

B. & O. - N. K. P. - Erie project eliminates train stops at railroad crossings; reduces delays for street traffic; provides increased safety

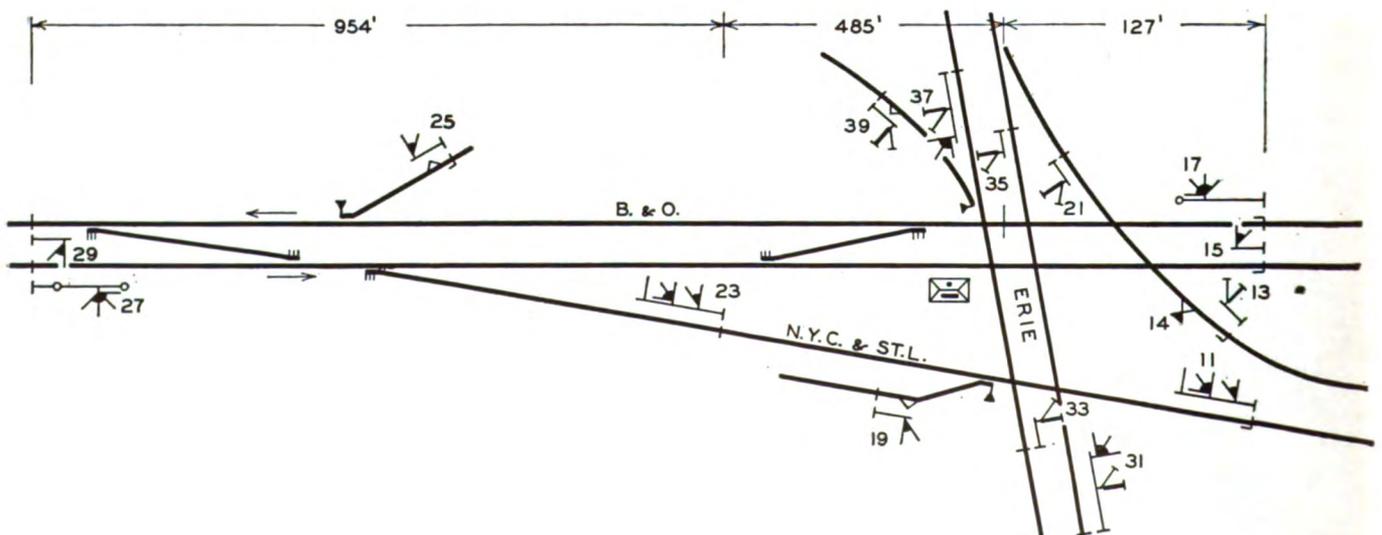
IN LIMA, Ohio, the Baltimore & Ohio, individually and jointly with the New York, Chicago & St. Louis (N.K.P.), has installed flashing-light signals at 15 street crossings, of which three are also protected by gates. An all-relay interlocking constructed at about the same time protects crossings of the Erie with the Baltimore & Ohio and Nickel Plate, and a junction of the Nickel Plate and Baltimore & Ohio.

Lima is 129 miles north of Cincinnati on the Baltimore & Ohio north-and-south line between Cincinnati and Toledo. At Erie Junction, in South Lima, the east-and-west main line of the Erie crosses the Baltimore & Ohio. Also a single-track line of the Nickel Plate crosses the Erie and makes a junction with the Baltimore & Ohio, 943 ft. north of the Erie.

Previously, a mechanical interlocking included the N.K.P. junction switch and two crossovers at Erie

Train Time Saved By

New Interlocking and Automatic

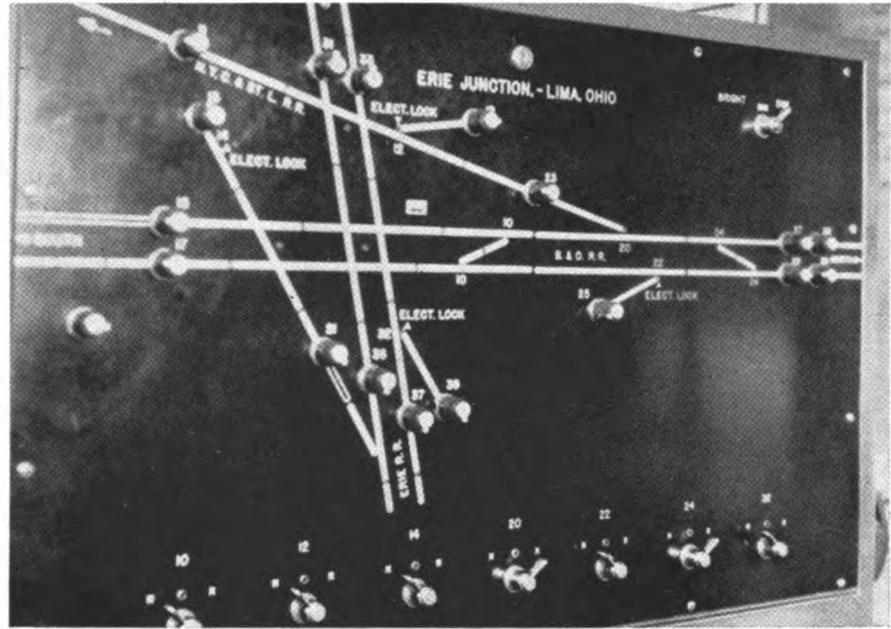


Track and signal plan of Erie Junction in Lima, Ohio

Junction. However, no interlocking was in service at the railroad crossings with the Erie.

This route of the Baltimore & Ohio handles heavy freight traffic, much of which is coal being hauled north to docks at Toledo on Lake Erie. In addition to 8 passenger trains, the traffic on the Baltimore & Ohio includes from 20 to 22 freight trains daily. The Erie operates 6 passenger and about 18 freight trains daily, and the Nickel Plate 2 passenger and about 20 freight trains daily. Counting through trains and switching operations, more than 100 movements are made through this interlocking every 24 hours. All trains were previously required to take statutory stops before moving over the crossings with the other railroad. These stops not only caused considerable delay to trains, but the public was inconvenienced due to consequent blocking of street crossings.

The Baltimore & Ohio and the N.K.P. jointly operate two main tracks from Erie Junction north for about 1½ miles through Lima. The B. & O. has 2 main tracks from this point to the north end of their North Lima Yard, a distance of approximately 2¼ miles, single track C.T.C. is in service on the B. & O. north of North Lima and single track A.P.B signaling south of Erie Junction. The



Control panel; push-pull-turn knobs control home signals, levers control switches

pipe-connected to the hand-throw electrically-locked switch. Signal 19 governs train movements from this spur to the main track.

The new interlocking control panel is 42 in. wide and 30 in. high. The panel is black, with the tracks represented by white lines. On this diagram, each home signal is controlled by a push-pull-turn knob. Each

switch or crossover, and the electric lock on each hand-throw switch, is controlled by a small lever. Switch levers are located in a horizontal row near the bottom edge of the panel. In the normal position, each lever is 45 deg. to the left of center, being turned 45 deg. to the right of center, to reverse a switch or release a lock. Operation of a switch lever causes an

Protection at 15 Street Crossings

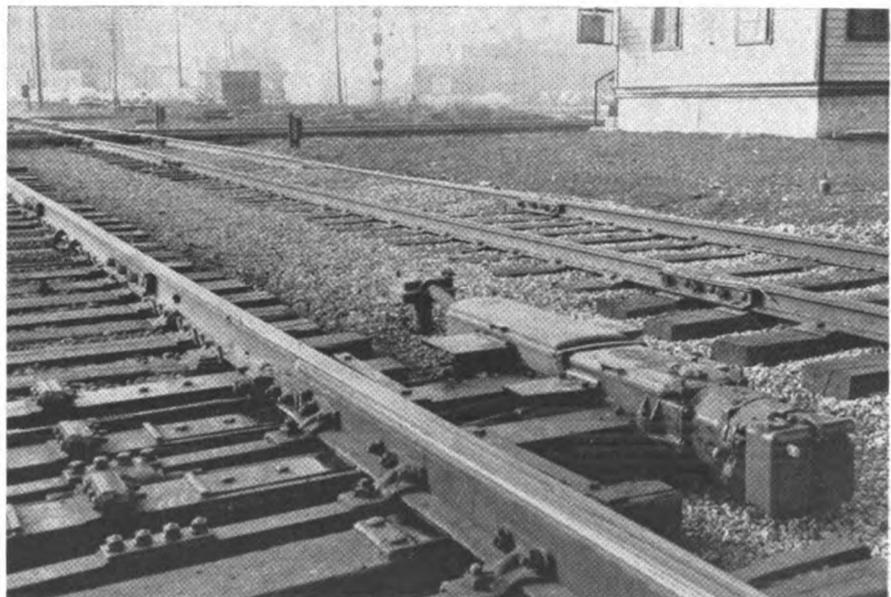
In Lima, Ohio

N.K.P. has single track C.T.C. in service west of Erie Junction, South Lima and east of Pennsylvania Crossing, North Lima.

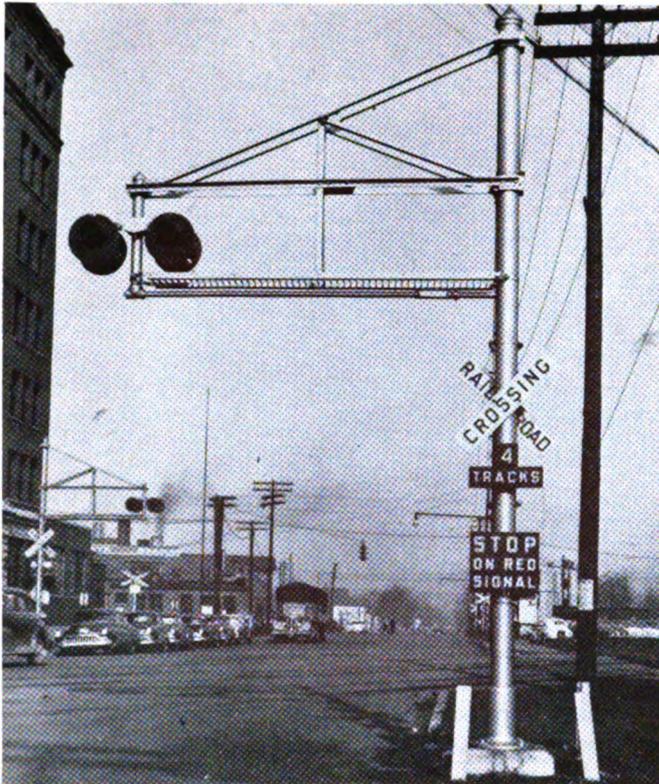
New Electric Interlocking

The new all-relay control interlocking includes electric switch machines at two crossovers and one single switch; electric locks on four hand-throw switches; six high home signals; and eight dwarf signals.

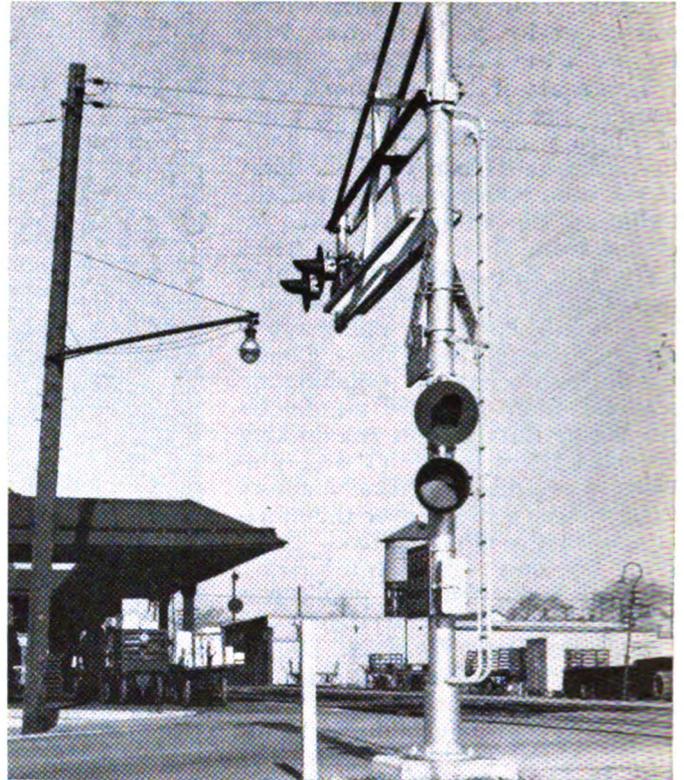
Derail No. 14 on the commercial track between the Erie and Locomotive Works is operated by a separate hand-throw stand electrically locked. The derail at the turnout on the spur track on the Nickel Plate is



The gage plates extend and are connected to the switch machine



Parked cars do not obstruct view of flashing-light signals



"No Right Turn" sign illuminated when flashers operate

amber lamp to be lighted in a lens in the face of the lever, and this lamp stays lighted until the corresponding switch completes its movement and is locked in the position called for by the position of the lever. An amber lamp, in the face of a lever controlling an electric lock, is lighted while the lock is released. On the track diagram, in each section representing a switch, there is a small red lamp which is lighted when the detector track circuit is occupied or when electric locking is in effect to prevent operation of the switch.

Having lined the switches for a route, the signal is cleared by operating the signal control knob on the diagram corresponding with that signal. When a signal clears, an orange lamp is lighted in the face of the button, outlining a black arrow, pointing in the direction which the signal controls. When a train accepts the signal and passes it, the lamp in the

button goes out, and the control relays revert to normal position with no further action by the leverman. If a signal which has been cleared is to be taken away, the corresponding aspect is to be displayed on signal 31 or 37, the corresponding button is pushed in and turned 90 deg. Dwarf signals 14, 21, 33 and 35 are cleared by buttons turned 90 deg. After a train accepts and passes such a signal, the leverman turns the button back to normal.

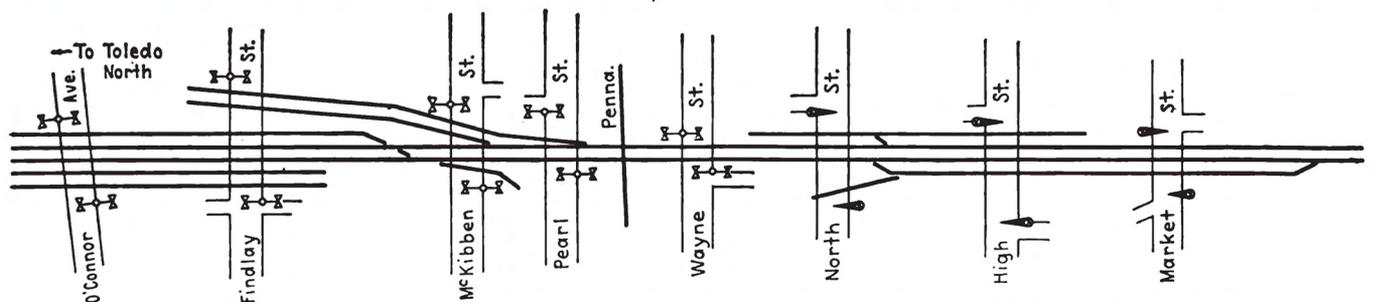
Multiple tracks through Erie Junction interlocking are signaled for movements with the current of traffic only. Where reverse movements are regularly made, a traffic-direction button is provided to remind the operator. These are located in the line representing the respective track, and just in approach to the button governing the home signal for the track. An arrow without lamp, in the face of the button, points in the di-

rection for which traffic is to be routed. To change direction of traffic, the button is turned 180 deg., to the opposite direction.

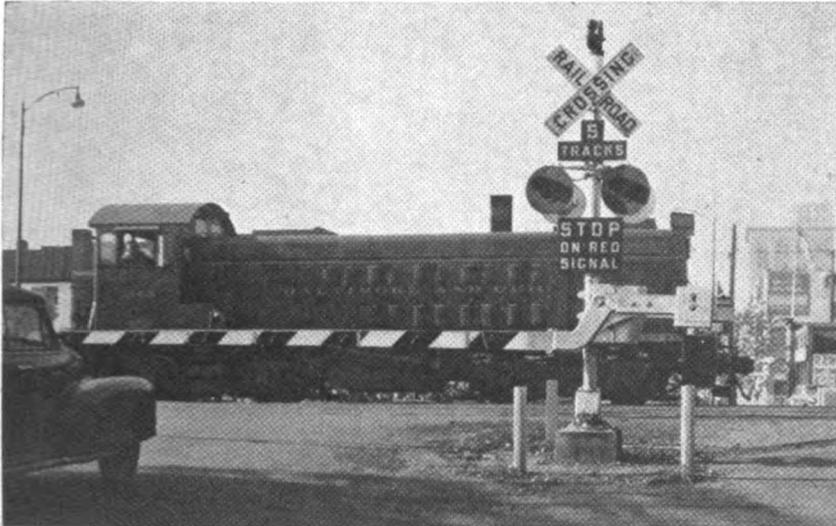
The track sections at the B. & O. and the Erie double-track crossings, are provided with trap circuits. In event of incomplete train movement, release of trap circuit is accomplished by operation of a manual clockwork time release.

The switch machines are the G.R.S. Model 5C with 24-volt d.c. motors. Each switch is fitted with insulated gage plates, 1 in. thick and 8 in. wide on the No. 0, the No. 1 and the No. 2 ties. The gage plates on No. 1 and No. 2 are attached to the switch machine, thus preventing lost motion. Positive rail anchor type adjustable rail braces are used with the insulated gage plates.

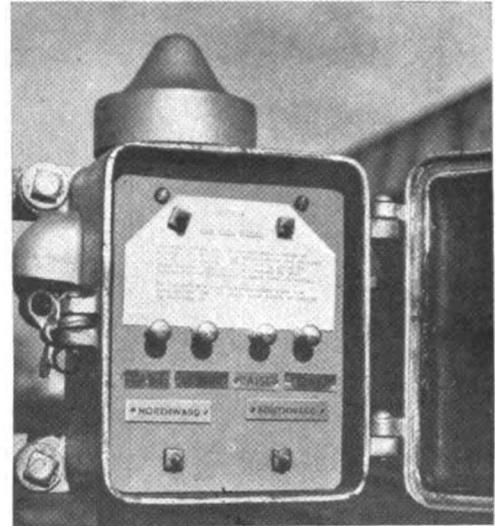
The new interlocking machine is controlled by an operator located in a one-story frame structure on a concrete foundation. The relays and bat-



Track and street plan showing crossing protection equipment installed in Lima, Ohio with



This gate has manual as well as automatic control



Manual control for short-arm gates

teries are located in a sheet-metal bungalow 8 ft. by 12 ft. located on the east side of the B. & O. tracks opposite the control office, thus minimizing fire hazard for this equipment. Relays located in the bungalow are plug-in-type.

Crossing Protection at 15 Street Crossings

As a part of the 1951 project at Lima, the Baltimore & Ohio and N.K.P. installed flashing-light signals at 12 street crossings, and automatic short-arm gates with flashing-light signals at 3 crossings (North, High and Market streets), which are the more heavily traveled thoroughfares. Previously, some of these crossings were protected by full-time or part-time crossing watchmen. Now the 15 crossings through the city, over joint Baltimore & Ohio and N.K.P. tracks and sole B. & O. tracks, are protected by automatically-controlled protection 24 hours every day.

At some of the crossings, such as at Main street, the flashing-light signals are mounted on cantilever brackets of sufficient length to put the lights out over the street so that the view to such signals is not obstructed by automobiles and trucks parked along the curb.

At some of the crossings, side streets, running parallel to the tracks,

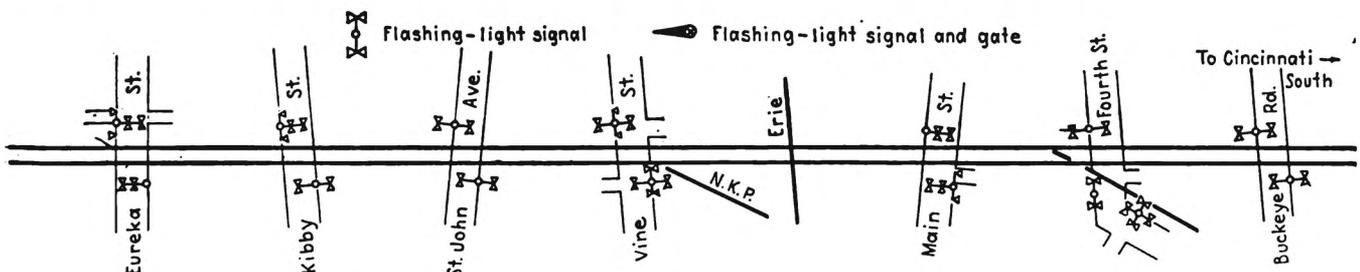
intersect the protected street near the crossing. In these instances, "No-Right-Turn" or "No-Left-Turn" signs were installed to indicate to drivers that they are not to turn onto tracks when trains are approaching.

The flashing-light signals, and also the gates, where used, are controlled automatically by track circuits in the conventional manner. Pushbuttons to provide manual control were installed at Market, High and North streets where automatic short-arm gates are in service. If a train or cars are to be left standing on the tracks within control limits but outside of street limits for some time, a member of the train crew operates pushbuttons located on a post at the crossing. To raise the gates with track occupied, a crew member pushes the "Raise" button for the track the train occupies. When the train is ready to move over the crossing, the "Lower" button is pushed to set the signals in operation and lower the gates. In the meantime, if a train approaches on another track, the signals will operate automatically and gates lower, because the pushbutton control is only effective for the track and direction designated. Each pushbutton is clearly identified.

The distance between the interlocking at Erie Junction and the interlocking at the crossing with the

Pennsylvania is 7,728 ft. If a long freight train is stopped in this section, it will block nearly all of the eight street crossings in this area. The towermen at these interlockings work very closely together to keep trains moving through both interlockings to avoid delays to street traffic. Train occupancy of a track circuit in approach to a home signal is not effective in starting the operation of street crossing protection beyond the signal until it has been cleared. Thus, if a train is stopped and waiting at a home signal, the crossing protection beyond will not interfere with the movement of street traffic.

The interlocking at Erie Junction was planned jointly by the three railroads. Street crossing protection was planned jointly by the B. & O. and the N.K.P., in cooperation with the City Council. Construction was carried out by signal forces of the Baltimore & Ohio under the jurisdiction of W. W. Welsh, signal engineer, of the Baltimore & Ohio, and H. A. Maynard, assistant engineer-signals, Western Region. The interlocking equipment and relays for the entire project were furnished by the General Railway Signal Company, and the crossing gates and flashing-light signals by the Western Railroad Supply Company.



flashing-light signals at 12 streets and flashing-light signals with short-arm gates at three streets