SIGNALING AND INTERLOCKING.*

The author of this paper directed the attention of his audience to the signaling and interlocking systems of the new passenger terminal of the Chicago and North Western Railway Company.

When this structure had assumed a condition wherein the signaling system demanded a rigid comparison with pre-existing types, the three-position upper quadrant semaphore signal was adopted.

By the adoption of this type of signaling and the use of all three positions on the dwarf signals in the Lake Street or terminal plant, the company were able, with one signal, to give information of proceed, stop, and as to position of the signal ahead. This was deemed necessary for enginemen and trainmen in the safe handling of trains at reasonable speed, and results have shown the absolute safety and reliability of the practice. At Lake Street use was made of the third position on the last signals governing trains inbound into the depot to indicate that the track under the train shed is clear.

The dwarf signals (Fig. 1) are motor driven and, except at the Lake Street plant, all dwarf signals are used in two positions only, viz., horizontal and diagonal.

Inasmuch as the signaling and interlocking of a large terminal is installed as much for the acceleration of traffic as for its protection, the means of receiving and giving information and of communication is one of the important features, and was, therefore, given a great deal of attention, and in the solution of the problem almost everything was considered. The telegraph was dismissed from considera-

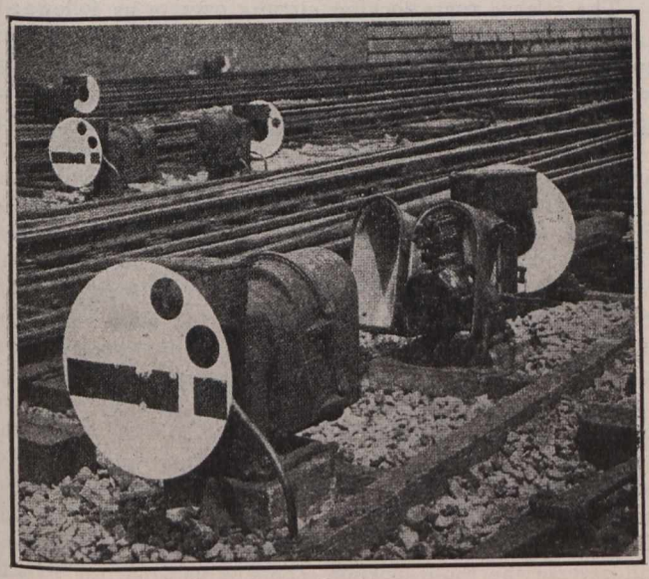

Fig. 1.

tion almost immediately, as it restricted too closely the source of supply for levermen to operate the plants and for tower directors. The various means finally adopted and used were:—

Conductors-towermen-gatemen's system of annunciators.
Telautographs.
Various forms of automatic train annunciators and indicators.
Illuminated track diagram.
Lights over levers.
Telephones.
Intercommunicating system.

* Abstracted from a paper read before the Western Society of Engineers, by J. A. Peabody.

In operating the system for through trains, the conductor pushes his butten one minute before time for his train to leave. This lights the top light on the tower director's table and the first light of the gatemen's indicators, reminding the tower director and gateman that it is nearly time for the train to leave. The tower director, if he can handle the train on time, immediately pushes his button, which action puts out the top light and lights the second one on his table, puts out the first and lights the second one at the gate, and lights the top light of the conductors' indicators. When it is time for the train to leave, the gateman closes his gates, and after waiting for the last passenger who went through the gate to get on the train or at least giving him sufficient time to do so, he pushes his button. This puts out the second light at the gate, puts out the top light and lights the lower one of the conductors' lights, and

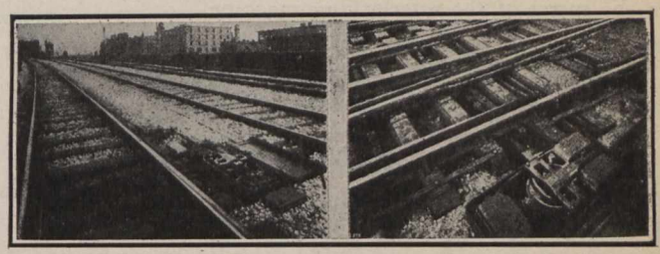

Fig. 2a. **Single Switch.**

Fig. 2b. **Double Slip Switch.**

puts out the second and lights the third of the tower directors' lights, thus advising the conductor and tower director that the train may leave. The conductor then, and not until then, gives the engineman the signal to proceed, which he does, provided the proper interlocking signal indicates that he may. The restoring of the first interlocking signal to the stop position automatically restores the system to its normal condition ready for the next move.

For giving information from one tower to another of a train move and something as to its character, a push button scheme was developed which has been named the "Intercommunicating System."

The indication on these boards is made by small telephone lamps arranged in horizontal rows and columns. The columns represent the track numbers, and the rows the various classification of trains. The boards were made to suit local conditions and are entirely of standard telephone apparatus.

The method of connecting the switch movements to the switches, movable point frogs, and derails is clearly shown in Fig. 2 a. b. The General Railway Signal Company's standard No. 4 movement was used for everything except derails, for which their standard No. 2 movement was used.

No detector bars were employed on the switches, derails, etc., of the Lake and Clinton Street plants, detector circuits only being relied on to protect against the throwing of these functions under trains. In the other three plants, where the speed of trains is on an average much higher, both detector bars and detector circuits are employed. When detector bars were not used with the No. 2 movement, a spring was applied on each movement to take its place in insuring that vibration would not operate the movement sufficiently to unlock the derails if the control circuit were broken.

The track circuits used as detector circuits were made as long as possible consistent with operating conditions, in order to cut down as much as possible the total number of track circuits required and also in a measure provide against slow-acting relays.

Continuous rail insulated joints were used. The switch rods are insulated and the switch tie plates cut so as to