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ANNUNCIATING AND INDICATING
APPARATUS

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My invention relates to annunciating and indicating apparatus, and is particularly adapted for use in centralized traffic control systems for railroads.

In systems of this character, it is the practice to provide a track diagram at the control office comprising a representation of the controlled stretch of track, and to provide lamps in the various track sections of the diagram which are lighted by remote control to visually indicate the progress of trains through the stretch, together with annunciating means comprising a single stroke bell or the like for audibly indicating when a train enters certain of the sections.

The object of my invention is to provide an improved arrangement of circuits for controlling an audible signal device of this character in accordance with traffic conditions in the controlled territory in such a manner as to cause the device to sound selectively, preferably only when some action is required by the operator to control traffic movements as a result of a train entering or leaving a particular track section. In the arrangements as used heretofore it has been found that the operator may become so accustomed to the frequent sounding of an audible signal device under conditions when no action is required that he is likely to become unaware of its operation, and as a consequence the purpose for which the bell is provided is not attained.

One feature of my invention is the provision of means for causing an audible signal device to sound when a train enters an approach section, but only if the train is approaching a railway signal at stop, but which must be cleared by the operator to permit the continued movement of the train. That is to say, the audible signal device does not sound if the operator has already cleared the railway signal, or if the train is moving in the opposite direction and enters the approach section from the end adjacent the railway signal.

Another feature of my invention is the provision of means for causing the audible signal device to sound when a train vacates a route including a manually controlled track switch provided there is a train on an adjoining track awaiting the clearing of a railway signal governing its movement over a conflicting route including the switch.

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

In the accompanying drawing, the track plan at the top represents a typical portion of a single track railroad including a passing siding, having

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a centrally controlled track switch and group of signals at each end. The stretch is divided into sections as shown, each provided with a track circuit identified by the reference character T with a distinguishing prefix, each section having a normally energized track relay TR. When a train occupies any of the sections, section 2RT for example, the track relay 2RTR for the occupied section releases and the corresponding indication relay, such as the relay 2RAK located at the control office, becomes energized and by closing its front contact b effects the lighting of a lamp 2RAE in the corresponding section of a miniature track diagram, as shown in the lower portion of the view, the successive lighting of the lamps indicating the progress of a train through the stretch to the control operator.

The track switches 1W and 5W are controllable manually from the office under proper traffic conditions by the operation of the switch levers 1 and 5. The group of signals 2RA, 2RB, 2LA and 2LB which govern traffic movements over the switch 1W in its normal and reverse positions, respectively, are controlled by a three position signal lever 2, and the similar signals 6LA, 6LB, 6RA and 6RB are controlled by another signal lever 6. When a signal is cleared a signal repeating relay, such as the relay 2RGP or 2LGP, releases to energize a corresponding signal indication relay at the office, such as the relay 2RHK or 2LHK, to light a lamp 2RE or 2LE associated with the lever and to extinguish the lamp 2NE which when lighted indicates that all of the signals of the corresponding group stand at stop.

The remote control of the switches and signals may be accomplished either by the provision of direct wire connections such as those shown for energizing the indication relays K, or the controls may be effected by means of a remote control system of the code type, such as is shown in the Lewis Letters Patent of the United States No. 2,229,249, issued Jan. 21, 1941. In the latter case the indication relays K are to be understood to be controlled intermittently by codes transmitted over a line circuit, and to be held locally in their last operated position during the intervals between codes, as described in this patent.

The approach indication relays 2RAK and 5LAK each have a contact c of the make-before-break type arranged to close a circuit momentarily when the relay picks up but under no other condition, for energizing a bell relay AP to thereby operate a single stroke bell A, as described in the Agnew Letters Patent of the United States No. 2,206,556, issued July 2, 1940.

In accordance with my invention, contacts of other indication relays are included in these circuits in order to effect the selective operation of the audible signal device, as will now be described. When a train moving from left to right enters section 2RT, relay 2RTR releases, energizing the office indication relay 2RAK, and if signals 2RA and 2RB are at stop with section 1T unoccupied, so that relays 2RHK and 1TK are released, a circuit is closed momentarily from one terminal B of a suitable local source of current at contact c of relay 2RAK over contacts c of relays 2RHK and 1TK through relay AP to the other terminal C of the same source, so that relay AP is momentarily energized to close its contact a and thereby sound the bell A. This calls the operator's attention to the fact that he must clear signal 2RA or 2RB to permit the further progress of the train. In the event he has already cleared the signal, relay 2RHK will be energized and the circuit for relay AP will be open at contact c of relay 2RHK. Relay 2RAK also becomes energized when a train moving from right to left enters section 2RT, but in this case the train also occupies section 1T and relay 1TK is energized, and bell A will not sound because the circuit for relay AP is open at the back contact c of relay 1TK.

The bell circuit controlled by relay 6LAK is similar, and is closed to sound bell A only when a train enters section 6LT from the right, with signals 6LA and 6LB at stop, being open at contact c of relay 6LHK when one of these signals is at clear, and at contact c of relay 5TK if the train which enters section 6LT is moving from left to right and consequently occupies section 5T at the time.

The track section 4AT serves as an approach section for the two leaving signals 2LA and 6RA at the opposite ends of that section and the indication relay 4ATK has two make-before-break contacts d and e. If a train enters section 4AT from the left, relay 1TK will be energized at the time to prevent the closing of the circuit including its back contact c and contact e of relay 4ATK, and the circuit including contact d of relay 4ATK will be closed to sound the bell A only if signal 6RA is at stop so that contact d of relay 6RHK is closed. Similarly, if the train enters section 4AT from the right, contact c of relay 5TK will be open, rendering the circuit controlled by contact d ineffective, and the one controlled by contact e of relay 4ATK will be closed to sound the bell A only if signal 2LA is at stop so that contact d of relay 2LHK is closed.

It will be seen, therefore, that the bell A is controlled by each of the approach sections 2RT, 4AT and 6LT in such a manner that it is caused to sound only in the event the signal which the train is approaching is at stop, requiring action by the operator in order to enable the train to proceed.

A further condition under which the circuits of my invention are useful is when the siding serves as a meeting point for two opposing trains. Assume for example, that a train is moving from left to right on the main track through sections 1T and 4AT, and an opposing train is standing on the siding, in section 4BT. When the main line train vacates section 1T, switch 1W is free to be operated to reverse, and then signal 2LB may be cleared for the opposing train.

The departure of the train from section 1T is announced to the operator in response to the release of the indication relay 1TK in the following

manner: When relay 1TK releases, it completes a circuit from terminal B at its back contact a for energizing a slow pick-up relay 1TKP, but before relay 1TKP picks up, a circuit is closed momentarily over its back contact a and over the front contacts c of relays 4ATK and 4BTK through relay AP to terminal C, to energize relay AP and thereby operate the bell A. It follows that the bell A sounds when a train vacates section 1T, provided sections 4AT and 4BT are both occupied. The bell is also caused to sound when the train moving from right to left into the siding vacates section 5T, provided this occurs after the train moving from left to right has entered section 4AT. In this case, when relay 5TK releases to energize relay 5TKP, it closes a circuit momentarily from terminal B over back contacts a of relays 5TK and 5TKP, and front contacts c of relays 4ATK and 4BTK through relay AP to terminal C. In the first example, the sounding of bell A announces to the operator that he should reverse switch 1W and should clear signal 2LB, and in the second example, that he should restore switch 5W to normal and should clear signal 6RA. When the relative directions of movement of the two trains is the opposite to that described, the circuits serve to announce to the operator when it is proper to operate the switches and to clear signal 6RB or 2LA, respectively, as will be readily apparent.

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. Train annunciating apparatus for indicating traffic movements in a stretch of railway track comprising, a first and a second track section in said stretch, a signal for governing the movement of traffic from said first section to the second section, a track indication relay for indicating the condition of occupancy of said first track section, a signal indication relay for indicating the position of said signal, an audible signal device, and a circuit for energizing said device controlled by said indication relays including a contact closed momentarily by said track indication relay when a train enters said first track section and a contact closed by said signal indication relay only when the signal is in its stop position.

2. Train annunciating apparatus for indicating traffic movements in a stretch of railway track comprising, a first and a second track section in said stretch, a signal for governing the movement of traffic from said first section to the second section, a track indication relay for each section for indicating the occupancy of such section, a signal indication relay for indicating the position of the signal, an audible signal device and a circuit for energizing said device controlled by said relays including a contact closed momentarily by the indication relay for the first section when a train enters said first section, a contact closed by the indication relay for the second section only when said second section is unoccupied, and a contact closed by the signal indication relay only when the signal is in its stop position.

3. In combination with a stretch of railway track including a detector section and two approach sections one at each end of said detector

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section, an indication relay for each section responsive to the presence of a train in such section, an audible signal device, and circuits controlled by said indication relays for briefly energizing said device once for each train movement through the stretch including contacts of the make-before-break type controlled by each approach section relay which close momentarily when a train enters the corresponding approach section, and in series therewith a contact controlled by the detector section relay which is closed only when the detector section is unoccupied.

4. In combination with a detector section of railway track including a track switch operable to normal or reverse to form routes leading to a first track section or to a second track section, an indication relay for each section responsive to the presence of a train therein, an audible signal device, and a circuit for briefly energizing said device closed momentarily by the detector section relay when a train vacates the detector section said circuit including contacts closed by the other indication relays indicating that both said first track section and said second track section are occupied.

5. In combination with a detector section of railway track including a track switch operable to normal or reverse to form routes leading to a first track section or to a second track section, an indication relay for each section responsive to

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the presence of a train therein, an audible signal device, and means for momentarily sounding said device in response to the operation of said detector section indication relay when a train passes from said detector section to said first track section, and means controlled by the indication relay for said second section for preventing the operation of said device in response to said train movement unless said second track section is also occupied by a train.

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