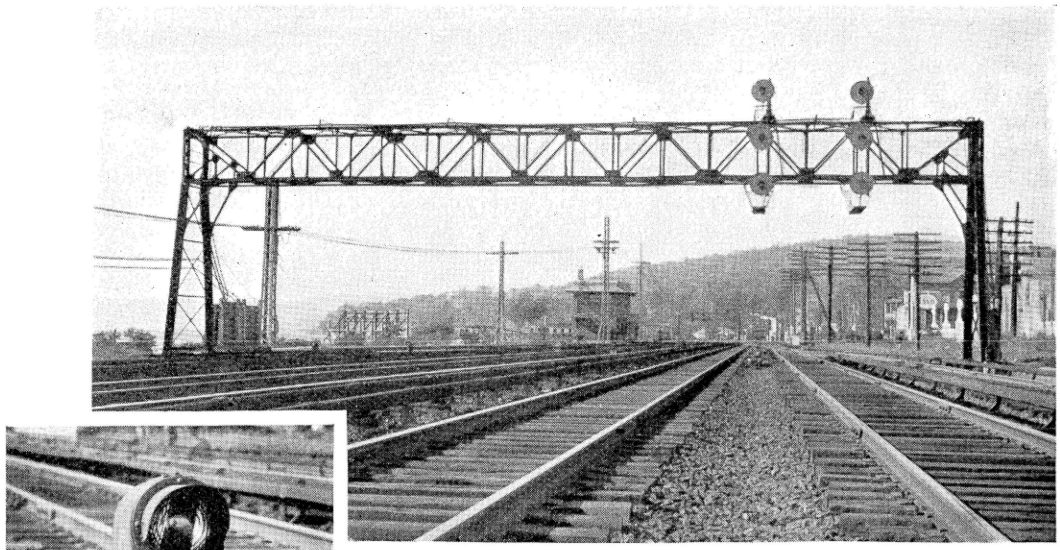
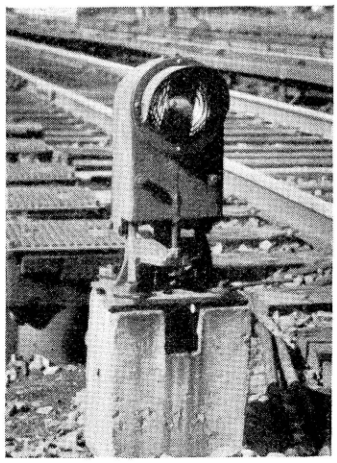




Semaphores were replaced with modern searchlight type signals —Upper view shows westward home signal bridge and insert shows typical dwarf.

N. Y. C. Modernizes

Rebuilt plant at Croton, N.Y., includes 48 working levers and handles 220 train movements daily

At Croton, N. Y., on the Hudson, 34 miles from New York, on the main line of the Electric division, the New York Central has entirely reconstructed an electric interlocking. A new signal station building, a new interlocking machine, signals and wiring distribution form such extensive rehabilitations as to constitute practically a new plant.

The track layout in the Croton plant, from the signal station eastward, includes the four main-line through tracks and turnouts to four additional running tracks extending from Croton to Harmon, a distance of one mile. Harmon is the beginning point of the electrified territory extending on eastward to New York, and one of the principal functions of the Croton plant is to route trains to and from Harmon on certain tracks so as to facilitate changing from steam to electric locomotives or vice versa. In addition to the turnouts mentioned above, there are six crossovers in the entire plant as well as two additional single switches at the west end of the layout.

The previous interlocking installed at Croton in 1911, included a brick and frame signal station located 650 ft. north and across the tracks from the new brick signal station. The old Model-2 interlocking machine, including 50 working levers, controlled the switches and signals of a layout quite similar to the present one.

On account of the excessively heavy traffic in this territory, including about 220 trains daily, as well as numerous switching movements, the interlocking facilities were subject to severe service. In view of the fact that the entire plant was in need of repair and replacements, it was decided that extensive rehabilitation, equivalent to the construction of an entirely new and modern plant, was justified. In planning the new installation, advantage was taken of the opportunity to utilize modern materials, equipment and circuits, as well as construction methods, so as to insure the best performance possible in this important territory.

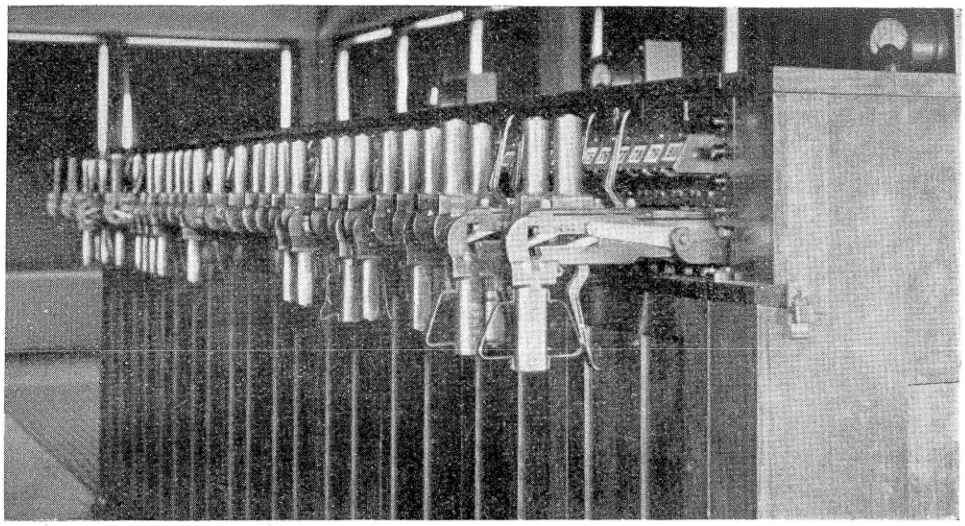
New Signal Station

The new signal station building is of concrete and brick construction, located 650 ft. south of the old tower location. The new interlocking machine has 33 levers for 33 signals, 12 levers for 19 switches and 1 derail and 3 traffic levers, totaling 48 working levers, together with 32 spare spaces, making an 80-lever frame.

The interlocking machine is of the G.R.S. Model-5, Form-A, all-electric type equipped with latch-lever locking and forced-drop electric locks. The switches are operated and indicated by the regular G.R.S. system, using dynamic indication with individual cross protection. One lever is used for the control of each crossover, double indication being provided.

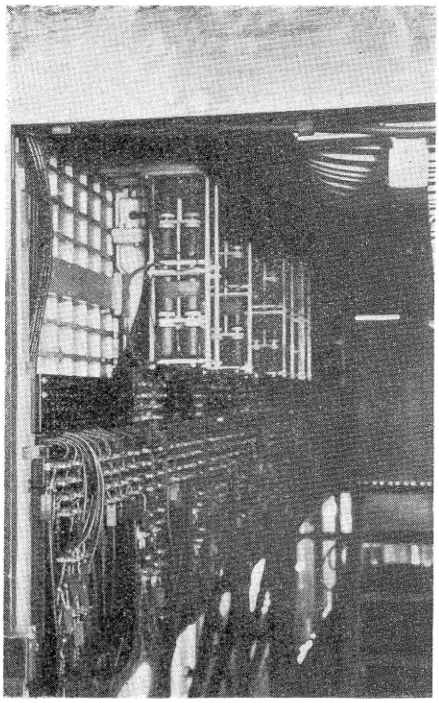
Electric locks are not provided on signal levers. Restricted-speed signal levers are equipped with 15-sec. mechanical time releases which, with the signal red repeater, control the route-locking stick relays. Approach locking for the high-speed signal levers is provided. Approach locking is released by manually-operated 1½-min. hand-screw time releases.

A small lamp is mounted behind the frosted glass number plate on each lever. On a switch lever this lamp is lighted when the lever is unlocked



The new interlocking machine is equipped with latch-lever locking and forced-drop electric locks

The inspection passageway beneath the interlocking machine facilitates construction and maintenance



Electric Interlocking

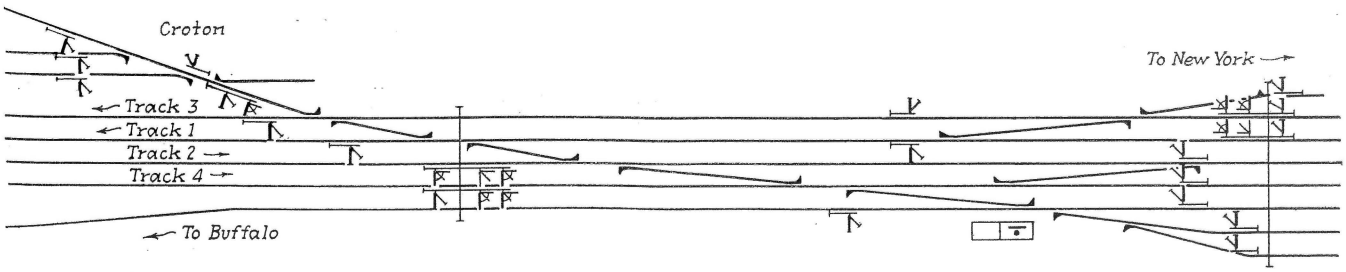
electrically, thus informing the leverman that it can be used. For the signal levers this number-plate lamp is illuminated when the signal is cleared, and remains lighted until the signal assumes the stop position. The polar relays are glass enclosed with the reset lever outside of the enclosure, for use by the leverman. Likewise, he can replace a fuse, but he cannot get to any other apparatus in the machine. A special fuse tester with a light as an indicator is provided.

Pit Beneath Interlocking Machine

The interlocking machine rests over a hole in the floor, thus forming a pit, the floor of which is a steel grating set 52 in. below the floor level of the tower, thus allowing full head room for a man to stand under the machine within easy reach of the apparatus and wiring on the interior of the interlocking machine.

The wiring is brought up from the relay racks to the machine in small made-up cables of single conductors which are held together with cable straps and are supported from ½-in. round rods. In addition to three fixed electric lamps, a lamp on an extension cord is available to illuminate the pit.

In the signal station the main room of the ground floor is utilized as an instrument room. The relays are all of the wall type with spring mountings, and are attached to sheet-metal boards supported from angle-iron uprights, which go to make up the relay racks. The face of each board is 8 in. high. The first board is set 16 in. from the floor, and there is a 4-in. vertical space between each of the six boards on each rack. The racks are set back to back with 18-in. spacing from face to face, the intervening space being used for wire and cable

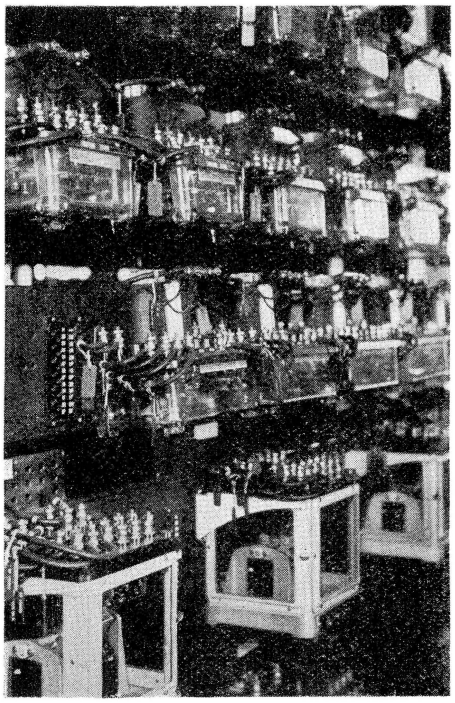


Track and signal plan of interlocking at Croton

runs. A space of 33 in. is allowed from the face of one rack to the next one.

Terminal Board and Wiring

Beneath the racks there is a pit 18 in. deep below floor level, which is used for incoming cable runs, this area being normally covered in the runways by steel plates. The lower boards



Wall-type relays are attached to sheet-metal relay racks

or panels of the racks are used as terminal boards, each incoming cable wire being terminated on a Raco bakelite-based terminal; these terminals are furnished in blocks of six each. Alongside each relay there is a bakelite template with individual holes through which wires are brought separately, each hole being marked to show to which post of the relay the wire is attached.

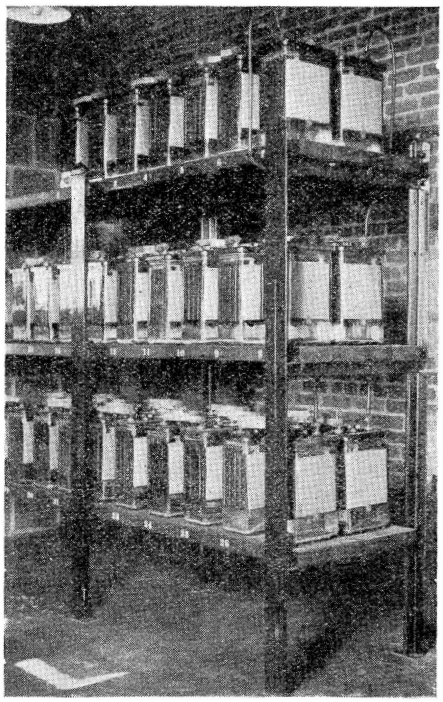
As this track layout is within the d-c. electrified territory, the track circuits are operated on alternating current, using Type-N, 25-cycle, a-c. vane relays. The remainder of the relays are of the d-c. type, the Type-K, 200-ohm, polar relays being used for line circuits, as well as SS relays. Slow-release, 400-ohm relays are used to carry over the change in aspects in the SA searchlight signals. The thermal timing relays for the interlocking are Type-TD and are set at 15 sec.

The wiring in the relay racks and other instrument houses is No. 14 solid single-conductor with 4/64-in. rubber insulation, and the wiring in the interlocking machine is No. 14 stranded, with 19 strands concentrically, having 4/64-in. rubber wall insulation. All single-conductor rubber-covered wire has braid which is flame and moisture proof.

The main battery for the operation of the switches consists of 55 cells of Exide Type-EMGO-9 lead storage battery, which are cycle-charged by a motor-generator. This battery is located on a rack made up of angle-iron uprights and cross-pieces, using 2-in. treated planks for shelving as shown in one of the illustrations. The low-voltage lock and control circuits are fed from 10 cells of Edison-A8H nickel-iron battery, which are on floating charge from a Type-BPA rectifier.

Switch Machines and Signals

The switch machines formerly in service at the old plant were reconditioned and used again in the new in-



The battery rack is made up with an angle-iron frame

stallation. These machines are the G.R.S. Model-4 equipped for operation on 110-volt d-c.

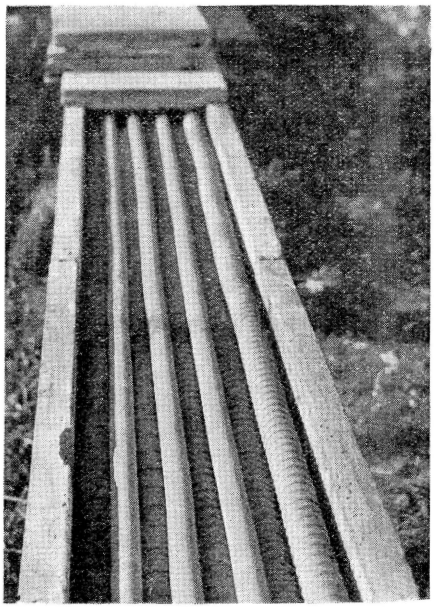
The old semaphore signals on the old plant were all replaced with modern SA-type signals operating on 10-volt d-c. In all 29 SA units were installed as high signals and dwarfs, as a part of the new installation. Each of these signals is equipped with a 12- to 16-volt, 21 c.p., C2R lamp. These lamps are operated at approximately 10.5 volts at the lamp so as to lengthen the life. The average lamp life is estimated to be 2,000 hr. for high signals and 3,600 hr. for dwarfs, and the lamps are replaced about every five to six months so as to preclude failures in service.

The main runs of the outside wiring are in lead-covered cable run in concrete trunking. In these cables No. 12 conductors are used for the control circuits and No. 6 for track circuits. The main cables range in size from 19-conductor to 37-conductor as required, and a separate 2-conductor No. 4 cable is used for the distribution of the 110-volt a-c. circuit.

Outside Wire Distribution

At the signal station, these cables extend through ducts to the pit below the relay racks and up to the terminal boards, the outer protective coverings being left on the cable as far as practicable. Likewise, at the junction boxes and instrument cases in the field, the complete cable is carried up into the box, as shown in one of the illustrations. The individual insulated conductors extending from the cable to the terminals are wrapped with sleeving and painted to preserve the insulation.

At the signal bridges and at other central locations, the instruments and track-feed apparatus are housed in large wooden cases set on concrete foundations. The doors of these cases are hinged at the top and when swung up and supported by long iron rods



The main cable run is in concrete trunking

form a protecting shelter for the maintainer, as well as the instruments, during wet weather.

This interlocking was planned and installed by signal department forces of the New York Central, the major items of signaling equipment being supplied by the General Railway Signal Company.