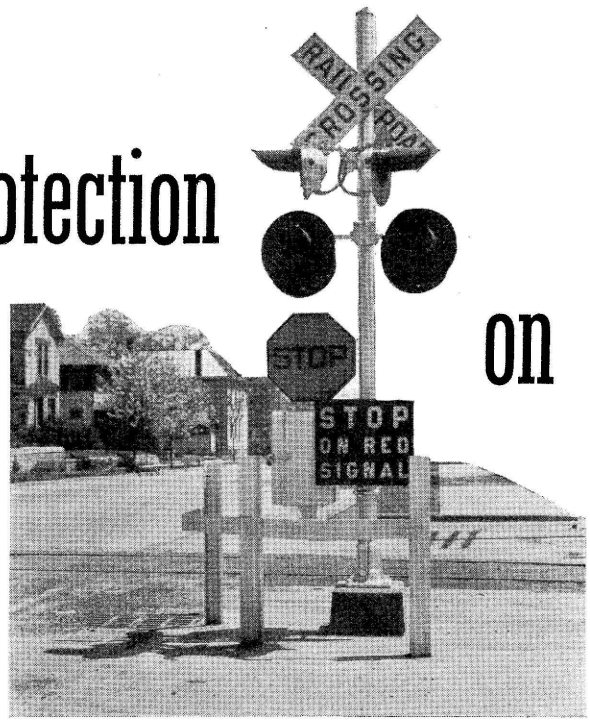
Crossing Protection on the Monon



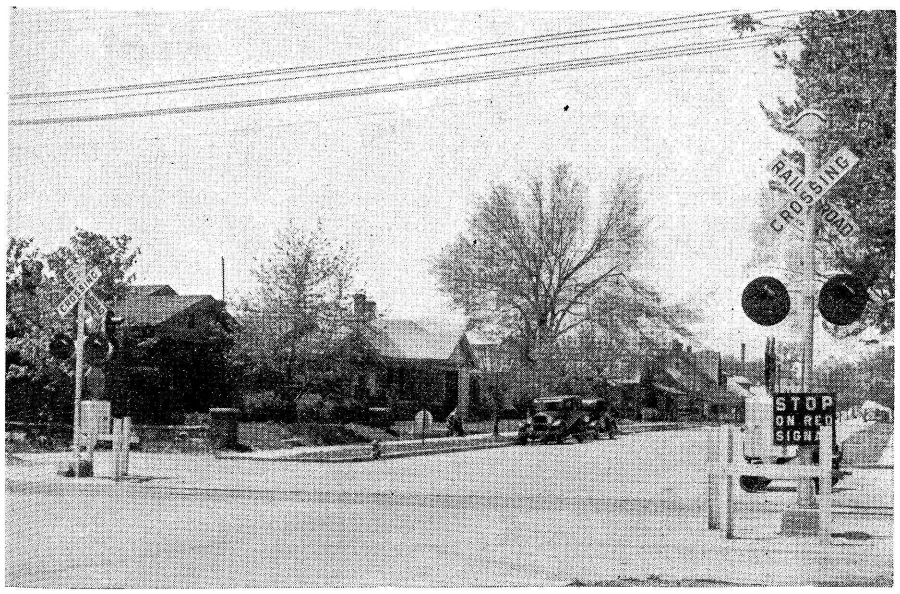
Mechanism for operating rotating stop sign located on the street side of the mast thus permitting the stop sign to be displayed in both directions of the street

Installation at Bloomington, Ind., includes flashing-light signals with rotating stop signs and special cut-outs for switching operations

As PART of the program of crossing protection of the State of Indiana, financed from Federal funds, signals were installed at the crossing of Second street in Bloomington, Ind., where State Highway 45 crosses the main line of the Chicago, Indianapolis & Louisville. The main line of the Monon at this crossing is single-track and handles 4 passenger trains, 14 freight trains and about 12 switching movements daily.

In addition to through traffic on State Highway 45, there is considerable local vehicular traffic over this crossing. As the crossing is located in a residential section and near a high-school, pedestrian traffic includes numerous school children. In consideration of these factors, it was decided as part of the Indiana program that this would be a good location to determine the merits of the rotating-disk stop sign as an addition to the flashing-light signal.

The flashing-light signals are assembled complete, back-to-back mounting, with signs according to the A.A.R. Signal Section standard. In view of the fact that side streets, paralleling the track on the west side, enter the highway at the crossing, extra flasher units were mounted on the signal on the west side of the track. These lamps flash the same as the main signal units to give warning to drivers approaching on the side



View looking west showing the rotating stop signs in the clear position

streets. The flashing-light units are the W.R.S. Co. No. 880-1, made to conform with the specifications of the State of Indiana, as explained on page 634 of *Railway Signaling* for December, 1936. A crossing bell is mounted on the signal east of the track.

Stop Signs Displayed in Both Directions

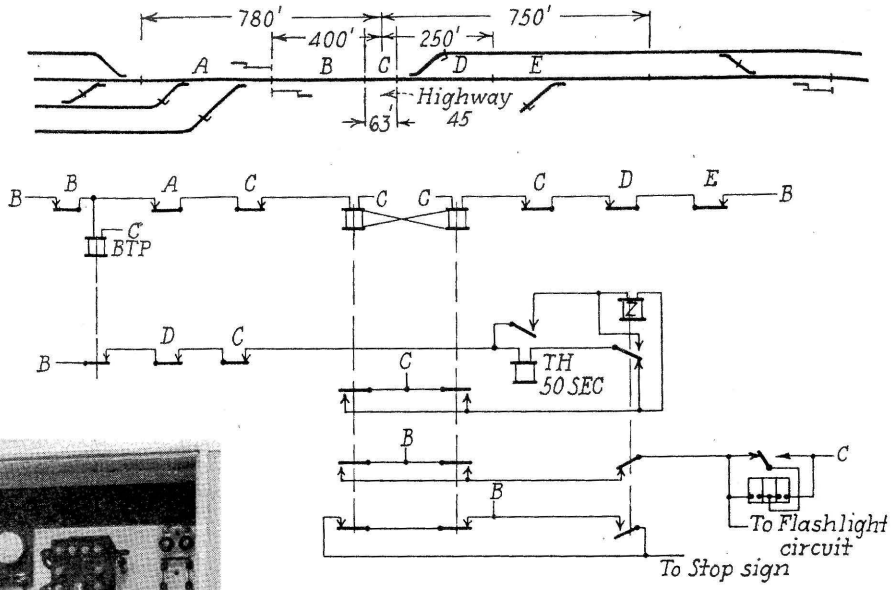
In addition to the flashing lights, a rotating-disk signal is mounted on each mast, a special feature being that the mechanism is mounted on the street side of the mast, which permits the "STOP" sign, when indicating the approach of a train, to be seen from both directions when approaching on the highway. Two complete stop disks, mounted back to back, are used for each signal. Thus the side of the sign toward the track performs a similar function to that of the back lights on the signals. The word "Stop" on these disks is painted black on a yellow background, the word being outlined with reflector buttons.

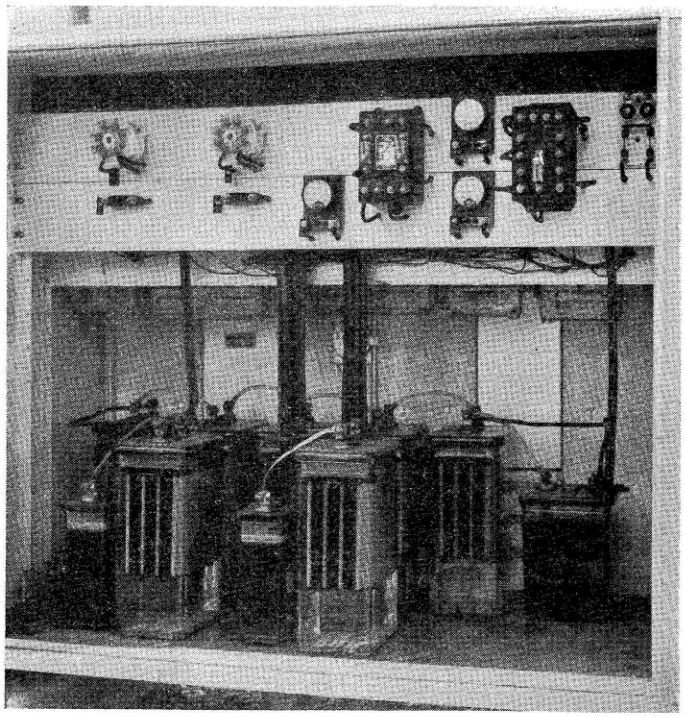
tition board. The rectifier transformers are mounted on the field side of this board.

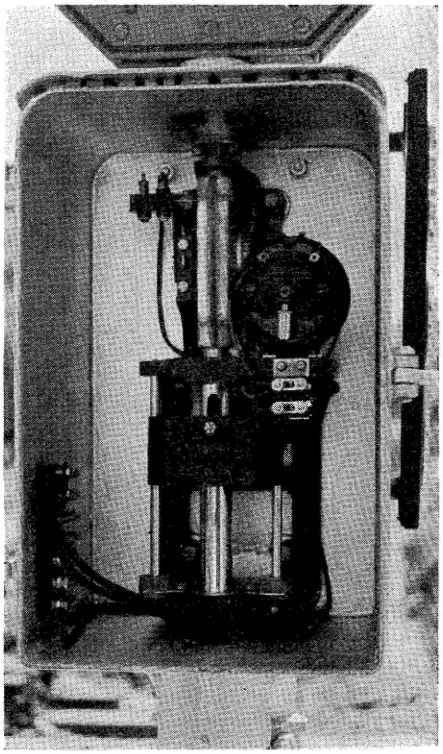
With each of the 10 flasher units equipped with a 10-volt, 10-watt lamp, the average lamp load is about 5 amp. When the two signals clear, a load of about 7.5 amp. is taken from the battery for 3 or 4 seconds. The hold-clear coils on the two rotating-disk signals cause a normal drain of about 60 m.a. In consideration of these requirements, a 120 a.h. storage battery was used as the main power supply, this battery consisting of five cells of Exide EMGS-7. One cell of the same type is used for each of the new track circuits, while the track circuits formerly a part of the automatic block signal system are each operated from three cells of Edison primary battery. The main storage battery is charged by a Balkite taper charger, type C-10, and each of the track cells is charged by a Balkite type C-1 rectifier.

A 5-ohm fixed resistance and a 5-ohm adjustable resistance, both of Raco manufacture, are used in the track battery feeds. The lightning arresters are the W.R.S.Co. neon Form B-23. As shown in one of the illustrations, a concrete foundation was built for each end of the instrument case, a 2-in. angle iron being placed on each foundation to support the case so as to allow ventilation between the foundation and case, thus preventing corrosion.

All of the underground wiring is in parkway cable. The runs from the case to the signals are in multiple-conductor No. 8 Okonite cable made up with protection including jute, steel tape and lead sheath. Number 9



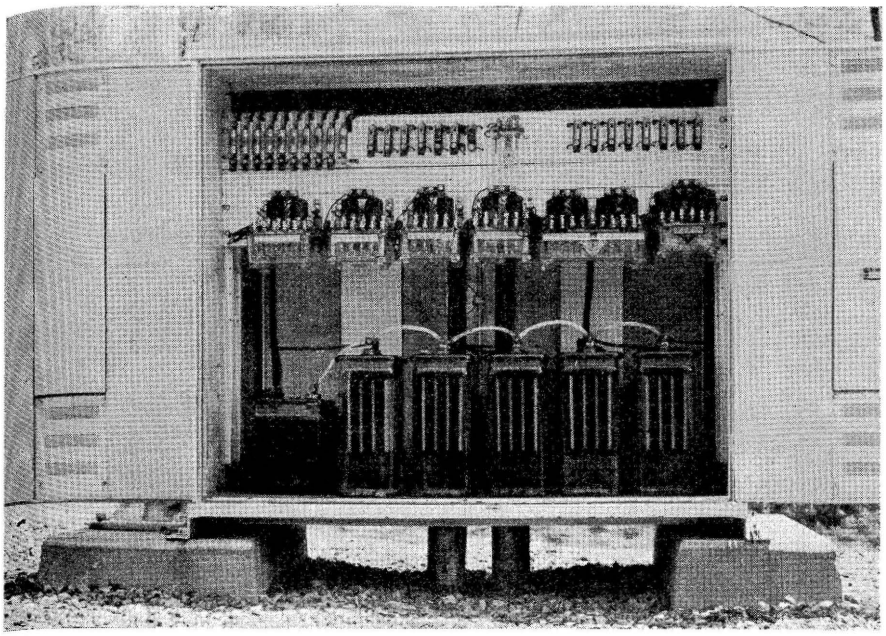




Above—Diagram of circuits showing the automatic cutouts. Left—Interior of field side of the case showing transformers, rectifiers and battery. Right—Mechanism for operating rotating stop sign

Sheet-Metal Instrument Case

The relays, battery, rectifiers, etc., at the crossing location are housed in a large-sized, welded sheet-metal case, designed and furnished by the General Railway Signal Company for this work on the Monon. The case is lined with ½-in. Celotex and equipped with doors on both the track and the field sides. The relays are the G.R.S. Style-K, equipped with shock-absorbing spring mounting brackets, and are attached to the track side of the par-



Large-size welded sheet metal case housing the instruments and battery at the crossing location

single-conductor cables used for the track connections are made up the same, except that no lead sheath is used. At the instrument case the underground cables are brought up through a 4-in. steel pipe at the center of the bottom of the case. This pipe was threaded and fitted with nut rings and gaskets so as to make a waterproof connection to the case. After the cables were in place, the top was sealed with compound.

The cable from the pole line drops to the top of a cable post, set near one end of the case, and from the cable post the wires go through a 2-in. pipe into the side of the case, these connections being threaded and fitted so as to be waterproof.

Special Cut-Out for Switching Moves

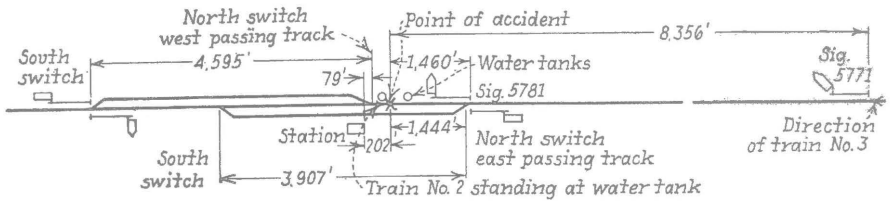
A considerable number of switching movements are made on part of the approach control section north of the crossing. The circuits are so arranged that if a train occupies section A for 50-sec., the control for this section is cut out, and the signals stop operating. This result is effected by a G.R.S. thermal relay which, after 50 sec. operation, causes stick relay Z to pick up. If the train moves back off of section A, the control system reverts to normal condition. On the other hand, if the train standing on section A proceeds toward the crossing after the time-element has operated and the stick relay has been picked up, the signals will start operation as soon as the train shunts track circuit B, which is 400 ft. long. For northbound trains the automatic cut-out is effective in section E. A separate track circuit C extends over the width of the crossing, and the controls are so arranged that the signals continue to operate until the rear of a train clears the crossing.

This installation was planned and constructed by signal forces of the Monon.

Accident in Fog

On December 17, 1936, there was a head-end collision between two passenger trains on the Louisville & Nashville at Castleberry, Ala., which resulted in the death of three employees and the injury of two passengers, one dining car employee, and four employees. This is a single-track line over which trains are operated by timetable, train orders and automatic block. A passing track is on each side of the main track at Castleberry. The accident occurred on the main track, 1,444 ft. south of the north switch of the east passing track. The three-position semaphore automatic signals involved, No. 5771 and No. 5781, are located 8,356 and 1,460 ft., respectively, north of the point of accident. Train orders calling for a meet at the siding were issued to the crews of Trains No. 2 and No. 3, which were involved in the accident.

A dense fog prevailed on the night of the accident, making it difficult for the members of the crew to identify their location, it not being possible at some points to see signal indications at a distance greater than 15 ft. Train No. 3 should have entered the north switch of the east passing track. The engineman of Train No. 3 was in normal condition and apparently understood the orders when delivered to him. On approaching Castleberry whistle signals were sounded and a service application of the air brakes was made. While the engineman of Train No. 3 may have been uncertain as to his location, due to the dense fog, the evidence indicates that he reduced the speed of his train at Sparta, only five miles north of Castleberry, in accordance with a slow order, and that he sounded a whistle signal of some kind on approaching Castleberry, and should have reduced his speed accordingly. Furthermore, Castleberry was a scheduled station stop for Train No. 3, and the fact that the accident occurred 202 ft. north of the station, while the train was running at a speed of from 30 to 50 miles per hour with the engine still using steam, indicates that the train would not have been brought to a stop until it was a considerable distance beyond the station. This, together with the fact that the train passed signal 5771 apparently displaying a yellow indication, signal 5781 displaying a red indication, and collided with Train No. 2 while traveling at a high rate of speed, would indicate that the engineman either was not aware of his location or had become physically incapacitated just prior to the accident. The Bureau of Safety, Interstate Commerce Commission, recommended that consideration be given to the need of additional protection on this line.



Track and signal plan in the vicinity of the accident at Castleberry, Ala.