lay, BX, which controls both the eastward high signal 1R1 and the westward high signal 2L1. Thus BX serves the purpose of the BE and the BW in Fig. 1. Say, for example, that signal 2L1 is to be cleared and no westward train has passed station A, or no eastward train has passed station C. When office relay BX is energized, no further action takes place until the approaching westbound train passes station A and causes relay BAE to be released. Then back contacts of that relay complete the circuit to energize relay 2L1. In other words, this is a station-to-station approach control which, of course, would already be in effect if the lever for 2L1 is not thrown to the clearing position until after the westbound train had entered the block between stations A and B.

An important point with reference to Fig. 5 is that two over-all station-to-station opposing signals cannot be cleared simultaneously, which also is true for Fig. 1. When a westbound train passes signal 1L1 at station A, signal 2L1 at station B is cleared, and at that time, when relay 2L1YGP picks up, the feed to the possible control of the eastward high signal 2R1 as well as the eastward leave-siding signal 2R2 at station C, are opened. The controls of the leave-siding and take-siding signals are the same for Fig. 5 as for Fig. 1.

Machine Indications

For use with either of the schemes, Fig. 1 or Fig. 5, a simplified form of track-occupancy indications can be used. Instead of using small lamps in the lines representing the track on the diagram, arrow indicators are suggested to show not only track occupancy but also the direction of train movements. One idea would be to have arrows pointing eastward below the line representing the track to indicate eastward moves, and arrows above the line to represent westward moves, this applying if the machine is on the north side and facing toward the track. Another idea would be to have the arrows form parts of the line representing the track. Normally the arrows would be non-illuminated. When a signal is cleared for a train movement, the corresponding arrows would be illuminated white, this control being through lever contacts. When a train occupies the route, the arrows would be lighted red.

The main line within station limits, such as track circuits BI and BG, as well as turnout track circuits BD and BJ, would be indicated on the track diagram as a unit, in other words, with any one or more of these track circuits occupied, the section as a whole would be indicated.

For example, the line relay BAW at station B is de-energized from the time that the head end of an eastbound train passes signal 2R1 at station C, until the rear passes signal 1R1 at station B. In the office, a relay, BAWP, can repeat the position of the contacts of relay BAW. Thus the control of the eastward arrows, to indicate track occupancy eastward, can be accomplished through contacts of the BAWP. Likewise, a repeater for relay CAE at station C provides a means for controlling the westward arrows.

While a westbound train is occupying track circuit BK, the office repeaters BAWP and CAEP would both be in effect, but the eastward arrows would not be lighted red because of interconnects through contacts to control eastward indications.

When the westbound arrows are lighted, a leverman should decide what signal is to be cleared at station C. As additional information, however, the equivalent of an approach annunciator can be provided. A stick relay in the office can be energized when both the CAEP and the BAWP relays are controlled by the CAE and BAW relays de-energized. Using these positions of these relays a stick relay is energized.

Then the stick is held up through CAEP. The BAWP operates when the rear of the westward train clears track circuit 4A. Therefore, the annunciator indication that a westward train is approaching station C can be controlled through the stick up and BAWP in its position which repeats BAW energized. Cut-outs to prevent the appearance of this approach indication for an eastward train are obvious, because, for example, BAW is dropped before CAE is released. For all practical purposes, this arrangement gives information of the progress being made by trains, and of approach to stations.

A conclusion is, that track-occupancy indications can be controlled by three relays in the office, BAWP, CAEP and BP, the latter to be operated when any one or more of the track circuits BD, BG, BI or BJ is occupied. The track-occupancy indications give information of the arrival and the departure of trains, at passing tracks, and also show direction for moves on *all* portions of the main line between passing tracks and, in addition, the approach of trains toward stations is provided.

Indications on the control machine to show when a signal has cleared are not absolutely necessary, but can be provided. For example, a relay, BQ at station B, could be operated when any one of the six signals is cleared. In the office, a circuit through contacts of BQP repeater relay could control a circuit through lever contacts to light a lamp in the symbol of the signal corresponding with that of the lever position. No two signals at a passing track can be cleared at any one time, and, therefore, the signal repeater indication on the machine is "actual."

OPEN FORUM

This column is published to encourage interchange of ideas on railway signaling subjects. Letters published will be signed with the author's name, unless the author objects. However, in order to encourage open discussion of controversial matters, letters may be signed with pen names at the request of the author. In such instances, the correspondent must supply the editor with his name and address as evidence of good faith. This information will not be disclosed, even on inquiry unless the correspondent consents.

Simplified Signaling

Cincinnati, Ohio
March 22, 1941

To the Editor:

I am glad to see your editorial on "A Simplified Signaling Arrangement" beginning on page 136 of the March issue.

It should have a good effect in bringing people, who have gone "crazy" about unnecessary features on centralized traffic control, back to their senses. The manufacturer is somewhat helpless in this regard because if he refuses to give the customer a lot of "stuff" he wants to pay for, but does not need, he is apt to lose business.

To cure this, the railroad people themselves must start thinking, and also analyzing what they need, rather than what they think they need. The difference is enormous in dollar value and, in many instances, is just enough to "sink" a proposed centralized traffic control installation, which many times could be made almost as cheaply as Absolute Permissive Block. As you have pointed out, the simplified arrangement of semi-automatic signals surely does overcome all of the shortcomings of Absolute Permissive Block, particularly in light of the Interstate Commerce Commission requirements.

I hope you will keep on "pounding" on this matter.

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