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## TRAIN ANNUNCIATING APPARATUS

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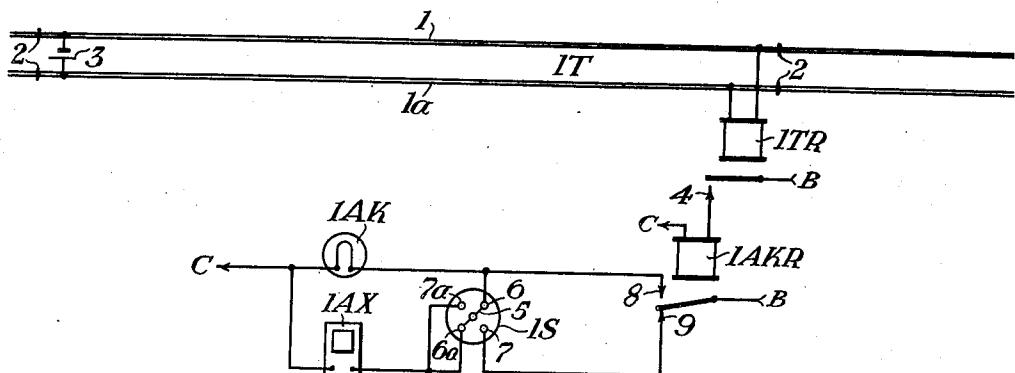


Fig. 1.

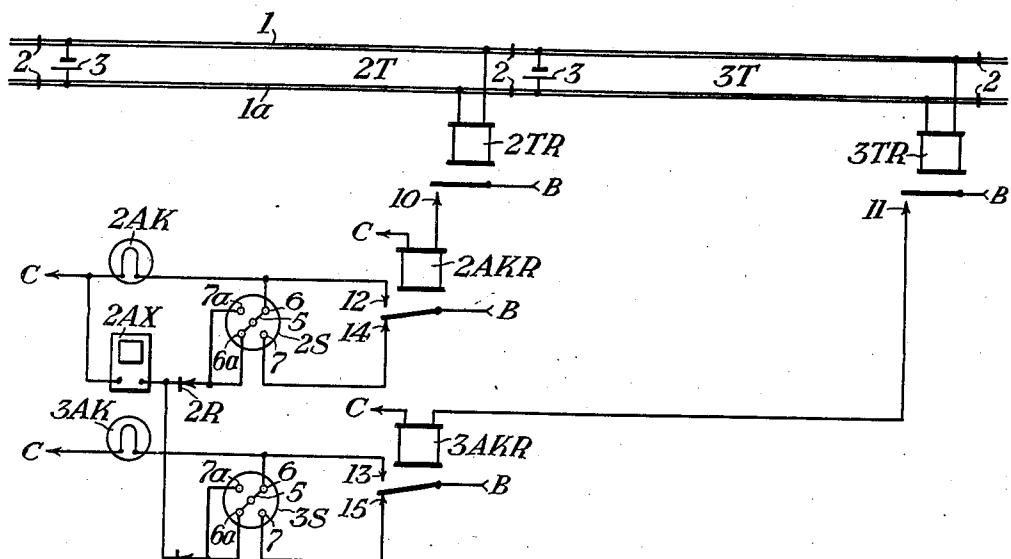


Fig. 2.

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## UNITED STATES PATENT OFFICE

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## TRAIN ANNUNCIATING APPARATUS

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2 Claims. (Cl. 246—124)

My invention relates to annunciating apparatus, and has particular reference to train annunciating apparatus for indicating at one point, such as an interlocking tower, the presence of 5 a train at another point.

One feature of my invention is the provision of novel and improved apparatus for causing a steady indication to be displayed whenever a selected stretch of railway track is occupied, and 10 for exhibiting a second indication the duration of which is dependent upon the will of the operator whenever a change occurs in the traffic conditions upon such stretch. A further feature of 15 my invention is the provision of means to reduce the number of contacts required of the relay which controls the two indications, thus reducing the power requirements of the relay so that the relay may be operated over relatively long line circuits.

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

In the accompanying drawing, Figs. 1 and 2 are diagrammatic views of two forms of apparatus each embodying my invention.

Referring to Fig. 1, the reference characters 1 and 1a designate the track rails of a stretch of railway track which are divided by means of the usual insulated track joints 2 to form a track 30 section 1T. Track section 1T is provided with a track circuit comprising a suitable source of current, such as track battery 3, connected across the track rails at one end of the section and a track relay, designated as 1TR, connected across 35 the rails at the other end.

Located at an interlocking tower or other central control point is an annunciator 1AK, which, as shown here, is a visual indicator in the form of an electric lamp, and a second annunciator 40 1AX, which, as shown, is an audible indicator in the form of an electric buzzer. These annunciators are governed by a train controlled relay 1AKR which is energized by a simple circuit including back contact 4 of relay 1TR, and connected with terminals B and C of a suitable source of energy. A manually operable switch or circuit controller 1S cooperates with relay 1AKR in controlling the second indicator 1AX. Switch 1S is provided with a movable contact 45 member 5, which is operable to two positions, and with sets of contacts 6—6a and 7—7a. Contact 6—6a is closed when contact member 5 is in its normal position, that is, the position shown in the drawing, and contact 7—7a is closed when 50 contact member 5 is in its reverse position, that

is, the position the reverse of that shown in the drawing.

Under normal conditions, that is, when no train is present in the track section 1T, relay 1TR is energized; and relay 1AKR, the first indicator 5 1AK and the second indicator 1AX are deenergized.

When a train enters track section 1T, relay 1TR becomes deenergized and closes back contact 4 to complete the energizing circuit for relay 1AKR. Relay 1AKR becomes energized and closes front contact 8 to complete a circuit passing from terminal B through front contact 8 of relay 1AKR, and the filament of indicator 1AK to terminal C; and to complete a circuit passing 15 from terminal B through front contact 8 of relay 1AKR, contact 6—6a of switch 1S, and the winding of indicator 1AX to terminal C. Indicators 1AK and 1AX are now energized so that each indicator now exhibits its respective indication. 20 The operation of the buzzer 1AX warns the operator that a change in traffic conditions upon the stretch of railway has occurred, and the operation of lamp 1AK indicates to the operator that section 1T has become occupied. 25

The operator may now operate the switch contact member 5 to its reverse position so that contact 6—6a is opened and contact 7—7a is closed. The opening of contact 6—6a opens the previously traced circuit for indicator 1AX, and the indicator 1AX becomes deenergized. 30

Then, when the train vacates track section 1T, relay 1TR becomes energized to open back contact 4 and open the energizing circuit for relay 1AKR. Relay 1AKR becomes deenergized to 35 open front contact 8 to open the energizing circuit for indicator 1AK, and to close back contact 9 to complete a second circuit for indicator 1AX, which circuit passes from terminal B through back contact 9 of relay 1AKR, contact 7—7a of switch 1S and the winding of indicator 1AX to terminal C. Indicator 1AK is now deenergized so that its indication is no longer exhibited, and indicator 1AX is now energized so 40 that it exhibits its indication. The operation of buzzer 1AX now warns the operator that a change in traffic conditions has occurred upon the stretch of railway, and the darkened condition of lamp 1AK indicates that section 1T has been vacated. 45 The operator may now operate switch contact member 5 so that contact 7—7a is opened and contact 6—6a is closed. The opening of contact 7—7a opens the second energizing circuit for indicator 1AX; and, when contact 6—6a of 50 55

switch 1S closes, the apparatus is in its normal position.

Referring now to Fig. 2, which is a diagrammatic view of a second form of apparatus embodying my invention, the track rails 1 and 1a are divided into track sections 2T and 3T, which sections are provided with track circuits in a manner similar to that described for section 1T in Fig. 1. Track relay 2TR is included in the track circuit for section 2T, and similarly track relay 3TR is included in the track circuit for section 3T. A relay 2AKR is energized by a simple circuit including back contact 10 of relay 2TR, and a relay 3AKR is energized by a simple circuit including back contact 11 of relay 3TR. Although the track sections 2T and 3T are here disclosed as being adjacent sections, it will be understood that I do not limit myself to this one arrangement, and these sections, or a plurality of sections including these sections, may be otherwise disposed with respect to each other should it seem desirable.

Indicators 2AK and 3AK, which may be of the same form as indicator 1AK referred to in Fig. 1, and indicator 2AX, which may be of the same form as indicator 1AX referred to in Fig. 1, are provided at an interlocking tower or other central point. The indicators 2AK and 3AK are controlled by the relays 2AKR and 3AKR, respectively. Manually operable switches or circuit controllers 2S and 3S, which may be of the same form as switch 1S referred to in Fig. 1, cooperate with relays 2AKR and 3AKR, respectively, to control indicator 2AX. The reference characters 2R and 3R designate asymmetrical units, that is, units in which the impedance to the flow of current in one direction is greater than for a flow of current in the other direction, which are associated with switches 2S and 3S, respectively.

Normally, when no trains are within section 2T or 3T, relays 2TR and 3TR are energized; relays 2AKR and 3AKR are deenergized; contact 6-6a of switch 2S and contact 6-6a of switch 3S are closed; and indicators 2AK, 3AK and 2AX are deenergized. Then, when a train traveling from left to right enters track section 2T, relay 2TR becomes deenergized to close back contact 10 and complete the energizing circuit for relay 2AKR. Relay 2AKR picks up and closes front contact 12 to complete a circuit passing from terminal B through front contact 12 of relay 2AKR and the filament of lamp 2AK to terminal C; and to complete a circuit passing from terminal B through front contact 12 of relay 2AKR, contact 6-6a of switch 2S, asymmetrical unit 2R in the current conducting direction and the winding of indicator 2AX to terminal C. And, since indicators 2AK and 2AX are energized, they exhibit their respective indications. The operator may now operate movable contact member 5 of switch 2S to open contact 6-6a of switch 2S, which opens the previously traced circuit for indicator 2AX, and to close contact 7-7a of switch 2S. Indicator 2AX now becomes deenergized and no longer exhibits its indication.

Then, when the train enters track section 3T, relay 3TR becomes released and closes back contact 11 to complete the energizing circuit for relay 3AKR. Relay 3AKR picks up to close front contact 13 and to complete a circuit passing from terminal B through front contact 13 of relay 3AKR and the winding of indicator 3AK to terminal C; and to complete a circuit passing

from terminal B through front contact 13 of relay 3AKR, contact 6-6a of switch 3S, asymmetrical unit 3R in the current conducting direction, and the winding of indicator 2AX to terminal C. As the indicators 3AK and 2AX are now energized, they exhibit their respective indications. The operator may now operate switch 3S to open contact 6-6a of switch 3S, and to open the previously traced energizing circuit for indicator 2AX, and to close contact 7-7a of switch 3S.

Then, when the train vacates track section 2T, relay 2TR picks up to open back contact 10 and open the energizing circuit for relay 2AKR. Relay 2AKR releases to open front contact 12 to open the previously traced circuit for indicator 2AK, and to close back contact 14 to complete a circuit passing from terminal B through back contact 14 of relay 2AKR, contact 7-7a of switch 2S, asymmetrical unit 2R in the current conducting direction, and the winding of indicator 2AX to terminal C. Indicator 2AX now becomes energized and exhibits its indication, while indicator 2AK becomes deenergized and no longer displays its indication. The operator may now operate the switch 2S to open contact 7-7a of switch 2S and open the last traced circuit for indicator 2AX, and to close contact 6-6a of switch 2S.

When the train vacates section 3T so that relay 3TR picks up to open back contact 11, the energizing circuit for relay 3AKR is opened and relay 3AKR becomes released. Front contact 13 of relay 3AKR opens to open the previously traced energizing circuit for indicator 3AK, and back contact 15 of relay 3AKR closes to complete a circuit passing from terminal B through back contact 15 of relay 3AKR, contact 7-7a of switch 3S, asymmetrical unit 3R in the current conducting direction, and winding of indicator 2AX to terminal C. Indicator 3AK now becomes deenergized and no longer displays its indication, and indicator 2AX becomes energized to display its indication. The operator may now operate switch 3S to open contact 7-7a of switch 3S and to close contact 6-6a of switch 3S. The apparatus is now in its normal condition.

It is obvious that the apparatus of Fig. 2 will operate for a train operating from right to left in a manner similar to the foregoing description of the operation for a train operating from left to right, and a detailed description is not thought necessary.

It is to be noted that the asymmetrical units 2R and 3R are interposed in the energizing circuit for indicator 2AX intermediate the winding of the indicator 2AX and the switches 2S and 3S, respectively, so that current may flow from each switch to the winding of the indicator 2AX, but current cannot flow in any appreciable amount from the winding of indicator 2AX to the respective switches. Thus, it can be seen that indicators 2AK and 3AK can only become energized by virtue of their respective energizing circuits including the front contact of the associated train controlled relay. It is to be noted further in each figure that the two indicators are controlled over dependent front and back contacts of the control relay.

It will be understood, of course, that my invention is not limited to the specific forms of annunciators described above and that such other forms may be selected as may be desirable to employ. As stated previously, my invention is not restricted to the track layout set forth in the description, the scope of my invention embracing a plurality of track sections each provided with a train con-

trolled relay and an associated first indicator co-acting with a single second indicator common to all of the relays in the manner set forth hereinbefore.

5 One advantage of apparatus embodying my invention is the provision of means for controlling separate indicators so that one indicator may exhibit a continuous indication, and the other indicator exhibit an indication for a period determined by the operator.

10 A further advantage of my invention is that both indicators are controlled over front and back dependent contacts of a train controlled relay. Previous to my invention, the control of the two separate indicators required

15 independent contacts of the control relay. Since the apparatus embodied in my invention requires but a single movable contact member for each control relay, and since the power required to energize a relay is dependent upon the contact

20 load imposed upon the relay, it can be seen that my invention provides means to reduce the power required to energize the control relay. Furthermore, since the power supplied to a relay is dependent upon line resistance of the line circuits,

25 which resistance is in turn dependent upon the length of line circuits, it can be seen that the apparatus embodying my invention can be used with line circuits much longer than previously employed in the art.

30 Although I have herein shown and described only two forms 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

35 from the spirit and scope of my invention.

Having thus described my invention, what I claim is:

1. In combination with a remotely controlled relay having two contacts a first of which is a front contact closed in the energized condition of the relay and the second of which is a back contact closed in the deenergized condition of the relay, a first indicator having an operating circuit including one of said two relay contacts, a second indicator having a first operating circuit also including said one relay contact and having a second operating circuit including the other of said two relay contacts, and a two position man-

ually operable circuit controller interposed in said first and second operating circuits of said second indicator for selectively conditioning said second indicator for operation by said one or said other relay contact according as said circuit controller is in one or the other of its two positions, whereby said first indicator is operated during the interval said relay holds said one relay contact closed and said second indicator is operated upon a change in the condition of said relay until the circuit controller is actuated to terminate such operation and to condition said second indicator for operation upon further change in the condition of said relay.

2. In combination, a plurality of separately controlled relays each having two contacts one of which is a front contact and the other of which is a back contact and which contacts are closed respectively in the energized and deenergized condition of the relay, a plurality of first indicators one for each of said relays, an operating circuit for each of said first indicators including one of said two contacts of the associated relay, a second indicator common to all of said relays, an operating circuit for said common indicator having a common portion connected with a plurality of pairs of alternate circuit paths one pair of such paths for each of said relays and each of such pairs of paths comprising a first path including

25 said one contact of the associated relay and consequently having a portion thereof common with the operating circuit of the first indicator of such relay and a second path including the other of said two contacts of the associated relay, a plurality of two-position manually operable circuit controllers one for each of said relays and interposed in the associated pair of circuit paths of such relay for selectively conditioning said common indicator for operation by said one or said other contact of the associated relay according as the associated circuit controller is in one or another of its two positions, and a plurality of asymmetrical units one for each relay interposed in its associated pair of alternate paths and poled to prevent current flow in such paths in the direction to effect operation of the first indicator associated with such relay.

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