the ordinary interlocking. However, it is possible to provide release locking for the master lever so that the route may be changed after a train has cleared the crossing, but still occupies the interlocking. The simplest way to accomplish this is through the use of route and release detector locking by means of directional selecting relays, such as is used for the release of switches.

Chicago. E. A. THOMAS,
Chief Signal Inspector, Pennsylvania.

When Derails Are Removed the Signal Levers Should Lock Mechanically

WE have installed interlocking plants or what might be termed traffic plants without derail protection, having switches and signals only. In such plants the switch levers, mechanically lock the signal levers in the normal position for all signals governing over conflicting routes. In plants where derails would be removed the locking performed by derail levers would be accomplished by the signal levers mechanically. I have had no instance where there was any necessity for locking signal levers normal by the use of an electric lock for this purpose. I am not able to give you any definite idea as to what I would do without knowing more of the actual layout of track and traffic conditions. Off-hand I would say that probably all necessary locking could be accomplished mechanically and it should not be necessary to lock signal levers normal electrically.

Springfield, Mo. I. A. UHR,
Signal Engineer, St. Louis-San Francisco.

Another A.P.B. Circuit Explanation

"How are single track signals controlled so as to discriminate between opposing and following trains?"

Simplified Written Circuits are Given for One Set of Signals Only With a Clear Description of the Stick Relay Directional Control Feature

IN an effort to make simplicity the keynote I have not attempted to describe any particular single-track signal system, but instead I have endeavored to bring out the safety features of absolute permissive block signaling so that a person with a comparatively limited knowledge of railway signaling practice could understand it. For this reason I have left out all details and refinements not essential to the understanding of the system. In general two main problems must be solved in the directional control of single-track signals, first, the prevention of train movements in a direction opposite to that of the trains entering the single-track territory and second, the provision of means for a second train to follow the first train with signal protection, the second train moving in the same direction as the first train.

Fig. 1

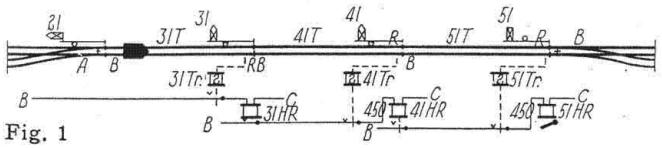
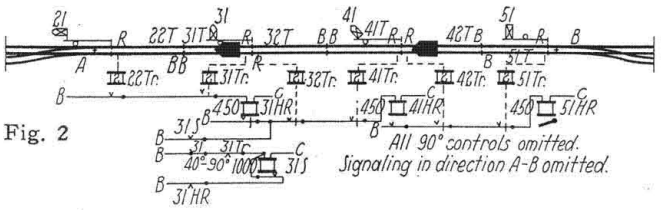


Fig. 2



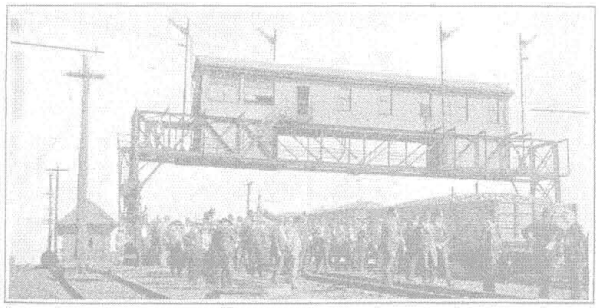
Written circuits for single-track A. P. B. signaling—For simplicity only one set of signals are shown

Problem 1 (*See Fig. 1*). Prevention of opposing moves is accomplished by cascading the home control relays of the signals so that as soon as a train enters single track in the direction *A* to *B* home relay *31HR* on the first opposing signal (No. *31*) is de-energized, due to track relay *31TR* dropping. Home relay *31HR* dropping opens the circuit of home relay *41HR* and *41HR* in turn opens the circuit of home relay *51HR*, in this manner dropping all the home relays and putting the signals to stop all the way through to the end of the single track. A single track block system could be operated in this manner, but would have the disadvantage that signals behind a train would remain at stop, thereby preventing one train following another. It is, therefore, imperative that means be provided to clear the signals behind the train so that following moves can be effected.

Problem 2 (*See Fig. 2*). Provision for following moves in the direction *B* to *A* is accomplished by taking steps to pick up the home relay of the signal behind the one governing the block occupied. To do this the track circuit is cut in two sections of approximately equal length and battery is fed from the center toward both ends. When the first train passes signal *31* in the direction *B* to *A*, stick relay *31S* is picked up through a contact on the signal circuit breaker which is closed in the 90 to 40 deg. position of the signal and track relay *31TR* down. This will occur only when the train is moving from *B* to *A*, as when the train is moving from *A* to *B* signal *31* will assume the stop position when the train hits track circuit *22T*, and *31TR* will not drop until some time after the signal has assumed the stop (or zero degree) position, and this will prevent the stick relay from picking up. Thus it will be seen that the stick relay is picked up for a movement in one direction (following movement only) but does not pick up for a move in the reverse direction. When the stick relay is picked up a front contact on the stick relay bypasses the contact on relay *31HR* which is open due to relay *31TR* being down, and feeds positive battery back on the line, picking up relay *41HR* and permitting signal *41* to assume the caution position for a following train. The stick relay will stay picked up as long as relay *31HR* is down, that is until train passes signal *21* entirely.

It is thus seen that a train moving in a direction *A* to *B* puts signals *31, 41, 51* to stop for opposing moves, while a train moving in a direction *B* to *A* will pick up the bypassing stick relays and allow another train to follow. Another complete set of signals, of course, would be necessary in the direction *A* to *B* and all signals must be wired with a stick relay like the one at signal *31*, but for the sake of simplicity these and all 90 deg. controls are omitted.

Cincinnati, Ohio. OSCAR E. MILLER,
Circuit Engineer, Big Four.



Hump yard switching tower on bridge