Feb. 6, 1945.
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2,368,785
RAILWAY TRAFFIC CONTROLLING APPARATUS
Filed April 16, 1943


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# UNITED STATES PATENT OFFICE 

2,368,785

# RAILWAY TRAFFIC CONTROLLING APPARATUS 

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Application April 16, 1943, Serial No. 483,285

5 Claims.<br>(C1. 175-320)

My invention relates to railway traffic controlling apparatus, and particularly to apparatus of the type involving a flasher relay for at times controlling a signal to display an intermittent or flashing indication.

In various arrangements for controlling a signal by a flasher relay comprising two control windings alternately energized, it is common practice to employ a slow release flasher checking relay so controlled by a contact of one of the windings of the flasher relay as to be energized only if the flasher relay is actually operating for the intended purpose of controlling the signal to display a flashing indication. One such arrangement is shown in Letters Patent of the United States No. 2,166,083, granted July 11, 1939, to A. R. Whitehorn, for Trafic controlling system for railroads.

One feature of my invention is the provision of means comprising a front and a back contact of a flasher checking relay for controlling the associated flasher relay so that when the flasher relay control circuit becomes closed, the first periods of energization of the windings of the Casher relay will be lengthened, and will therefore fully energize these windings, thereby improving the initial operation of the flasher 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 signal, designated by the reference character 2 , is shown for governing traffic movements along a track $X$ over a track switch 1 in the normal position, as shown in the drawing, or for governing traffic movements from track $X$ over switch $\mid$ in its reverse position to an auxiliary track $Y$. Signal 2 may be of any suitable design such, for example, as the searchlight type, having a lamp 2E. Signal lamp 2 E is controlled by a signal relay 2 H and by a flasher relay $F P$. If signal 2 is of the searchlight type, the mechanism of this signal may also be controlled by a front contact 16 of relay $2 H$.

Relay 2H is in turn controlled by a manually operable device such, for example, as a lever ?V, by a switch contact 5 , by a flasher relay FR , and by a flasher checking relay FC. Relay 2H may also be controlled in part by a relay $R$ which is controlled in any suitable manner such, for example, as by a traffic responsive relay for the section of track in which switch is located.

Lever 2V operates a contact 3 which is nor-
mally open when lever 2 V occupies a normal position $n$, in which it is shown in the drawing, but which becomes closed when lever 2V is moved to a reverse position $r$.
Switch contact 5 is operated in conjunction with switch I so as to be closed in the normal position, in which it is shown in the drawing, when switch 1 occupies its normal position, and to be closed in the dotted line position when switch I is operated to the reverse position.

Flasher relay FR is controlled by lever 2 V , by relay $R$, by switch contact 5 in the reverse position, and by flasher checking relay FC.

Relay FR has a first control winding 6, and a second control winding 1 . Winding 6 of relay $F P R$, upon becoming energized while winding 1 of this relay is deenergized, will open its back contacts 10 and 14 and close its front contact 8, and will also open front contact 9 of winding 7 and close back contact 11 of winding 7 . Similarly, winding 7 of relay FR, upon becoming energized while winding 6 is deenergized, will open its back contact II, if it is already closed, and will close its front contact 9 , if open, and will also open contact 8 of winding 6 , if this contact is closed, and will close contacts 10 and 14 of winding 6 , if they are open. Relay $F R$ is so constructed that the contacts of its windings 6 and 7 are biased toward the positions in which they are shown in the drawing. Consequently, when both windings are deenergized, contact 9 of winding 7 and contacts 10 and 14 of winding 6 are closed, and contact 8 of winding 6 and contact 11 of winding 7 are open.

Flasher checking relay FC is controlled over the same circuit path as relay $F R$ as far as switch contact 5 , and is controlled from there by relay FR.

As shown in the drawing, all parts of the appa2 V occupies its normal position $n$ in which it is shown; relay $R$ is energized; switch 1 is in its normal position; relays $\mathrm{FR}, \mathrm{FC}$ and 2 H are deenergized; lamp 2E of signal 2 is constantly lighted; and the mechanism of signal 2 is deenergized, so that this signal is indicating stop.

The circuit by which lamp 2 E is constantly lighted passes from terminal $B$ of a suitable source of current, through the back point of contact 15 of relay 2 H , and lamp 2 F to terminal O of the same source of current.

In describing in detail the operation of the apparatus, I shall first assume that, with switch 1 in the normal position, a leverman moves le55 ver $2 V$ to its $r$ position, thereby completing a
circuit for energizing relay 2 H , this circuit passing from terminal B, through contact 3 of lever 2 V , contact 4 of relay $R$, contact 5 of switch 1 in the normal position, back point of contact 13 of relay FC , and the winding of relay 2 H to terminal $O$. Lamp 2E of signal 2 will now be energized by a second circuit, passing from terminal $B$, through contact 14 of winding 6 of relay FR , front point of contact 15 of relay 2 H , and lamp 2 E to terminal O . Since relay FR is deenergized, contact 14 of this relay remains constantly closed, and hence lamp 2 E is constantly lighted. With relay 2 H energized, the mechanism of signal 2 will be energized by a circuit including contact 16 of relay 2 H , and hence signal 2 will display a constant proceed indication.
I shall next assume that, by some suitable means, switch 1 is operated to the reverse position, and that the leverman again moves lever. 2 V to its $r$ position, thereby closing contact 3 . A circuit is thereby completed for energizing winding 6 of relay FR, this circuit passing from terminal $B$, through contact 3 of lever 2 V , contact 4 of relay $R$, contact 5 of switch 1 closed in the reverse position, winding 6 of relay FR, and the back point of contact 12 of relay FC to terminal $O$. Winding 6 , upon thus becoming energized, will open its contacts 10 and 14 , and contact 9 of winding 7 , and will close its contact 8 and contact 11 of winding 7. A circuit is now completed for energizing relay $F C$, which is the same as the circuit previously traced for relay $F R$ as far as contact 5 of switch 1 , and which then passes through contact 11 of winding 1 of relay FR , and the winding of relay FC to terminal 0 .
In former arrangements, which do not include the front and back points of contact 12 of relay FC, a shunt path around winding 7 of relay FR becomes opened as soon as contact 9 of winding 1 opens, and a shunt path around winding 6 of relay FR becomes closed as soon as contact 8 of winding 6 closes.
In apparatus embodying my invention, however, the shunt path around winding 7 of relay FR remains closed until relay FC has become energized and opened its contact 12 at the back point. and the shunt path around winding 6 of relay FR does not become closed until contact 12 of relay FC has closed at its front point. In this way, the first period of energization of winding 6 is lengthened, in apparatus embodying my invention, thereby making provision that winding 6 becomes fully energized, and winding 7 also becomes fully energized during its succeeding period of energization. During the brief interval between the time of opening of contact 12 at its back point and the closing of this contact at its front point, windings 6 and 7 of relay FR are connected in series with each other.
As soon as contact 12 of relay FC closes at its front point, a circuit is completed for energizing winding 1 , which is the same as the circuit previously traced for winding 6 as far as contact 5 of switch 1, and which then passes through contact 8 of winding 6 , front point of contact 12 of relay FC , and winding 7 to terminal $O$. Winding 7, upon thus becoming energized, opens contact 8 of winding 6 and closes its own back contact 9 . Winding 6 therefore now becomes energized by a circuit which is the same as the circuit previously traced for this winding as far as contact 5 of switch 1 , and which then passes through winding 6 , front point of contact 12 of relay FC ,
and contact 9 of winding 7 to terminal 0 . Windings 6 and 1 will now continue to be alternately energized by circuits including the front point of contact 12, previously described, as long as the path remains closed from terminal $\mathbf{B}$ through contact 5 of switch 1 .
During this operation of relay FR, relay FC is intermittently energized by its circuit including contact 11 of relay $F R$, but relay $F C$, being of the slow releasing type, will retain its contacts 12 and 13 closed at their front points. Relay 2 H is also now intermittently energized by a circuit which is the same as the circuits previously traced for winding 6 of relay $F R$ as far as contact 5 of switch 1, and which then passes through contact 10 of winding 6 of relay $F R$, front point of contact 13 of relay FC, and the winding of relay 2 FI to terminal O . Relay 2 H , being also of the slow releasing type, will retain its contact 15 closed at the front point, and lamp 2 E of signal 2 will therefore be intermittently energized by its circuit, previously traced, through contact 14 of winding 6 of relay FR. The mechanism of signal 2 will be held in the "proceed" position by a circuit including contact is of relay 2 H .
Although I have herein shown and described only one form of apparatus embocying 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 electrical controlling apparatus including a flasher control relay which comprises a first and a second control winding and a front and a back contact for each of said windings and which is constructed so that each of said windings if energized while the other winding is deenergized will open its own back contact and the front contact of the other winding and will then close its own front contact and the back contact of the other winding if the various contacts are not already in those positions and which is also constructed so that the back contact of the first winding and the front contact of the second winding are biased toward their closed positions if both windings are deenergized, including a slow release flasher checking relay controlled by a back contact of the second winding, the combination comprising, a control circuit for energizing said first winding including a back contact of said checking relay connected in multiple with the second winding, a control circuit for energizing said second winding including a front contact of said checiing relay and a front contact of said first winding connected in series with each other but in multiple with said first winding, and a second control circuit for energizing said frist winding including a front contact of said checking relay and a front contact of said second winding connected in series with each other but in multiple with said second winding.
2. In electrical controlling apparatus including a flasher control relay which comprises a first and a second control winding and a front and a back contact for each of said windings arranged so that each of said windings upon becoming energized and operating its own front and back contacts to the closed and open positions respectively will at the same time operate the front and back contacts of the other winding to the open and closed positions respectively and also arranged so that the back contact of the first winding and
the front contact of the second winding are biased toward their closed positions, including a slow release flasher checking relay controlled by a back contact of the second winding, the combination comprising, means controlled by said checking relay in its deenergized condition for energizing said first winding and keeping said second winding deenergized, and means including a front contact of said checking relay for energizing said first and second windings alternately.
3. In electrical controlling apparatus including a flasher control relay which comprises a first and a. second control winding and a front and a back contact for each of said windings arranged so that each of said windings upon becoming energized and operating its own front and back contacts to the closed and open positions respectively will at the same time operate the front and back contacts of the other winding to the open and closed positions respectively and also arranged so that the back contact of the first winding and the front contact of the second winding are biased toward their closed positions, including a slow release flasher checking relay controlled by a back contact of the second winding, the combination comprising, means controlled by said checking relay in its deenergized condition for energizing said first winding and keeping said second winding deenergized, and means including a front contact of said checking relay in series with a front contact of said first winding or of said second winding for energizing said second or said first winding respectively.
4. In electrical controlling apparatus including a flasher control relay which comprises a first and a second control winding and a front and a
back contact for each of said windings arranged so that each of said windings upon becoming energized and operating its own front and back contacts to the closed and open positions respectively will at the same time operate the front and back contacts of the other winding to the open and closed positions respectively and also arranged so that the back contact of the first winding and the front contact of the second winding 0 are biased toward their closed positions, including a slow release flasher checking relay controlled by a back contact of the second winding, the combination comprising, means controlled by said checking relay in its deenergized condition for 5 energizing said first winding, and means controlled by said checking relay in its energized condition for energizing said first and second windings alternately.
5. In controlling means for electric signal ap20 paratus including a flasher control relay which comprises a first and a second control winding and which is constructed so that a back contact of the first winding and $a$ front contact of the second winding are biased toward the closed position when both windings are deenergized, including a slow release flasher checking relay controlled by a back contact of the second winding, the combination comprising, means controlled by said checking relay in the deenergized condition for energizing said first winding and keeping said second winding deenergized, and means controlled by said checking relay in its energized condition for energizing said first and second windings aiternately. 35
