

Locking Arrangement for Movable Point Crossing Frogs*

System Installed on the Central of Argentine Insures Safety With Minimum Apparatus

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THE original layout of the Retiro terminal station was arranged with 1 in 10 crossings, which proved to be unsatisfactory, as minor derailments, chiefly with two-axle covered freight cars, were numerous. To overcome this difficulty it was decided to replace the fixed crossing by movable ones.

The type adopted consisted of 20 ft. spring switches, reinforced at the nose with a ramped block, and fixed rigidly at the heel to the slip rails with block and bolts; or in the case of a crossing with no slips, to a special chair. The whole of each crossing with ties and switch gear was erected clear of the track and lifted into position with a crane. Each crossing was put in place and brought into work between the hours of 22 (10 p. m.) and 6 (a. m.).

Operating Gear

The interlocking at Retiro is the low-pressure pneumatic type. The problem to be solved was to rearrange the gear used for the operation of an ordinary pair of switch points in such a manner as to operate the movable crossings. From a signaling point of view the movable point crossing may be considered as two facing switches operating together. By putting an additional leg on the escapement crank it was possible to operate all four switch points with one pneumatic cylinder and slide.

The bolting gear was modified to take the four blades of the split stretchers, instead of two. By turning the ends of the blades outwards a short straight connection was made to each switch tongue.

The indication valve remained the same and the control valve, which is fixed on the controlling points, was sufficient for the movable crossing as well. By fitting two small scale beams on the detector, one detector was made to detect all four switch tongues.

Control of Crossing

The operating gear having now been settled, the next question for consideration was the control of this gear. On studying the question it was found that in all cases no extra lever was necessary, as one of the levers operating the points leading through the crossing could always be made to control the crossing operating gear as well. Where there was a choice the crossing operating gear was made to operate with the switch points which were not moved as often as others.

Locking Bars

Providing the track circuit did not fail, detector locking bars were not absolutely necessary, but it was decided to put them in as additional security. By extending the existing bars on the points controlling the crossing and by inserting an additional valve allowing the crossing to operate only after the controlling points had

been moved and bolted, the necessary protection could be obtained without putting bars on the operating gear for the crossing.

In Fig. 1, for example, points No. 25 control the crossing, the original bars (shown in full line) have been extended (as shown in dashed line). Points 24 was made

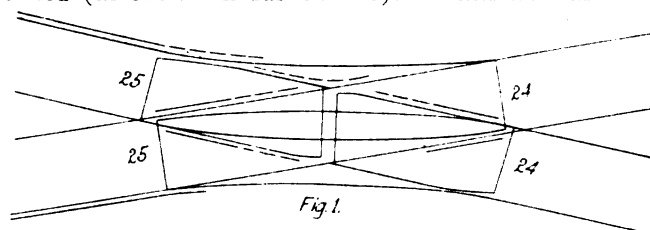


Fig. 1.

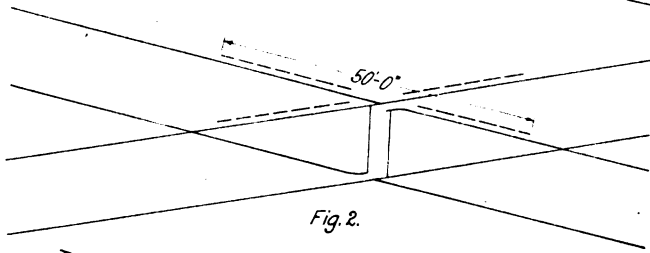


Fig. 2.

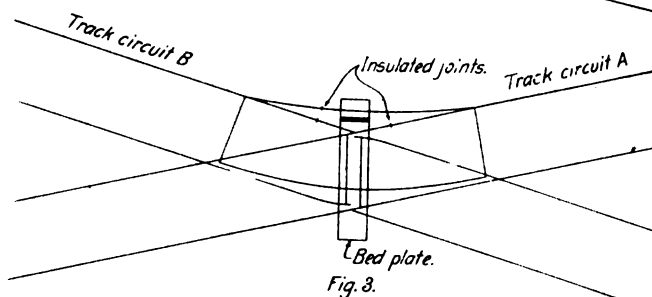


Fig. 3.

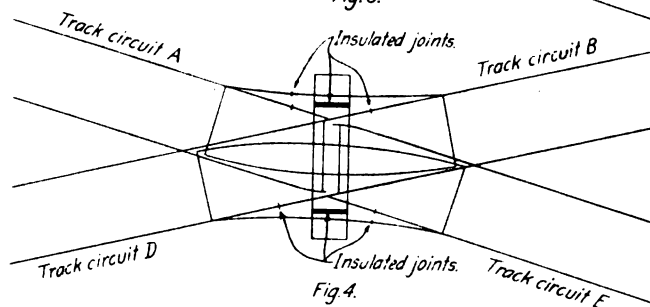


Fig. 4.

Track Diagram of Bars and Insulation

to lock points 25 in both positions and the bars on points 24 were also extended; the protection was then obtained as follows: For a train running from 25 to 24 or vice-versa with both points normal, bars prevent the crossing being moved until the train is clear. For a train running from the other end of 24 through the crossing with 25 and 24 reversed the extension of the bars on 24 prevented 24 being moved until the train was clear of the crossing

*Read before the Institute of Railway Signal Engineers.

and as 24 locks 25 in both positions, therefore 25 and the crossing could not be moved.

Figure 2 shows a crossing without slips operated by points on the other track. In this case two complete new bars had to be installed and operated by the gear operating the crossing.

Track Circuits

A short length including the crossing was cut out from the track circuit. When fixing the movable crossings, two, three or even four tracks were affected; but as the track circuits are single rail a.c. and not carried through the crossings, it was possible by insulating the bed plates, as shown in Figs. 3 and 4, and moving the insulated joint to one side of the center of the crossing, to cut out the whole of the center part of the crossing, using it as a return, and thus avoiding the trouble of insulated joints at the heel of the switch tongues.

In arranging the detector circuits it was necessary to realize that two new facing points were being dealt with and to make sure that all signals affected were taken into consideration. Before the movable crossing was put in it was not necessary for certain signals to detect points 25 as they were trailing, but with the crossing in, it became necessary to do so.

**Accident Investigations—
July, August and September**

THE Interstate Commerce Commission has issued its ninth quarterly summary of accident investigations made by the Bureau of Safety, covering the reports completed in the three months ending with September, 1921. This pamphlet, 32 pages, covers 17 accidents—seven collisions and 10 derailments—as follows:

Derailement ...	Pennsylvania	Huston Run, Pa.	July 13
Collision ...	Denver & Rio Grande	Grizzly, Colo.	July 19
Derailement ...	Delaware, Lackawanna & W.	Glenburn, Pa.	July 22
Derailement ...	New York, New Haven & H.	Chatham, Mass.	July 27
Collision ...	Central of New Jersey	Chatsworth, N. J.	July 27
Collision ...	Chic., Rock Island & Pacific	Clear Lake Jct., Ia.	July 29
Collision ...	{ Minneapolis & St. Louis	{ Perry, Iowa	July 30
	{ Chicago, Mil. & St. Paul.		
Derailement ...	New Orleans, Tex. & Mex.	Gordon, La.	Aug. 5
Derailement ...	New Orleans, Tex. & Mex.	Clear Creek, La.	Aug. 8
Collision ...	{ Toledo, St. L. & W.	{ Lerna, Ill.	Aug. 13
	{ Illinois Central		
Derailement ...	Baltimore & Ohio C. T.	Blue Island, Ill.	Aug. 20
Collision ...	Wash'n., Balt. & Annapolis	Revell, Md.	Aug. 23
Derailement ...	Denver & Rio Grande W.	Gale, Colo.	Aug. 24
Derailement ...	Delaware, Lackawanna & W.	Apalachin, N. Y.	Sept. 3
Derailement ...	Atlanta, Birm'ham & Atlantic	Cascade Cross'g, Ga.	Sept. 3
Derailement ...	Chicago and North Western	Belle Plaine, Ia.	Sept. 16
Collision ...	Pennsylvania	Gould, Ohio	Sept. 25

Following are abstracts of some of these reports:

On the Pennsylvania Railroad, near Huston Run, Pa. (Monongahela division), on July 13, a southbound freight was derailed by the emergency application of the air brakes when the train broke in two between the tender and the first car; and one car fouled on the northbound track. It was run into by northbound passenger train No. 7731, and the passenger locomotive was derailed and overturned. The engineman of this train was killed.

The trains in collision on the Denver & Rio Grande at Grizzly, Colo., on July 19, about 9:07 a. m., were westbound freight No. 65 and eastbound passenger No. 2. The trains met at a curve of eight degrees. They were moving at low speed, but the fireman of the freight was killed. Six other employees and two passengers were injured. The collision occurred between the switches of the passing track. The freight locomotive had been cut off from its train to be run forward and backed into the siding. It had right of track to do this as, by train-order No. 10, the passenger train would be two hours 40 minutes late; but train-order No. 15, which had not been delivered to the freight, allowed the passenger to run 20 minutes earlier; and the passenger had right of track to the east switch until 9:17 a. m. The inspector finds

that the dispatcher who omitted to send a copy of order No. 15 to the freight had ample time to do so; and if this had been done the freight would have had no right to the main track west of the east switch without flag protection.

The trains in collision on the Chicago, Rock Island & Pacific near Clear Lake Junction, Iowa, on July 29, were eastbound second-class freight No. 912 and westbound third-class freight No. 83. The trains met within yard limits at about 12 to 20 miles an hour and the engineman, fireman and one brakeman of train No. 83 were killed. The inspector finds that the conductor and the engineman of train No. 83 had departed from Clear Lake Junction without examining the train register; and they were encroaching on the right of an opposing superior train. It appears that an engine without train, No. 1523, had been run ahead of No. 912 as an extra, as far as Clear Lake Junction; and then from Clear Lake Junction eastward it was run as No. 912. Thus, the men of train 83 had met No. 912, but after passing Clear Lake Junction had to meet another train of the same number. The inspector also finds that if any one of the men on the engine of No. 83 had been maintaining a proper lookout, on the inside of the curve, the approach of No. 912 would have been observed in time to admit of stopping the westbound train. The eastbound engineman was deceived, for a short time, by assuming that the westbound train was on the track of the Chicago Great Western, which lies alongside the Rock Island track. Other irregularities contributed to the collision; and one flagman had made only two trips over this part of the road.

The trains in collision at Perry, Iowa, on July 30, about 6:10 a. m., were eastbound passenger No. 4 of the Minneapolis & St. Louis and westbound freight extra 8653 of the Chicago, Milwaukee & St. Paul, the passenger running into the side of the freight at the crossing of the two roads. The 22nd, 23rd and 24th cars of the freight were knocked off the track and damaged, and the passenger locomotive fell down a bank. An employee, off duty, was killed by being struck by one of the freight cars. There is no interlocking at the crossing and trains are required to stop at a stop board. The passenger train approached on a straight line, but the engineman, although he had reduced his speed at a point one mile back of the crossing, did not keep a good lookout, and reached the crossing sooner than he expected to. He said that he struck the freight at about 10 miles an hour, but the inspector thinks he was running faster. The engineman was acquainted with the road and there were landmarks, including a bridge about one-fourth mile from the crossing, which should have enabled him to determine his location with sufficient accuracy. The inspector finds that about 30 trains a day pass over this crossing on the St. Paul road and 14 trains a day on the M. & St. L.; and therefore recommends installation of an interlocking.

Trains in collision at Lerna, Ill., on August 13, were eastbound freight No. 46, second section, of the Toledo, St. Louis & Western, and northbound passenger No. 222 of the Illinois Central, the freight running into the side of the passenger at the crossing of the two roads; the crossing is at right angles. Both trains were moving very slowly. This collision occurred at about 9:50 p. m., and the passenger train had made a stop for the crossing, there being no interlocking signals. A conductor, off duty, was killed and four passengers and two mail clerks were injured. The engineman of the freight had not attempted to stop.

The collision on the Pennsylvania Railroad at Gould, Ohio, September 25, was caused by a false clear semi-automatic block signal, which was out of order by reason of grounds on controlling electric wires. This case was reported in the December *Railway Signal Engineer*.