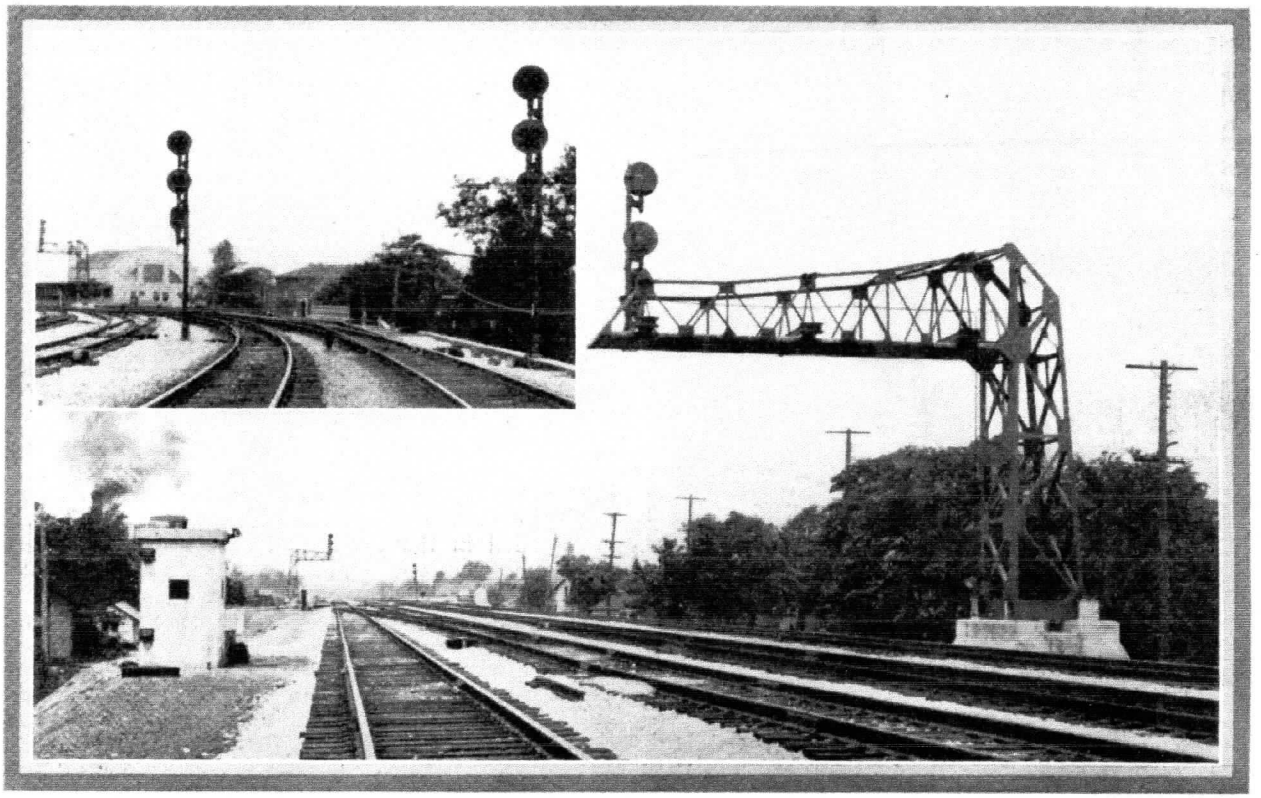

Top—View approaching station from the east Bottom—One of the three-track cantilever bridges

New York Central's Reconstruction Program at South Bend Involves

New Electric Interlocking

with Design Which Minimizes Maintenance Costs

By G. E. Beck

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THE New York Central's recent reconstruction program at South Bend, Ind., motivated by the desirability of separating the grade at important heavy-traffic street crossings, involved the construction of an extensive electric interlocking plant. The track layout within this territory includes: The ends of double track, at each end of the plant, leading to the center, or yard, tracks, two double-track junctions of the Grand Trunk; a double-track junction with its own Illinois division line; and a single-track crossing of the latter over its four-track main line. The distance between the east and west home signals is approximately 3.68 miles.

Where, formerly, 18 city street crossings presented a serious crossing-protection problem, there is now an elevated earthwork track structure nearly three miles long with 14 street bridges. A new passenger station was built, which also accommodates the Grand Trunk as a tenant line. The traffic through this plant each 24 hours consists of 40 Grand Trunk trains, 70 New York Central trains, and about 6 yard movements.

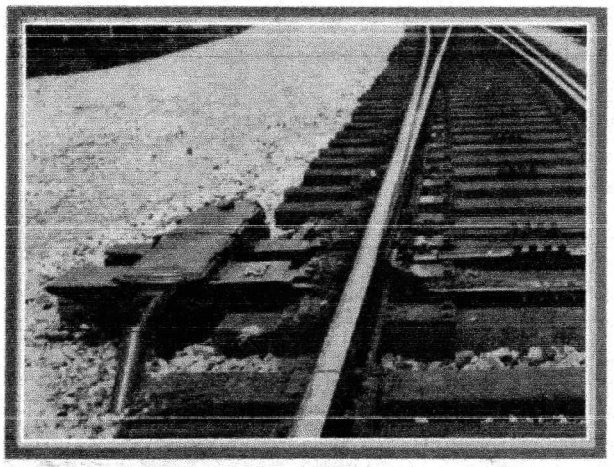
The interlocking installation is based on the principles of the General Railway Signal Company's all-electric system, the Model-5B interlocking machine, with latch locking, being used. This machine has 259 working levers, 9 spare levers, and 36 lever spaces in a 304-lever frame, which is enclosed in a steel cabinet, finished in olive green. Electric locking is effected by the use of 102 forced-drop electric locks, which are applied to the lever latches. Ninety-two time releases, adjustable from 0 to 90 sec. operation time are applied to various levers, as required. In addition, the machine is equipped with 662 six-way banks of low-voltage relay-type controller contacts, 2 ammeters, 1 voltmeter, and G. R. S. standard ground-detector switches. It is proposed to install, at a later date, transit lights over the switch levers to indicate that the switch is full normal or full reverse. Switchboard lamps will be used, and will be mounted in a hole drilled in the case of the machine. The indication will be effected by inserting a 100-ohm relay in series with the *SS* relay, the transit light to be controlled through a back contact of this series relay.

An illuminated track diagram, 3 ft. wide by 24 ft. long, mounted on the wall back of the machine, consists of 111 track sections, outlined in color, each

section being equipped with an indicating lamp of the switchboard type. Mounted also on the wall are two panels, bearing 32 clockwork hand releases, arranged so that they can be swung from the wall to facilitate inspection of the wiring on the back thereof.

Tower a Modern Structure

At about the center of the track layout there was built a three-story brick tower 17 ft. wide by 70 ft.



Note method of protecting cable at switch

long. The three floors are designed to accommodate the interlocking apparatus, heating plant, and maintenance headquarters in an efficient manner. The basement floor contains a battery room, repair room, cable terminal compartment, coal bunker, and furnace room. The second floor is divided into two rooms, one for the relays and charging equipment, the other an office for the maintainer. The third floor, containing the control apparatus, is designed as the operating room. Under the interlocking machine in this room is a repair pit, 2 ft. deep by 3 ft. wide which provides ample room for wiremen or maintainer; the indication apparatus is easily reached from this pit.

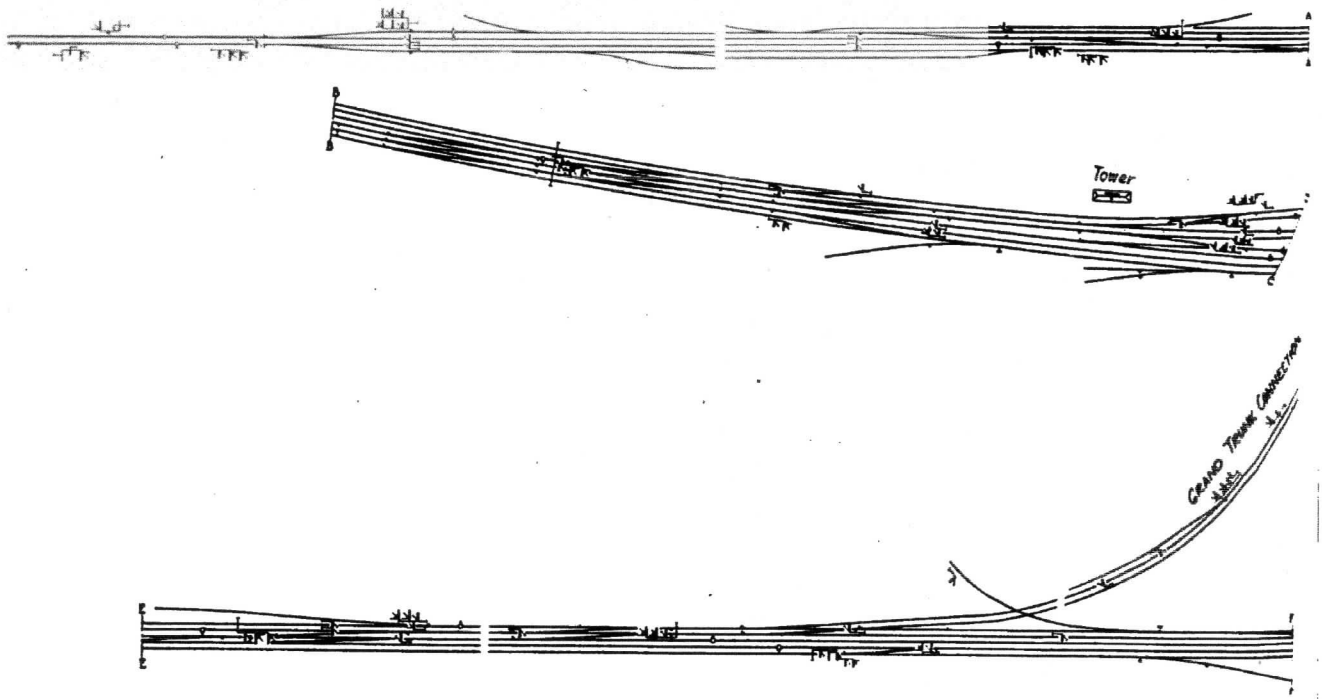
Aside from these practical conveniences, the interior of the tower is well appointed in a color scheme of olive green. The entire floor is laid with olive green battleship linoleum; desks, railings, cabinets, lockers and toilet partitions are of steel, finished in the same color; the windows are equipped with Venetian blinds to match. All floors are connected by inside stairways, while an outside stairway connects the first floor level with the basement level.

Operation and Maintenance

The maintenance schedule consists of three tricks of eight hours each, with the operating personnel consisting of a director and a leverman. Full advantage was taken of modern developments to give the director every available facility in his work of directing the traffic. A train describer, the Union Switch & Signal Company's latest button-type transmitter, is installed in the tower and serves to inform the station master and his attendants regarding train movements.

In addition to the regular dispatcher telephone equipment with loud speaker, the operating room has a loud-speaker telephone which can be connected through 22 telephone jacks to as many points suitably located throughout the plant, transmission being effected through No. 12 twisted pair in the power cable. Seven Klaxon horns, properly distributed, enable the leverman to call the maintainer to the nearest phone in case of trouble. Likewise, the maintainer may, at any one of the 22 telephone locations, call the leverman if his testing requires the co-operation of the latter.

The maintainer has his headquarters in the office room on the second floor of the tower structure, where he is conveniently located in case of trouble. Five tool houses are located at advantageous points



Track and signal plan of extensive interlocking

Interior of concrete relay house

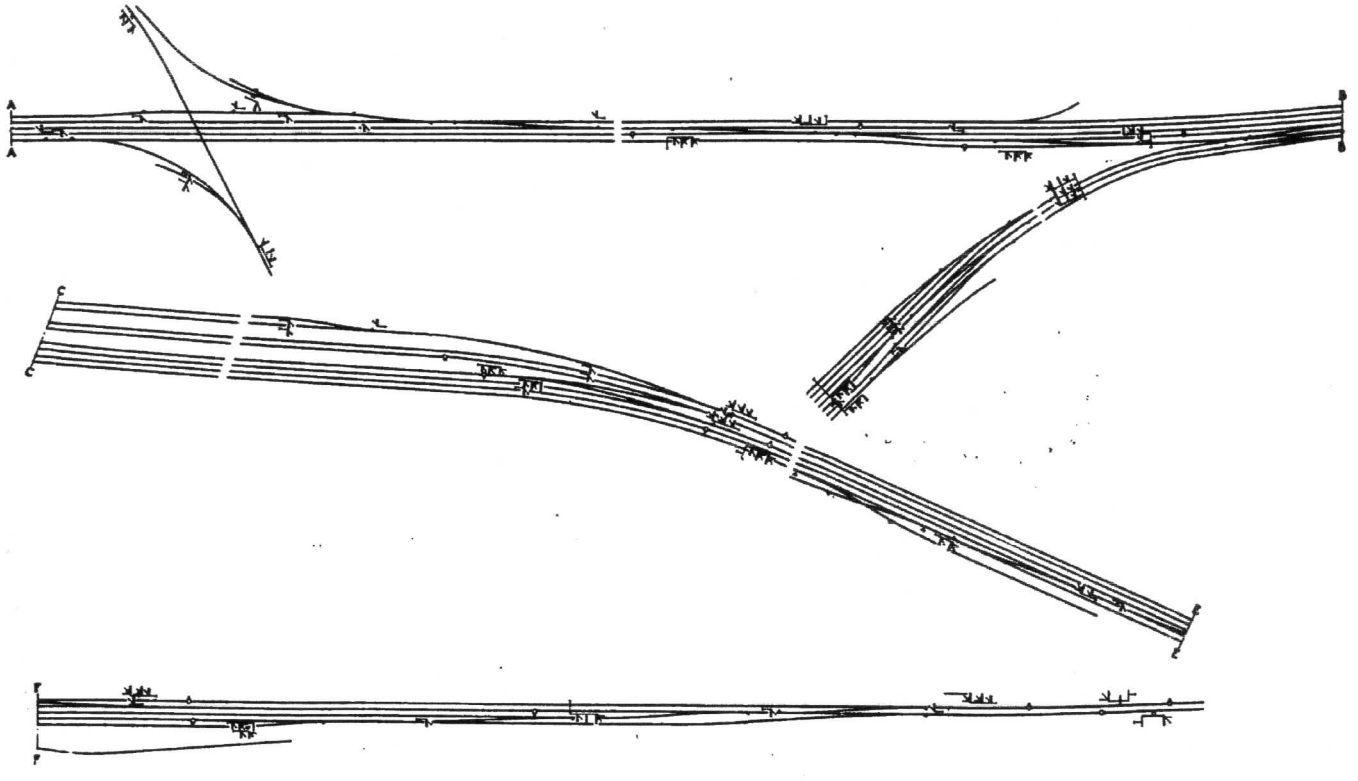
In relay room at tower

throughout the plant. Each of these tool houses is equipped with a work bench, desk, electric lights, telephone and space for motor car and light materials.

Engineering Features of Tower Equipment

Included in the tower equipment in the relay room are 995 relays, placed on three N. Y. C. standard channel-iron and wood relay racks, having a total capacity of 1,058 relays.

The charging equipment consists of an a-c. -d-c. motor-generator set and five Union Switch & Signal Company's copper-oxide rectifiers, with a control panel to operate same. The tower battery room contains racks which support the Exide storage cells. Batteries, consisting of seven 41-plate 680-a.h. cells



at South Bend, Ind., on the New York Central

each, are used for the low-voltage circuits; 65 cells, Type-EMGO, 15-plate, 280-a.h. are used for switch operation.

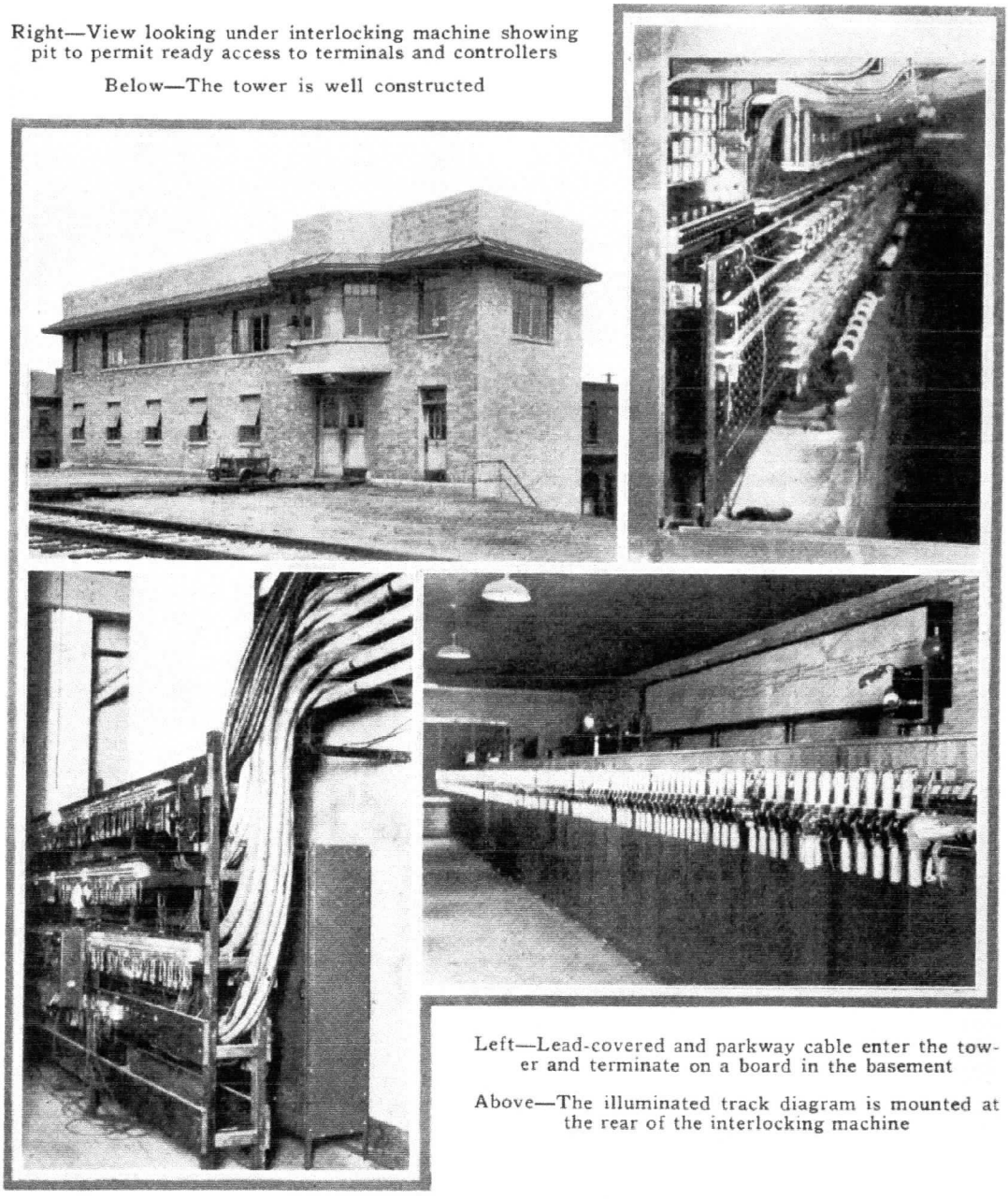
The basement of the tower contains a terminal compartment in which all cables from the conduit system terminate. These cables are carried into the base-

5-position dwarf signals, the top unit being three-position and the lower unit two-position. In addition to these there are 49 Type-F, two position dwarf signals and 34 Type-G, three-arm, two- and three-position high signals, arranged for four-block indications.

The approach-lighting circuits are so arranged that

Right—View looking under interlocking machine showing pit to permit ready access to terminals and controllers

Below—The tower is well constructed



Left—Lead-covered and parkway cable enter the tower and terminate on a board in the basement

Above—The illuminated track diagram is mounted at the rear of the interlocking machine

ment through wood-log conduits and terminate in banks on two terminal racks.

Color-Light Signals

All signals are the General Railway Signal Company's color-light type, approach lighted, and are mounted on ground masts, bracket masts or signal bridges, as required, to be to the right of the track governed. The railroad company's bridge department designed the cantilevers and bridges needed for the long spans across the three to seven tracks. Track 5, which is signaled in both directions, required 7 Type-SA

only those signals will be lighted that are on the route over which the prevailing train movement is to be made, as established by the prevailing lever positions and electric-locking conditions.

Switch Equipment

Switch machines are the General Railway Signal Company's Model-5A, designed for operation on 110 volts direct current. Twenty-eight are of the low-speed type, requiring from 8 to 15 sec. for operation; these are used at the ends of the plant to permit the use of smaller control wires than would otherwise be needed.