

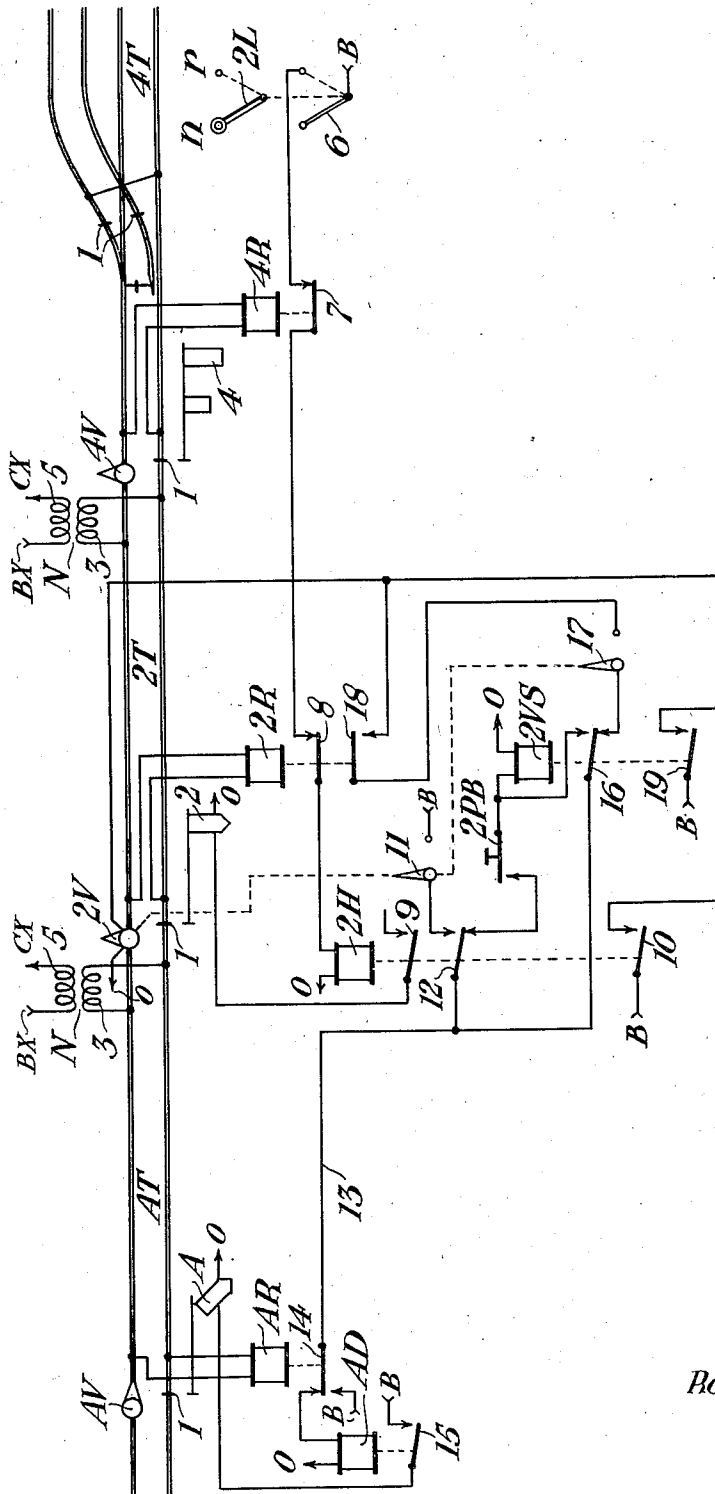
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RAILWAY TRAFFIC CONTROLLING APPARATUS

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RAILWAY TRAFFIC CONTROLLING
APPARATUS

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My invention relates to railway traffic controlling apparatus, and particularly to apparatus of the type comprising train control devices located in a trackway and adapted to cooperate with train-carried governing means. More specifically, my invention relates to apparatus for the control of a tripper arm train stop located adjacent an approach signal for an interlocking plant.

In one arrangement which has previously been used, a device is provided for manually "keying by" a tripper arm train stop when it is found to be in the tripping position and the adjacent signal indicates stop. With this scheme, the conductor alights from his car or train and holds a control device in a given position for clearing the train stop and retaining it in that position while it is being passed by the car or train.

In another arrangement which has also previously been used, provision is made for automatically clearing a train stop if a car or train passes it slowly, that is, at a speed of the order of 5 miles per hour, for example. In this scheme, the train stop is located a few feet beyond the entrance end of the associated track section, and the train stop is cleared by a circuit controlled by a back contact of the track relay for this track section.

One feature of my invention is the provision of a stick relay having a pick-up circuit controlled in part by a manual control device which may be operated by the motorman when he has stopped his car or train. The train stop will then be cleared by a circuit controlled by the stick relay. The stick relay will be retained in the energized condition by a stick circuit, and the motorman can therefore proceed to operate his car or train past the train stop.

I shall describe one form of apparatus embodying my invention, and shall then point out the novel features thereof in claims.

The accompanying drawing is a diagrammatic view showing one form of apparatus embodying my invention.

Referring to the drawing, a stretch of railway track is shown divided by insulated joints 1 into sections AT, 2T, and 4T, over which traffic movements toward the right, as shown in the drawing, which I shall assume is the eastbound direction, are governed by an interlocking signal designated by the reference character 4, by an approach signal designated by the reference character 2, and by a distant signal designated by the reference character A, and also by tripper arm train stops 4V, 2V and AV located adjacent signals 4, 2 and A, respectively. The signals, as shown in

the drawing, are of the semaphore type, but may be of any other suitable design.

Each of the track sections is provided with a track circuit including a suitable source of current such, for example, as a transformer N having a secondary winding 3 connected across the rails adjacent one end of the track section, and a track relay connected across the rails adjacent the opposite end of the section and designated by the reference character R preceded by a reference character corresponding to the reference character which precedes the reference character T for the same track section. Each track transformer has a primary winding 5 which is energized from a suitable source of alternating current such, for example, as a power supply line having terminals BX and CX.

A signal relay 2H is controlled by a manually operable control device 2L having a normal position *n* and a reverse position *r*, and by track relays 2R and 4R, for controlling signal 2.

A distant relay AD, controlled by relay 2H and also by relay AR and by train stop 2V over a circuit including a given line conductor 13, controls operation of signal A from the caution to the proceed position.

A stick relay 2VS has a pick-up circuit controlled by a manually operable device such, for example, as a spring push button 2PB located adjacent signal 2, and also controlled by back contacts of relays AR and 2H, and including the given line conductor 13. A stick circuit for relay 2VS also includes line conductor 13.

Train stop 2V has two clearing circuits for operating it from the tripping position to the non-tripping or clear position. One of these clearing circuits is controlled by signal relay 2H, and the other is controlled by stick relay 2VS. A retaining circuit for stop 2V is controlled by back contacts of relays AR, 2VS and 2R, and also includes line conductor 13.

As shown in the drawing, all parts are in the normal condition, that is, the stretch of track is unoccupied and hence track relays AR, 2R and 4R are energized; signal 4 is indicating stop; manual device 2L is in its normal or *n* position, and hence signal 2 is indicating stop; train stop 2V is in the tripping position; signal A is indicating caution; and relays 2H, AD and 2VS are deenergized.

I shall assume that a leverman closes a circuit for energizing relay 2H by moving the manual device 2L from its normal position *n* to its reverse position *r*. The circuit thus completed for energizing relay 2H passes from terminal B

of a suitable source of current, through contact 6 of device 2L, contacts 7 and 8 of relays 4R and 2R, respectively, and the winding of relay 2H to terminal O of the same source of current. With relay 2H energized, the arm of signal 2 is operated to a corresponding control position, by a circuit including contact 9 of relay 2H, for directing traffic movements into section 2T. Also, with relay 2H energized, train stop 2V is operated to its non-tripping position by a circuit passing from terminal B, through contact 10 of relay 2H, and the mechanism of stop 2V to terminal O.

Upon completion of the operation of train stop 2V to the non-tripping position, a circuit is completed for energizing relay AD, this circuit passing from terminal B, through contact 11 of stop 2V, front point of contact 12 of relay 2H, conductor 13, front point of contact 14 of relay AR, and the winding of relay AD to terminal O. With relay AD energized, the arm of signal A will be operated to the proceed position by a circuit passing from terminal B, through contact 15 of relay AD, and the mechanism of signal A to terminal O.

If a train now passes signal A and enters section AT, relay AR will become deenergized, causing relay AD to become deenergized, which in turn causes the arm of signal A to be returned to the caution position.

The train, upon proceeding further and passing signal 2, will deenergize relay 2R, thereby completing a retaining circuit for train stop 2V, this circuit passing from terminal B, through the back point of contact 14 of relay AR, line conductor 13, back point of contact 16 of relay 2VS, contact 17 of train stop 2V, contact 18 of relay 2R, and the mechanism of train stop 2V to terminal O. Relay 2R, upon becoming deenergized, deenergizes relay 2H which thereupon opens its contact 9, causing signal 2 to return to the stop position. Relay 2H, upon becoming deenergized, opens the operating circuit for train stop 2V previously traced through contact 10 of relay 2H.

When the train leaves section AT, relay AR will become energized, thereby opening at the back point of its contact 14, the retaining circuit previously traced for train stop 2V, and hence train stop 2V will be returned to the tripping position.

I shall next assume that, while relay 2H is deenergized, as by relay 2R or 4R being deenergized, a second car or train enters section AT and stops at signal 2 on account of this signal indicating stop and train stop 2V occupying the tripping position.

The motorman can now effect energization of relay 2VS by depressing push button 2PB, thereby completing the pick-up circuit for relay 2VS passing from terminal B, through the back point of contact 14 of relay AR, conductor 13, back point of contact 12 of relay 2H, contact of device 2PB, and the winding of relay 2VS to terminal O. Relay 2VS, upon becoming energized, completes its own stick circuit passing from terminal B, through the back point of contact 14 of relay AR, conductor 13, front point of contact 16 of relay 2VS, and the winding of relay 2VS to terminal O. Relay 2VS, upon becoming energized, completes a second operating circuit for train stop 2V passing from terminal B, through contact 19 of relay 2VS, and the mechanism of stop 2V to terminal O. Train stop 2V

will therefore be operated to the non-tripping position.

When the car or train leaves section AT, the stick circuit traced for relay 2VS will be opened at the back point of contact 14 of relay AR. The circuit for stop 2V including contact 19 of relay 2VS will therefore be opened, causing stop 2V to be returned to the tripping position.

I shall now assume that the train proceeds through the stretch of track shown, and that all parts of the apparatus are again returned to the normal condition, and that the leverman again clears signal 2 and train stop 2V. I shall further assume that a train then enters section AT and that the leverman desires to stop the train at signal 2. He will therefore move lever 2L from its *r* position back to the *n* position, thereby deenergizing relay 2H and causing signal 2 to return to the stop position. Deenergization of relay 2H also opens the operating circuit for train stop 2V which includes contact 10 of relay 2H, thereby causing train stop 2V to be returned to the tripping position.

Although I have herein shown and described only one form of apparatus embodying my invention, it is understood that various changes and modifications may be made therein within the scope of the appended claims without departing from the spirit and scope of my invention.

Having thus described my invention, what I claim is:

1. In railway traffic controlling apparatus for a stretch of railway track divided into a first section and an approach section, including a signal and a train stop for governing traffic movements from said approach section into said first section, including a first relay responsive to traffic in said first section, including an approach relay responsive to traffic in said approach section, and including a signal relay controlled by said first relay and by a manual control device for controlling said signal, the combination comprising, a stick relay, a second manual control device, a pick-up circuit for said stick relay controlled by said second manual control device and by back contacts of said approach and signal relays, a stick circuit for said stick relay controlled by a back contact of said approach relay, circuit means controlled by a front contact of said signal relay in multiple with a front contact of said stick relay for clearing said train stop, and a circuit controlled by back contacts of said stick relay and said first relay and said approach relay for retaining said train stop in the clear condition.

2. In railway traffic controlling apparatus for a stretch of railway track divided into a first section and an approach section, including a signal and a train stop for governing traffic movements from said approach section into said first section, including a first relay responsive to traffic in said first section, including an approach relay responsive to traffic in said approach section, and including a signal relay for controlling said signal, the combination comprising, a stick relay, a manual control device, a pick-up circuit for said stick relay controlled by said manual control device and by back contacts of said approach and signal relays, a stick circuit for said stick relay controlled by a back contact of said approach relay, and a circuit controlled by a front contact of said stick relay for clearing said train stop.

3. In railway traffic controlling apparatus for

a stretch of railway track divided into a first section and an approach section, including a train stop for governing traffic movements from said approach section into said first section, including a first relay responsive to traffic in said first section, including an approach relay responsive to traffic in said approach section, the combination comprising, a manually controllable relay, a stick relay, a manual control device, a pick-up circuit for said stick relay controlled by said manual control device and by back contacts of said approach and manually controllable relays, a stick circuit for said stick relay controlled by a back contact of said approach relay, means controlled by a front contact of said stick relay for clearing said train stop, and means controlled by back contacts of said stick relay and of said approach and first relays for retaining said train stop in the clear condition.

4. In railway traffic controlling apparatus for a stretch of railway track divided into a first section and an approach section, including a signal and a train stop for governing traffic movements from said approach section into said first section, including a manually controlled signal relay for controlling said signal, including an approach relay responsive to traffic in said approach section, including a given control conductor, and including a distant signal for said first signal, the combination comprising, a control circuit for said distant signal which includes said given control conductor and front contacts of said approach and signal relays, a stick relay, a manual control device, a pick-up circuit for said stick relay including said given control conductor and said manual control device and also back contacts of said approach and signal relays, a stick circuit for said stick relay controlled by a back contact of said approach relay, and means controlled by a front contact of said stick relay for clearing said train stop.

5. In railway traffic controlling apparatus for a stretch of railway track divided into a first section and an approach section, including a signal

and a train stop for governing traffic movements from said approach section into said first section, including a manually controlled signal relay for controlling said signal, including an approach relay responsive to traffic in said approach section, including a given control conductor, and including a distant signal for said first signal, the combination comprising, a control circuit for said distant signal which includes said given control conductor and front contacts of said approach and signal relays, a stick relay, a pick-up circuit for said stick relay controlled by back contacts of said approach and signal relays, a stick circuit for said stick relay including said given control conductor and a back contact of said approach relay, and means controlled by a front contact of said stick relay for clearing said train stop.

6. In railway traffic controlling apparatus for a stretch of railway track divided into a first section and an approach section, including a signal and a train stop for governing traffic movements from said approach section into said first section, including a manually controlled signal relay for controlling said signal, including an approach relay responsive to traffic in said approach section, including a given control conductor, and including a distant signal for said first signal, the combination comprising, a control circuit for said distant signal which includes said given control conductor and front contacts of said approach and signal relays, a stick relay, a manual control device, a pick-up and a stick circuit for said stick relay each including said given control conductor and a back contact of said approach relay and said pick-up circuit also including said manual control device and a back contact of said signal relay, clearing circuit means for said train stop including a front contact of said stick relay in multiple with a front contact of said signal relay, and a circuit for retaining said train stop in the clear condition including said given control conductor and back contacts of said approach and stick relays.

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