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RAILWAY TRAFFIC CONTROLLING APPARATUS

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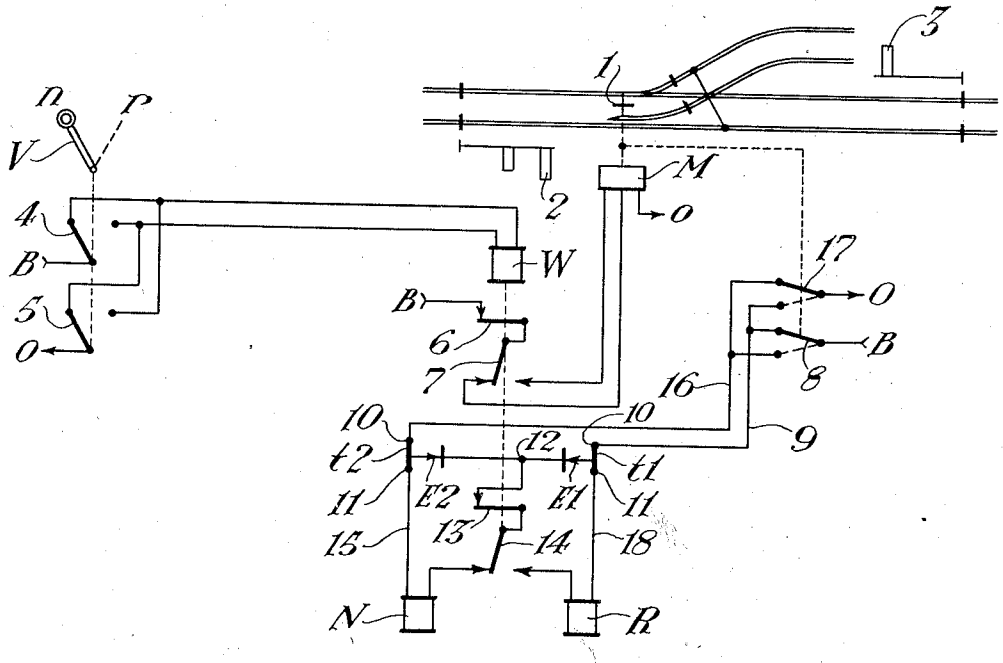

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RAILWAY TRAFFIC CONTROLLING APPARATUS

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My invention relates to railway traffic controlling apparatus, and particularly to apparatus of the type such, for example, as indication means controlled in conjunction with operations of a railway track switch to its normal and reverse positions.

In various switch indication control schemes, it is common practice to use a polarized indication relay, either alone or with one or two neutral indication relays controlled at least in part by the polarized relay as shown, for example, in applications for Letters Patent of the United States, Serial Nos. 424,151 and 465,183, filed December 23, 1941, and November 11, 1942, respectively, by Arthur E. Dodd for Electrical control apparatus, now Patents No. 2,324,200 and No. 2,351,495, dated July 13, 1943, and June 13, 1944, respectively.

One feature of my invention is the provision of an arrangement in which a normal and a reverse indication relay are operated directly from the switch indication control conductors through asymmetric units and through a normal and a reverse contact respectively of a switch control relay.

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 track switch is shown designated by the reference character 1, over which traffic movements in opposite directions are governed by signals designated by the reference characters 2 and 3, respectively. Switch 1 is operable between the normal position, in which it is shown in the drawing, and the opposite or reverse position by a suitable mechanism M which is controlled by a polarized switch control relay W.

Relay W may in turn be controlled by any suitable manual device such, for example, as a switch control lever V, which has a normal position *n*, in which it is shown in the drawing, and a reverse position *r*. Lever V, when moved from either of these two positions to the other, operates a pair of pole changing contacts 4 and 5 for effecting energization of relay W by current of one polarity or the other.

Operated in conjunction with switch 1, is a pair of pole changing contacts 8 and 17 for reversibly connecting a source of direct current having positive and negative terminals, designated by the reference characters B and O, respectively, across a pair of indication control conductors 9 and 16. By this arrangement, current of what I shall term normal polarity is supplied to conductors 9 and 16 when switch 1 is operated to its normal position, and current of the opposite or reverse polarity is supplied to conductors 9 and 16 when switch 1 is operated to the reverse position.

Two asymmetric units, which may be of the well-known copper oxide half-wave rectifier type, designated by the reference characters E1 and E2 and having a common terminal point 12, are connected in series with each other across conductors 9 and 16, but are poled in opposite directions to pass current of normal or reverse polarity, respectively. These asymmetric units have terminal plates, designated by the reference characters *t1* and *t2*, respectively, each of which has a first terminal point 10 and a second terminal point 11. The Dodd application Serial No. 424,-151 to which I have already referred, shows, in Fig. 4, and describes asymmetric units provided with terminal plates having two terminal points.

Normal and reverse indication relays N and R, respectively, are connected in branch paths around around asymmetric units E2 and E1, respectively, through a polar contact 14 of relay W in its normal and reverse positions, respectively.

As shown in the drawing, all parts are in the normal condition, that is, lever V is in its normal position *n*, and hence relay W is energized by current of normal polarity in a circuit passing from terminal B, through contact 4 of lever V, winding of relay W, and contact 5 of lever V to terminal O. Contact 7 of relay W is therefore closed in the normal position in the normal operating circuit for switch mechanism M, and hence switch 1 is in the normal position.

With switch 1 in its normal position and with relay W energized by current of normal polarity, a circuit is closed for energizing relay N, passing from the terminal B, through contact 8 of switch 1 in the normal position, conductor 9, terminal point 10 of plate *t1*, unit E1, terminal point 12, contact 13 of relay W, contact 14 of relay W closed in the normal position, winding of relay N, conductor 15, terminal points 11 and 10 of plate *t2*, conductor 16, and contact 17 of switch 1 closed in the normal position, to terminal O.

I shall assume that the leverman decides to reverse switch 1. He will, therefore, move lever V to the *r* position, thereby reversing contacts 4 and 5 and so causing relay W to be energized by

current of reverse polarity. Mechanism M will therefore be energized, for operating switch 1 to the reverse position, by its circuit passing from terminal B, through contact 6 of relay W, contact 7 of relay W closed in the reverse position, and mechanism M to terminal O. Upon the energization of relay W by current of reverse polarity, relay N becomes deenergized because of the opening of contact 14 of relay W in the normal position. Upon the completion of the operation of switch 1 to its reverse position, contacts 8 and 17 of switch 1 will be closed in their reverse positions, and hence a circuit will be completed for energizing relay R, this circuit passing from terminal B, through contact 8 of switch 1 in the reverse position, conductor 16, terminal 10 of plate *t2*, unit E2, terminal point 12, contact 13 of relay W, contact 14 of relay W closed in the reverse position, winding of relay R, conductor 18, terminals 11 and 10 of plate *t1*, conductor 9, and contact 17 of switch 1 closed in the reverse position to terminal O.

With conductors 15 and 16 connected to separate terminals of plate *t2* in the normal indication circuit, relay N would be deenergized if either of these conductors should become disconnected from plate *t2* of unit E2. If, on the other hand, conductors 15 and 16 were connected to the same terminal of plate *t2*, it might be possible for both these conductors to become disconnected from plate *t2* of unit E2 and at the same time connected with each other so that relay N might remain energized. Relay R is similarly prevented from remaining energized if either conductor 9 or 13 should become disconnected from plate *t1* of unit E1.

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 normal and reverse indication means for a railway track switch the operations of which to normal and reverse positions are effected by normal and reverse contacts respectively of a manually controlled polarized relay, including a pair of indication conductors to which current of normal or reverse polarity is supplied according as the switch is controlled to occupy its normal or its reverse position respectively, including a normal and a reverse indication relay, the combination comprising, a first and a second asymmetric unit connected in series with each other across said pair of conductors but poled in opposite directions, a branch path connected around the first asymmetric unit including a normal contact of said polarized relay in series with said normal indication relay, and a second branch path connected around the second asymmetric unit including a reverse contact of said polarized relay in series with said reverse indication relay.

2. In indication means controlled by railway traffic governing apparatus, said apparatus being capable of being put into a first or a second governing condition by means controlled by normal and reverse contacts respectively of a given manually controllable device, including a pair of indication control conductors to which current of normal or reverse polarity is supplied according as the traffic governing apparatus is in the first or second governing condition respectively, including a first and a second indication device, the combiation comprising, a first and a second asymmetric unit connected in series with each other across said pair of conductors but poled in opposite directions to pass current of normal or reverse polarity respectively, a circuit for controlling said first indication device including a branch path controlled by a normal contact of said manually controllable device connected around said second asymmetric unit and in series with said first asymmetric unit, and a circuit for controlling said second indication device only if said first branch path is open and including a branch path controlled by a reverse contact of said manually controllable device connected around said first asymmetric unit and in series with said second asymmetric unit.

3. In electrically controllable indication means for indicating a first and a second given condition, including a pair of conductors to which current of normal or reverse polarity is supplied in response to the existence of said first or second given condition respectively, the combination comprising, a first and a second asymmetric unit connected in series with each other across said pair of conductors but poled in opposite directions to pass current of normal or reverse polarity respectively, a manually controllable contact device, a first indication control circuit including said contact device closed in a given position in a branch path connected around said second asymmetric unit, and a second indication control circuit including said contact device operated away from said given position for opening said first branch path and closed in a different position in a second branch path connected around said first asymmetric unit.

4. In indication means for railway traffic governing apparatus which is capable of being put into a first or a second governing condition by means controlled by normal and reverse contacts respectively of a manually controllable device, including a pair of indication control conductors to which current of normal or reverse polarity is supplied according as the traffic governing apparatus is in the first or second governing condition respectively, including a first and a second indication device, the combination comprising, a first and a second asymmetric unit connected in series opposition with each other across said pair of conductors, a circuit for controlling said first indication device including a branch path controlled by said first asymmetric unit and by a contact closed in the normal position of said manually controllable device connected across said conductors, and a circuit for controlling said second indication device including a second branch path controlled by said second asymmetric unit and by said contact closed in a different position of said manually controllable device connected across said conductors.

5. In electrically controllable indication means for indicating a first and a second given condition, including a pair of conductors to which current of normal or reverse polarity is supplied in response to the existence of said first or second given condition respectively, including a first and a second asymmetric unit each of which has a terminal plate which is provided with a first and a second terminal point, the combination comprising, a branch path including said first and second asymmetric units connected in series with each other across said pair of conductors but poled in opposite directions to pass current of normal or reverse polarity respectively and with the first terminal point of said first asymmetric unit con-

nected with one of said conductors and the first terminal of said second asymmetric unit connected with the other of said conductors, a first indication control circuit including a manually controllable branch path connected around said second asymmetric unit and with one end of said branch path connected with the second terminal point of said second asymmetric unit, and a second indication control circuit including a second manually controllable branch path connected around said first asymmetric unit and with one end of said branch path connected with the second terminal point of said first asymmetric unit.

6. In indication means for railway traffic governing apparatus which is capable of being put into a first or a second governing condition by means controlled by normal and reverse contacts respectively of a manually controllable device, including a pair of indication control conductors to which current of normal or reverse polarity is supplied according as the traffic governing apparatus is in the first or second governing condition respectively, the combination comprising, a first and a second asymmetric unit each of which has a terminal plate provided with a first and a second terminal point, an indication control circuit responsive to current of normal polarity including a branch path through said first asymmetric unit and controlled by a normal contact of said manually controllable device and with one end of said branch path connected with one of said conductors at the first terminal point of said first asymmetric unit and with the other end of said branch path connected with the second terminal point of said second asymmetric unit, and a second indication control circuit responsive to current of reverse polarity including a second branch path through said second asymmetric unit and controlled by a reverse contact of said manually controllable device and with one end of said second branch path connected with the other of said conductors at the first terminal point of said second asymmetric unit and with the other end of said second branch path connected with the second terminal point of said first asymmetric unit.

7. In electrical control apparatus including a pair of conductors and means for supplying current of opposite polarities to said conductors, the combination comprising, a first and a second asymmetric unit having a common terminal point and each of which has at its opposite side a terminal plate provided with a first and a second terminal point, a manually controllable contact device operable to a first or a second position for closing a first or a second control contact respectively, a path including said first and second asymmetric units connected in series with each other across said pair of conductors but poled in opposite directions to pass current of normal or reverse polarity respectively and with said first terminal points of said asymmetric units connected with said conductors, a first electrical control circuit including said first control contact connected in a branch path one end of which is connected to the second terminal point of said second asymmetric unit and the other end of which is connected to the common terminal point between said asymmetric units, and a second electrical control circuit including said second control contact connected in a second branch path one end of which is connected to the second terminal point of said first asymmetric unit and the other end of which is connected to said common terminal point.

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