

View from the north looking toward the tower—Note dwarfs at left

Chicago & Illinois Midland Installs Electric Interlocking

Crossing with Wabash protected by modern plant—
Highway crossing protection
special feature

A MODERN 23-lever Union Type-F electric interlocking has recently been installed by the Chicago & Illinois Midland at a crossing with the Wabash in Springfield, Ill. This crossing was formerly protected by a 12-lever mechanical interlocking plant. Within the last year the track layout of the C. & I. M. was revised, a crossover was added, and a second main and a third switching lead were extended over the crossing. On account of these changes and because rapid operation of the plant was desirable, it was decided to replace the old plant with a new electric interlocking.

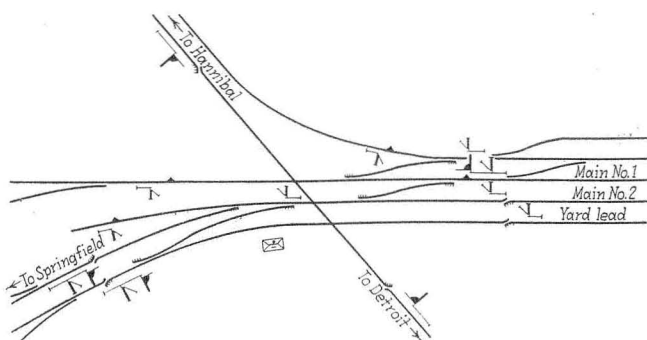
The Chicago & Illinois Midland operates four passenger trains, about eight through freights and two local freight trains over this crossing daily. As both the inbound and outbound freight yards are located just south of the crossing, there are numerous switching moves back and forth over the crossing when making up or breaking up trains in these yards. Furthermore, a large flour mill with eight yard tracks is located south of the

crossing and the switching lead to this mill yard extends over the crossing. During the early hours of the morning, and between 6 p. m. and 9 p. m., switching movements are being made constantly back and forth on this mill lead.

The Wabash single track over this crossing is a part of the main line extending from Detroit, Mich., to Hannibal, Mo., and four passenger and about twelve through freight trains are operated daily. Furthermore, numerous transfer moves are made between the Wabash and the C. & I. M. tracks. The Chicago & Alton, as well as the Baltimore & Ohio, make transfer movements over the C. & I. M. tracks in this territory, which further increases the number of train movements. Therefore, considering all the factors involved, this is an important layout and, therefore, it was decided to install a modern electric plant so as to facilitate train operation.

The Interlocking Machine

The interlocking machine is the Union Type-F including all the latest improvements, and is enclosed in a sheet-metal case painted olive green. Four spare spaces and 19 working levers are provided, 7 levers being used for 14 signals and 12 levers for 7 switches and 9 derrails. The switch levers are equipped with detector locking which prevents the initial movement of a lever when the corresponding track circuit is occupied. The indication locking prevents the final movement of a switch lever until the indication comes in from the switch after the switch has completed its movement to the desired position. In addition, a red lamp, located directly under each switch lever is lighted while the corresponding switch



Track-and-signal plan of plant at Springfield, Ill.

machine is operating, and this lamp is extinguished when the indication comes in, thus informing the leverman that he may complete the lever movement. Each signal lever is equipped with an electric lock which prevents the final movement to the center position unless the signal has assumed the Stop position. The operation and control circuits are of the standard Type-F arrangement.

The time-locking including the clockwork release is arranged so that an interval of 90 sec. must elapse before a lever can be moved to change a route after taking away

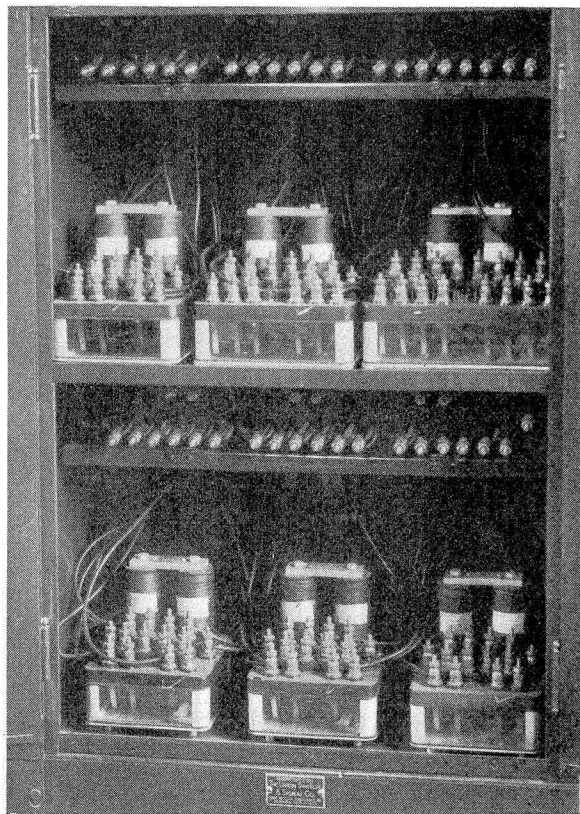
signals on the switching leads are the two-light Style-H-2 dwarfs. Of the Wabash signals, the home signals L22 and R22 are T-2 top-post semaphores. An unusual feature of this plant is that only two indications are displayed by each of the operative signals as shown in the accompanying chart.

Signals

L4-L12-R8=Searchlight High
 R6-R12=Searchlight Dwarf
 R4-LC12-R-10-L10-L14=Style N-2 Dwarf
 L22-R22=Style T-2 High
 Distant Signals=Fixed
 Signals L10-R10 to indicate—Yellow and Purple
 Signals R4-LC12-L14 to indicate—Yellow and Red
 Signals R6-R-12 to indicate—Yellow and Red
 Signals LA4-LA12-RA8 to indicate—Green and Red
 Signals LB4-LB12-RB8 to indicate—Yellow and Red
 Signals L22-R22 to indicate—Green and Red
 Fixed Signals to indicate—Yellow

The signal lights are normally energized from alternating current but a d-c. battery supply is provided for emergency use.

The switch machines are the Union Style-M2 equipped with 110-volt motors. The derrails on the main-line



Steel relay cabinets are used in the tower

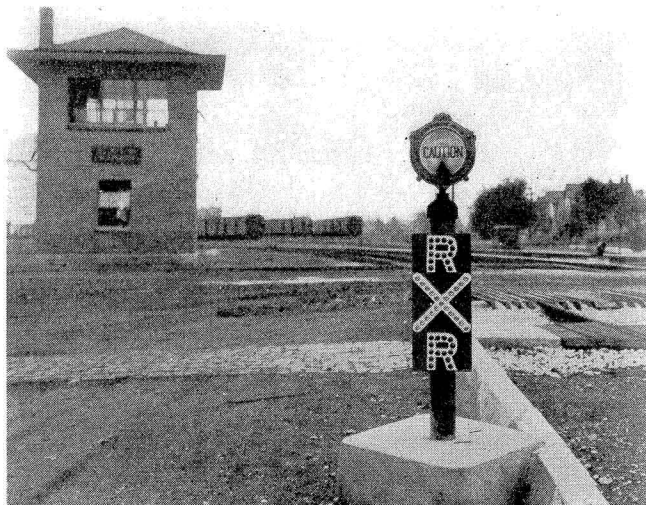
a high-speed green signal, whereas only 20 sec. is required when a caution or yellow signal has been given. This time locking was used on the C. & I. M. because it was not practicable to use approach track circuits due to yard limit conditions in this area. Standard approach locking is effective on the Wabash.

The relays in the lower floor of the tower are located in sheet metal cases with steel doors. As the state railroad commission requires that these cases be locked, bicycle padlocks with long shackles are used to connect over the knobs of adjoining doors on the cases.

The main 110-volt plant battery includes 55 cells of Exide DMGO-9. Two other sets of 5 cells each of the same type of battery are used for the lock and control circuits. This battery is mounted on heavy wooden racks so arranged as to permit ready inspection. The main battery is an a-c. floating charge from a Union RP-41 rectifier and a rectifier of the same general type is used for charging the lock and control batteries. A single Exide KXHS-7 cell of storage battery is likewise used on each track circuit in the plant.

Signals and Switch Machines

The signals on the through routes on the C. & I. M. are the searchlight type, signals L4, L12 and R8 being high signals while signals R6 and R12 are dwarf. The



Crossing protection of a special design

routes approaching the crossing are the Wharton type, while Hayes derrails are used for the main-line back ups and on the yard leads. Pettibone Mulliken type rail braces are used on all switches and derrails.

Special Crossing Signs

Two streets intersect on this railroad crossing in such a way that it is impossible to locate crossing signals in the proper positions. Even if the signals were in the correct positions it would be impracticable to arrange the control circuits to permit street traffic to move on the streets on which trains are not to interfere. After considerable study, it was decided to install special crossing signs as shown in the illustration. The single yellow top light unit is a Crouse-Hinds Type-RM11 traffic light; it includes a 25-watt 110-volt bulb that is flashed constantly by a thermal unit control. The vertical R. R. signal with the cross, furnished by the Louisville Frog Switch & Signal Company, includes reflector buttons

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$\frac{3}{8}$ -in. 7-strand, 6,000-lb. Copperweld messenger wire, using $1\frac{1}{2}$ -in. National Copperweld cable rings. Five- or seven-conductor modified Trenchlay cable is used for all of the underground wiring, which comprises the wiring between each relay case and its related units. All open line wire is No. 10 double-braid weather-proof 40 per cent conductivity Copperweld. The ground rods are $\frac{3}{8}$ -in. 8-ft. Copperweld clamp-and-safety-screw type.

Direct current, taken from 500-a.h. Edison primary batteries, is used for the operation of every electrical unit, as a-c. power is not available. All relays used in the installation are G.R.S. Type-K neutral. Three Graybar Electric Type-M magneto telephones are in service at the gate and at signals *L1* and *R1*, for the use of the trainmen in communicating with the telegraph operator at Hudson.

The maintenance force was not increased. The signal maintainer and helper maintaining this new plant maintain also another 16-lever G.R.S. Model-2 all-electric interlocker, 4 crossing signals, and 16 Model-2A automatic signals, in addition to having charge of the division signal store-room.

Completion reports showing the actual cost of the plant are not as yet available, but the cost is estimated to be \$13,000, borne entirely by the Omaha. The net annual saving to the latter road is estimated at 78 per cent of this expenditure.

Plans and specifications for the plant were prepared under the direction of Geo. Boyce, superintendent of telegraph and signals, and W. C. Johnson, general signal supervisor. The work was done by the Omaha's signal construction forces, in charge of F. W. Bleier, signal foreman.

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which are plainly seen in daylight and stand out at night due to light from the head lights of an approaching automobile being reflected in the sign. The sign and light unit are mounted on a four-inch Arco cast-iron pipe post set in concrete. This special type of warning sign was developed by the C. & I. M. to meet the requirement at this particular location, ordinarily this road uses the standard A. R. A. Signal Section type of flashing-light crossing sign.

The wiring distribution from the tower to the signals and switch machines on the C. & I. M. is in parkway cables run in vitrified clay duct lines extending from the tower to concrete manholes located at central points on the plant. From these manholes parkway cable buried in the ground is run to junction boxes on the signal foundations or to the controller units at the switches. Single conductors are used from these junction boxes to the signals or switch machines. Likewise parkway cable is run to Union pipe pedestal type parkway outlets out the rails.

The wiring distribution on the Wabash is all overhead, using bunched multi-conductor braided cables suspended from messenger cables supported on the pole line.

The insulated wires and cables were furnished by Kerite and the storage batteries by Exide. The Union Switch & Signal Company furnished the remainder of the interlocking materials and installed the plant complete under the jurisdiction of C. H. Paris, chief engineer of the C. & I. M., to whom *Railway Signaling* is indebted for the information in this article.

Michigan Adopts Crossing Signal With "Stop-on-Red" Sign

DURING the 1931 session of the Legislature of the State of Michigan an Act was passed regarding highway-railway grade crossing protection.

Section 3 of this act requires the State Highway Commission to install and maintain on the highway, approach warning signs not less than 250 ft. nor more than 350 ft. from each crossing. Section 5 has to do with the standard crossbuck signs including additional information as to the number of railroad tracks, for example, "Railroad Crossing 2 Tracks."

Section 8 deals with the automatic highway crossing signals and is given in full as follows:

"Section 8. When in the discretion of the Michigan Public Utilities Commission the safety of the public shall hereafter require that some protection device or improvement in existing devices be provided at a railway crossing to warn of the approach of trains about to cross the highway, it shall be the duty of the Michigan Public Utilities Commission and it is hereby empowered to order the railway authorities owning the tracks of such crossings to provide protection of a flashing-light type equipped with a gong of approved type at each signal which shall, unless otherwise agreed upon by the highway authorities responsible for the maintenance of the highway, be installed on the right-hand side of the highway approaching the crossing from each direction on the near side of and at a distance from the center line of the outside tracks to be determined by the railway authorities and at a distance from the center line of the highway and above the crown of the roadway to be determined by the highway authorities responsible for the maintenance of the highway. All flashing-light types of protection shall consist of two eight-inch diameter lights equipped with red lenses and reflectors mounted side by side on an appropriate standard arranged to flash alternately, each light to be visible from both directions on the highway. All standards carrying flashing lights shall also carry at a height to be specified by the highway authorities, a crossbuck design bearing the designation "Railroad Crossing Tracks" with letters studded with reflecting buttons, this design conforming to the requirements for "Crossing Signs" as specified in this act. The standard shall in addition bear the designation "Stop on Red" in reflecting-button design of similar type to the crossing sign. Whenever flashing lights are installed at any crossing and the Michigan Public Utilities Commission shall find it necessary, they shall be so arranged that for every train or switching movement over the crossing, the flashing lights shall be in operation for a period of not less than 20 sec. nor more than 60 sec. in advance of the train movement reaching the nearest established curb line of the highway and the flashing lights shall continue to operate until the train movement has passed the established curb line on the near side of the highway. The cost of all flashing-light installations and alterations or relocations of same shall be borne equally by the railway and highway authorities, and thereafter they shall be maintained by the railway authorities at their own expense except that the highway authorities shall pay \$10 per month to the railroad authorities for each crossing protected by flash-light signals. The railway authorities shall, however, furnish standard equipment uniform for all railroads and on a cost and installation basis consistent for all railroads and unusual or unbalanced costs shall be subject to the review and adjustment of the Michigan Public Utilities Commission."