Cut-Out Controls for Crossing Gates

Gates raised at Clinton street crossing in Grand Ledge, Mich.

Pere Marquette installation at Grand Ledge, Mich., includes cut-outs and restarts to insure protection for special train movements

AN interesting installation of highway crossing protection is in service at Grand Ledge, Mich., 99 miles west of Detroit, on the main line of the Chesapeake and Ohio's Pere Marquette district, between Detroit and Grand Rapids. Single track main line with automatic block signals is in service through this territory. At the west end of a small yard in Grand Ledge, Clinton street crosses the right of way as shown in the accompanying plan. The upper track adjacent to the main line is a siding, extending to the right of the crossover east of the crossing, the right end of the siding, however, not being shown. This siding extends to the left of the crossover, and over Clinton street, from which point it is the road's branch line to Ionia, Mich. The lower track, adjacent to the main line over the crossing, is a house track. Protection at this crossing consists of automatic electric short-arm gates and flashing-light signal assemblies.

When these facilities were first placed in operation at Grand Ledge, there were instances when a westbound train from Detroit to Grand Rapids would reach the westward approach circuit, after an eastbound train from Grand Rapids to Detroit had first occupied the eastward approach circuit and headed into the siding through the crossover east of the crossing. After the train from Grand Rapids to Detroit had entered the siding, the other train would then approach the crossing with the gates in the raised position and the flashers not operating.

To solve this problem, a X-over siding relay XSR, as shown on the plan, was added to the control circuits. Pick-up of this relay is through the circuit controller of the westward switch of the crossover reversed, and the approach track circuit relay B528TR de-energized. Crossing interlocking relay WXR, which has flagman contacts, is then energized over a front contact of the XSR, back contact of the B528TR and a front contact of the A528TR.

The ZR relay is de-energized because the XSR is energized, this being necessary to prevent the gates rising momentarily after an eastbound train passes over the short crossing track circuit A528T. This arrangement eliminated the necessity of installing another track circuit between A528T and B528T track circuit. The ZR relay is normally energized over front contacts of the EXR and WXR relays, a back

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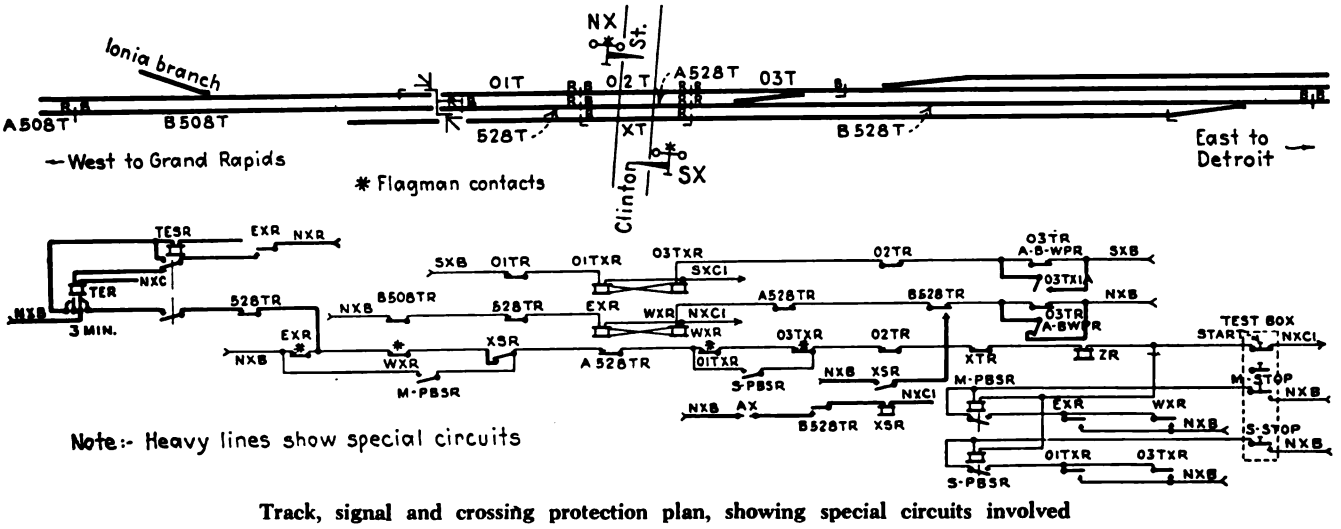

Track, signal and crossing protection plan, showing special circuits involved

Grand Ledge

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contact of the XSR, and front contacts of the A528TR, 01XTR, 03TXR, 02TR and XTR relays.

The timing circuit shown, using the TER thermal relay and TESR time-element stick relay, was installed because some eastbound trains stop west of the crossing near the station to take water. A restart is located at signal 528. Thus, trains stopped to take water do not keep the protection in operation and tie up vehicular traffic over the crossing unnecessarily. The TER starts to operate with the EXR and TESR down and, after three minutes, picks up the TESR, which holds up over one of its own front contacts with the EXR down. This picks up the ZR, and cuts out the operation of the protection until the train enters the restart track section 528T. Stop and start buttons, located in a test box attached to the side of the instrument house near the crossing, may be depressed to either raise or lower the gates. The use of the push buttons do not cut out the flasher operation, only raises the gates.

The gates and flasher signal assemblies at this crossing are the Transport Product Corporation's Model S, designed for operation on 12 volts d.c., and equipped with 23-ft. arms over the approach lanes of traffic only. Each assembly is equipped with a 10-volt top-of-mast bell and conventional cross-buck sign. Each gate arm has four red lamps which are lighted from the time flasher operation starts until stopped, even though the gates are in the vertical position.

Standby Power

The flashers and gate-arm lamps are normally lighted by a.c. In the event of a power failure, however, these circuits are cut over to two sets of seven cells of Exide, Type DME 9A, 80-a.h. storage battery, in service for standby power for the gates. The track circuits are the conventional d.c. type, with four-ohm neutral relays, each fed by two cells of Edison 1,000-a.h. caustic soda primary battery in multiple.

This highway crossing protection project was planned and installed by the regular signal forces of the Chesapeake and Ohio's Pere Marquette district, under the jurisdiction of M. F. Anderson, engineer communications and signals.