

Crossing Protection for 16 Streets

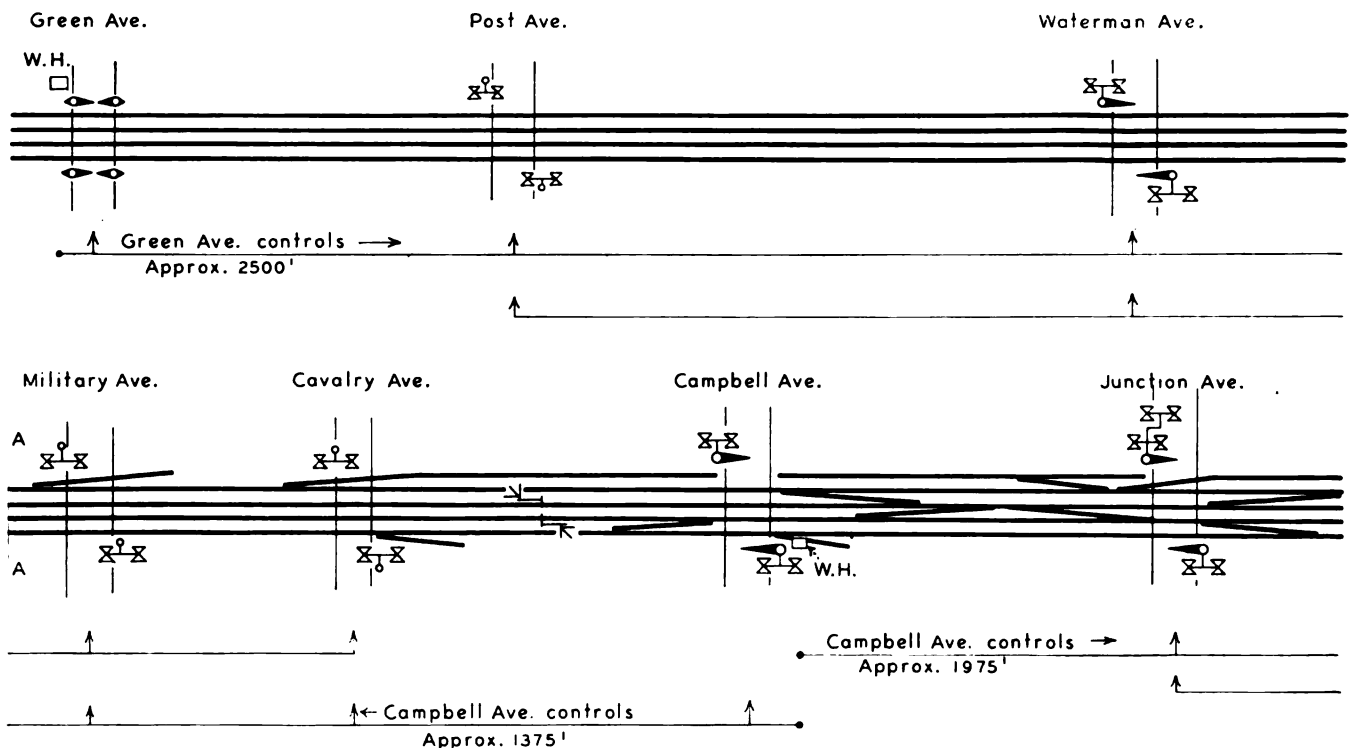


GUARDS OF OLD RAILS protect gates and signals from vehicles

PROTECTION for highway traffic has been provided at 16 street crossings of the Union Belt in Detroit, Mich. The Union Belt is a terminal railroad, operated by the Chesapeake & Ohio, Wabash, and Pennsylvania, which runs from the Fort Street Union Depot, 4.5 mi. along the Detroit river, through a heavy industrial area to Delray interlocking, where it connects with the C&O and Wabash. The speed limit on the 4-track (2 main tracks, 2 side tracks) Union Belt is 30 m.p.h. for all trains. Daily movements include four passenger trains each on the Wabash and the PRR, and six passenger trains on the C&O. Besides these passenger trains, there are numerous freight trains and switching movements.

Short-Arm Gates

The Union Belt has installed semi-automatic, short-arm gates with bells and flashing-light signals at three street crossings; Morrell, Campbell, and Waterman avenues. These streets were formerly protected by gates operated by compressed air. Also completed at this time has been the installation of supervisory control of all crossing



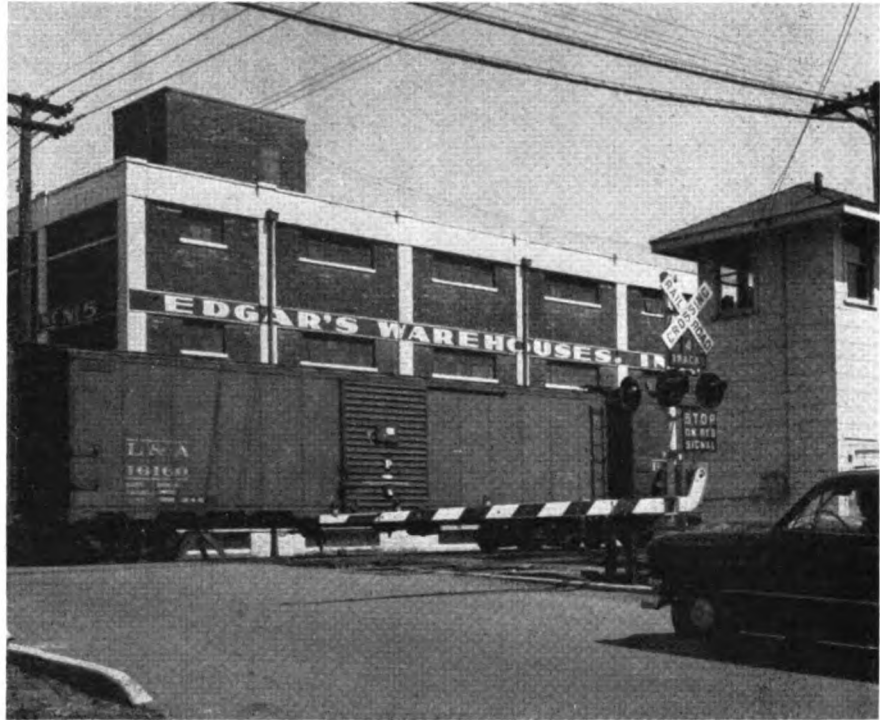
Short-arm gates installed at three streets and supervisory control of all crossing protection equipment from four control towers completes modernization program in Detroit

avenue, and these have been retained under the present program. At a later date, short-arm gates and flashing-light signals were installed at Junction and Livernois avenues.

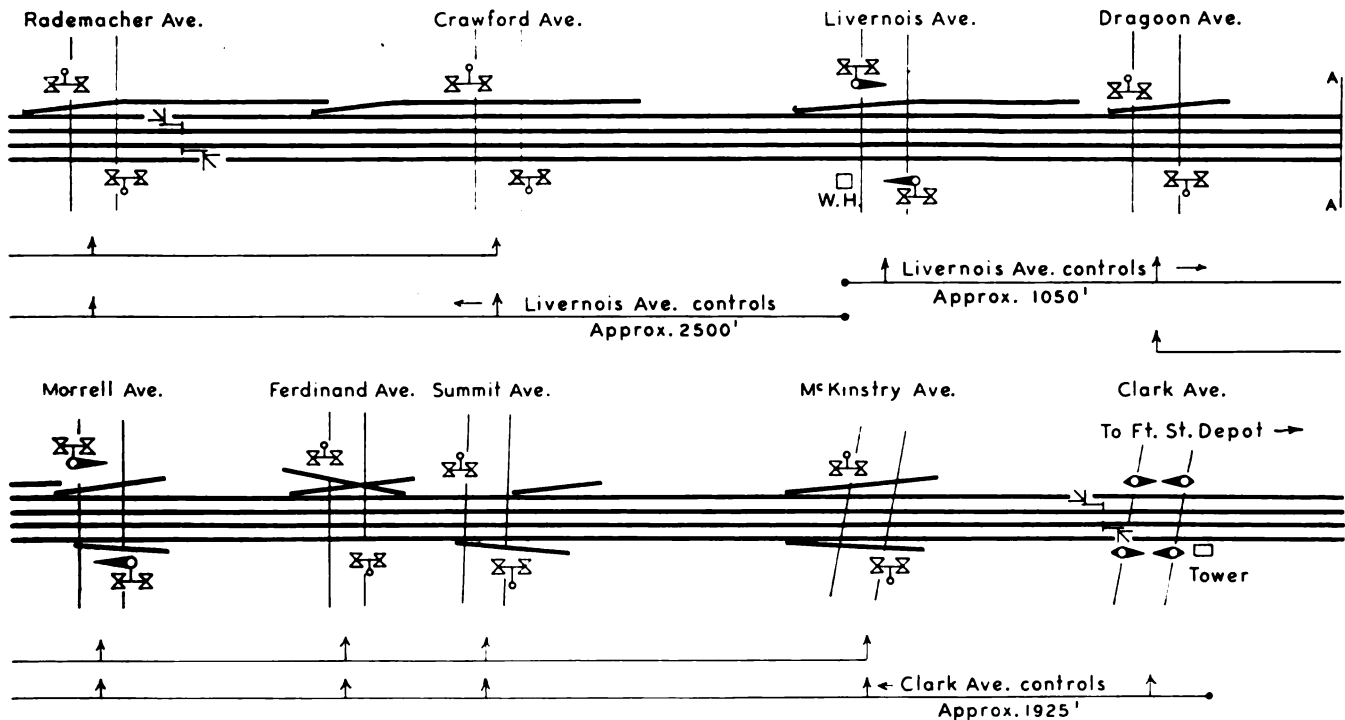
There are four control machines for operation of the crossing protection at the 16 streets. The watchman at Clark avenue controls the air gates at Clark avenue; and flashing-light signals at McKinstry, Summit and Ferdinand avenues, and short-arm gates and flashing-light signals

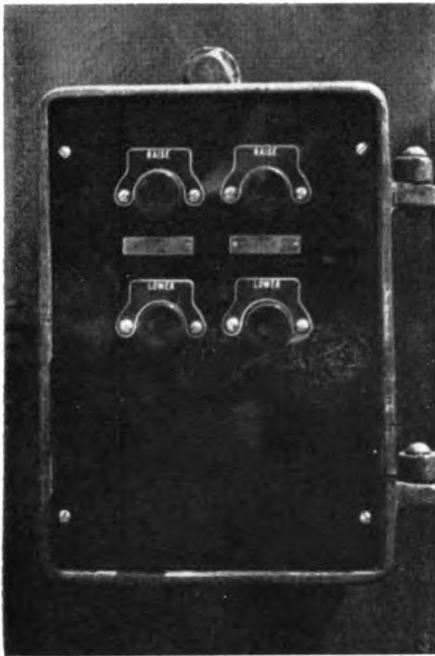
protection at the 16 streets. The supervisory control is concentrated in the watchman's towers at four streets; Clark, Campbell, Livernois and Green avenues. This control consists of toggle-type levers (keys) which, when actuated, set the crossing protection in operation. Because of the speed restrictions in the area, all protection is controlled by watchmen in towers with the exceptions, under certain conditions, of the short-arm gates which will be discussed later in the article. The crossing protection has been modernized under a continuing program over a period of years, with the result that the flow of street and railroad traffic has been coordinated. The purpose of the supervisory control is to avoid delays to street traffic by raising the gates and stopping the operation of flashing-light signals, if trains stop in approach sections, but do not proceed toward the crossing for some appreciable time. Thus, when switching moves are made to industries in the area, and freight cars are left standing between streets, the watchmen can allow vehicular and pedestrian traffic to proceed over the crossing.

flashing-light signals were added, their control was co-ordinated with the control of the nearest crossing which had a watchman. Several years ago 220-volt electric gates were placed in service at Green



MANUAL MACHINE for controlling gates is in this tower





PUSHBUTTONS are used by train crews

at Morrell and Junction Avenues. The Livernois avenue watchman controls flashing-light signals at Cavalry, Military, Dragoon, Crawford, Redemacher and Post avenues; and short-arm gates and flashing-light signals at Livernois and Waterman avenues. The Green avenue watchman controls flashing-light signals at Crawford, Rademacher and Post avenues; short-arm gates and flashing-light signals at Waterman avenue; and electric gates at Green avenue. Although the controls overlap at all streets except those at which watchmen are located, operating procedures are more than adequate to provide full protection. Conventional crossing bells at each crossing ring continuously while the signals are flashing and the gates arms are down.

When a westbound train approaches Clark avenue, the watchmen sets the protection equipment in operation for that street; the gates are lowered and the bells ring. Next, the operator will set the protection equipment in operation at McKinstry, Summit, Ferdinand, Morrell and Junction avenues, in that order. The watchman at Campbell avenue, seeing from the indication light over the associated control lever on his panel that the gates are down at Junction avenue, knows the train is approaching, and will, therefore, set the crossing protection equipment under his control in operation, beginning with the street nearest the approaching train. The process is continued on down the line to Green avenue. As the train clears each crossing the watchman will raise the gates or stop the flashers' operation

at that crossing. Usually the watchman who initiates the operation will release the operation. For eastbound train movements the procedure is similar but in reverse, i.e., the Green avenue watchman will originate the operation of the protection equipment.

Control Machine

The control machine is an upright desk cabinet on the face of which are painted heavy white lines representing the four main tracks and narrow white lines representing the streets. Amber indication lamps repeating occupancy of track sections are mounted in the track lines. Below the tracks and at each street crossing in the diagram is a telephone-type key and an associated red indication lamp. Depressing the key will cause the crossing protection equipment to operate and the red indication lamp will stay on. Raising the key to normal position cuts out the protection. The fact that the crossing protection at a street may be controlled from two machines will not cause any confusion or lessen the amount of protection. For example, if the watchman at Clark avenue depresses his key for Summit avenue, the Campbell avenue watchman probably had his Summit avenue key raised when the Clark avenue watchman set the flashers in operation. The overlapping controls provide an added factor of safety when a second train approaches a crossing in a direction opposite of that of the first train.

Semi-Automatic Short-Arm Gates

At those streets at which the semi-automatic short-arm gates and flashing-light signals were installed, short track circuit sections are in service which extend across the width of the street. If a train, engine or car stands on these track sections, the gates will be lowered and the flashers operated. This action is independent of the supervisory control by the crossing watchmen. They cannot raise the gates if a train or engine is standing on one of these track sections.

Also at each semi-automatic gate location there is a manual pushbutton control which can be operated by train crews to lower the gates. The control is located in an iron box mounted on the end of the relay case at the gate location. The manual controller housing is locked with a switch padlock. Train crews often use these controls when they are switch-

ing over Waterman, Junction or Morrell avenues. At Livernois and Campbell avenues, they can easily talk to the watchman to tell him of their moves.

New frame towers were erected at three of the four control locations. They are completely enclosed and contain toilet and washing facilities, as well as a central heating unit on the ground floor. The control machine is on the second floor, thus affording the watchman an elevated watching point to view the crossing.

Loudspeaker Communication

There is a line amplifier and 5-watt loudspeaker in each of the four watchman's towers. They are all connected to a train announcer line with transmitting stations located at Delray interlocking at the west end, and at 6th street interlocking at the east end. When the interlocking operator lines up routes for a through move onto the Union Belt, he informs the crossing watchman of the approaching train. For example, they will hear "C&O No. 7 leaving Fort Street Depot." The interlocking operators also announce switch runs and puller runs. A speaker in each interlocking tower also keeps the operators fully informed concerning train movements. A line amplifier is used at each interlocking and watchman's tower. The communications line is run in duct, aurally and underground.

At the crossings protected by the short-arm gates, power for gate operation is supplied by seven cells of Exide 120-a.h. storage battery. Two cells of Edison 1,000-a.h. primary battery are used to feed each track circuit.

The relays and terminal strips at these crossings are in sheet metal relay cases. Some of the relays for this project were furnished by the General Railway Signal Co., and the rest by the Union Switch & Signal division of the Westinghouse Air Brake Co. The crossing gates and flashing-light signals were furnished by the Western Railroad Supply Co. The C&O signal and communications department men installed the equipment, including the loudspeaker system, and constructed the control machines. BQ telephone-type relays, manufactured by the Automatic Electric Co. were used as indication relays in the control machines. The modernization program was designed, directed and executed by railroad forces under the jurisdiction of M. F. Anderson, engineer communications and signals, Pere Marquette district, Chesapeake & Ohio.