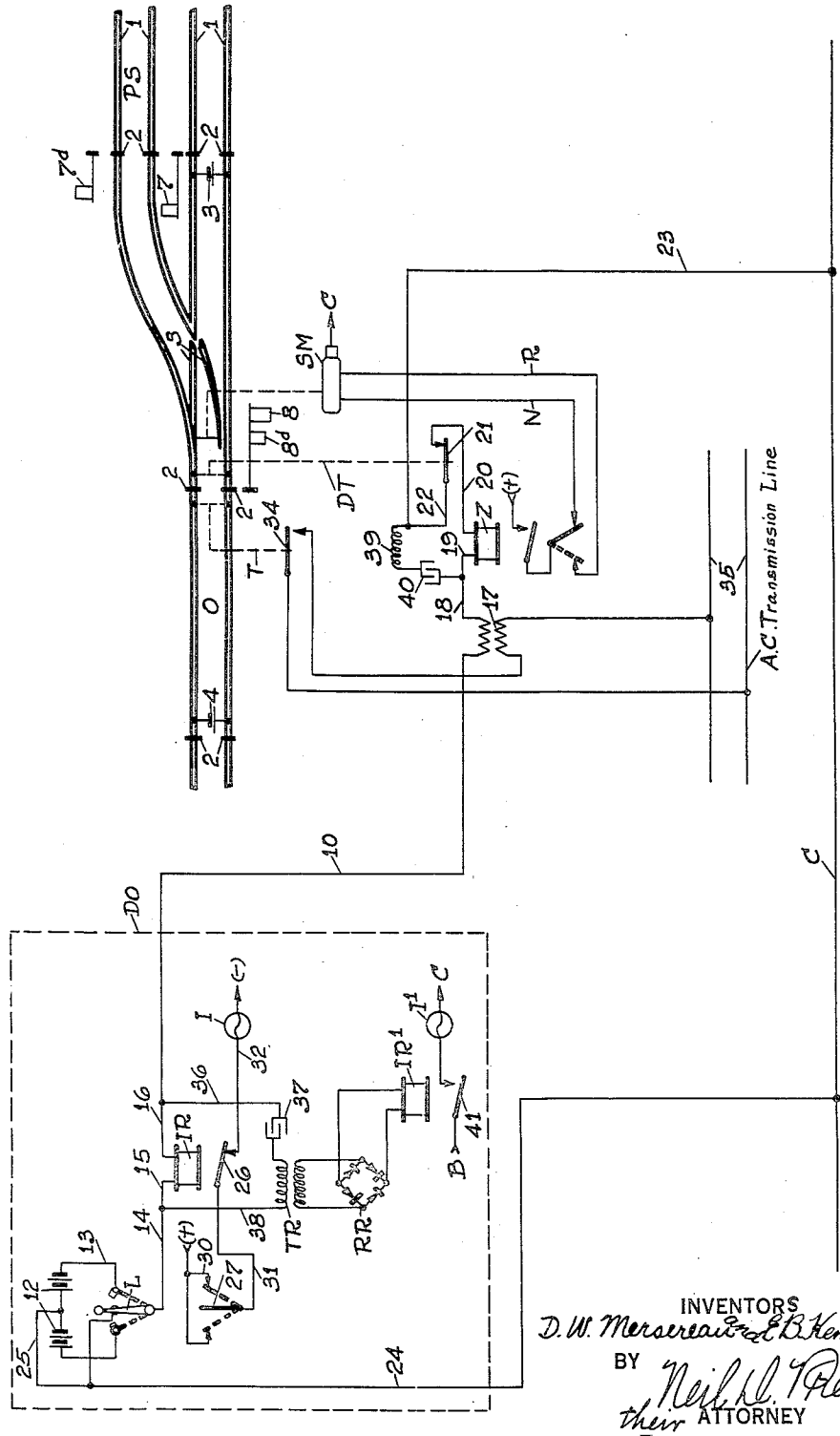
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CENTRALIZED TRAFFIC CONTROL SYSTEM

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CENTRALIZED TRAFFIC CONTROL SYSTEM

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This invention relates to centralized traffic controlling systems, and more particularly to means for controlling a distant traffic controlling device and receiving a plurality of distinctive continuing indications over a single line circuit.

In accordance with the present invention it is proposed to control a distant traffic controlling device over a circuit through the medium of direct current applied at a local central office, to indicate one condition of traffic at said traffic controlling device in accordance with the integrity of said circuit at said distant traffic controlling device, and in transmitting another and distinctive continuing indication from said distant traffic controlling device to said central office by the application of alternating current to the same circuit at said distant traffic controling device.

Other objects, purposes and characteristic features of the invention will in part be apparent from the drawing and will in part be more specifically pointed out hereinafter.

In describing the invention in detail reference will be made to the single drawing illustrating conventionally one embodiment of the invention.

Referring to the drawing the rails 1 of the railway system have been shown divided into track circuited blocks by insulating joints 2, of which the detector track circuit includes a detector track relay DT and a battery 3, and the block in the single track section O includes a track relay T and track battery 4. The switch S is preferably controlled by a switch machine SM and governs the movement of traffic out of the single track section O into the main track or the side track of said passing siding PS. The particular track lay-out illustrated may comprise part of a double track railroad, or a portion of a single track railroad equipped with absolute-permissive-block signalling. Proceeding on the assumption that the latter type of system has been illustrated, the starting signals 7 and 7^d govern the movement of traffic from the main track and side track of the passing siding, respectively, into the single track section O, whereas the main signal 8 and the take-siding signal 8^d govern the movement of traffic from the single track section O into the two tracks of passing siding PS. The switch machine SM is preferably controlled by the polar control relay Z, which relay in turn is controlled by the lever L located at the central office DO through the medium of the line wire 10. In the central office DO there is included in series with the line wire 10 an indicating relay IR the function of which is more fittingly described hereinafter.

In the central office there is also provided a direct current indicating relay IR^1 connected to the rectifier RR, which rectifier in turn is connected to the secondary winding of the transformer TR. The indicating relay IR controls the indicating lamp I, whereas the indicating relay IR^1 controls the indicating lamp I^1. Having now described the essential elements of the system it is believed expedient to consider the operation of the system and how indications of traffic conditions may be transmitted to the central office DO.

Operation

Let us first assume that there is a west bound train on the main track of the passing siding PS, and that the operator wishes this train to proceed into the single track section O. The operator will first move his lever L to the right hand position corresponding to the main track position for the switch machine SM. Movement of the lever L into the right hand dotted position will close the following circuit for energizing the polar control relay Z:—beginning at the terminal (+) of the battery 12, wire 13, lever L, wires 14 and 15, winding of the relay IR, wires 16 and 10, primary winding of the transformer 17, wires 18 and 19, winding of the relay Z, wire 20, front contact 21 of the detector track relay DT, wires 22 and 23, to the common return wire C connected through the medium of wires 24 and 25 to the midpoint of the battery 12. The completion of the circuit just traced will energize the control relay Z to the right, but since the switch machine SM already is in the main track position the switch machine SM will not respond to the energization of the relay Z. The energization of the circuit just traced will, however, energize the indicating relay IR, thereby opening the back contact 26 of this relay IR and prevent illumination of the indicating lamp I in spite of the fact that its energizing circuit has been closed at the lever contact 27. The lever contact L is preferably so constructed, as shown by the elongated stationary contacts, that it makes its connection earlier than does the contact 27 upon movement from the middle position, this to avoid flashing of the lamp I by reason of the time required for relay IR to pick up its contact 26. The operator will then through suitable means, for convenience omitted from the drawing, allow clearance of the starting signal 7 in accordance with traffic conditions in advance, which are assumed to now be favorable, so that the signal 7 assumes its clear proceed position.

The train in question may now proceed westwardly into the single track section O, and as soon as it treads upon the detector track circuit containing the track relay DT, the contact 21 will be opened, thereby breaking the circuit heretofore traced and effecting deenergization of the indication relay IR. With the relay IR deenergized the indicating lamp I is energized through the following circuit:—beginning at the terminal (+) of a suitable battery, wire 30, lever contact 27, wire 31, back contact 26 of the relay IR, wire 32, indicating lamp I, to the other terminal (—) of said battery.

As the train in question proceeds a little further in a westwardly direction it treads upon the first track circuit in the single track section O, thereby effecting deenergization of the track relay T and effecting closure of the contact 34 of the relay T, thereby energizing the transformer 17 by alternating current derived from the transmission line 35. In response to this energization of the transformer 17 alternating current will flow through the following circuit:—beginning at the secondary winding of the transformer 17, line wire 10, wire 36, condenser 37, primary winding of the transformer TR, wires 38 and 14, lever L, wire 13, one portion of this split battery 12, wires 25 and 24, common return wire C, wire 23, inductance 39, condenser 40, wire 18, back to the secondary winding of transformer 17.

It is desired to point out at this time that the inductance of the transformer TR and the capacity of the condenser 37 are of such value that when connected in series, as shown, they comprise a tuned unit tuned to resonate at the frequency of the alternating current supplied by the transmission line 35, and similarly, the inductance 39 and the condenser 40 are tuned to resonate for this same frequency. From this it will appear that alternating current can readily flow in the circuit just traced in spite of the opening of the contact 21 of the detector track relay DT, and also the indicating relay IR will furnish sufficient impedance to allow very little alternating current to flow therethrough. With the transformer TR now energized due to the alternating current flowing by reason of the occupancy of the block containing the track relay T, direct current is caused to flow through the winding of the indicating relay IR^1, through the medium of the rectifier RR (preferably of the multiple plate copper oxide type), the functioning of which is thoroughly understood by those skilled in the art of railway signalling. Obviously, the indicating lamp I is again extinguished as soon as the track relay DT picks up, and similarly, the indicating lamp I^1 which was illuminated through the front contact 41 of relay IR^1 is extinguished as soon as the track relay T picks up.

Attention is directed to the fact that the control relay Z will remain deenergized so long as the contact 21 of the detector track relay DT is open, but this is immaterial in that the switch machine SM should not be permitted to have its operation initiated when there is a train occupying the detector track circuit containing track relay DT. Obviously, movement of the lever L to its left hand position will energize the relay Z to its left hand position, thereby operating the switch machine SM to its reversed take-siding position through the medium of the reverse wire R, in the same way as the switch machine SM may be operated to the normal position through the medium of the normal wire N. Obviously, the progress of a train moving off of a side track of the passing siding PS may be indicated in the central office DO in exactly the same way as a train moving off of the main track of the passing siding PS is indicated. Furthermore, an east bound train will be indicated in the central office DO in exactly the same way as a west bound train is indicated, except that in the event of an east bound train the indicating lamp I^1 is energized prior to the energization of the indicating lamp I, whereas for west bound traffic the indicating lamp I is the first one to be energized. Also, instead of employing the superimposed alternating current for indicating the condition of occupancy for the block containing the track relay T, this alternating current apparatus may be employed for indicating the condition of occupancy of other track circuits, the position of signals, derails, or the like.

Having thus shown and described one rather specific embodiment of the present invention it is desired to be understood that this has been done for the purpose of facilitating description of its underlying principles and advantageous features, and has not been selected for the purpose of showing the scope of the invention or the exact construction preferably employed in practicing the same, and that various changes, modifications and additions may be made to adapt the invention to the particular problem encountered in practicing the same, all without departing from the spirit or scope of the invention or the idea of means underlying the same, except as demanded by the scope of the following claims.

What we claim as new is:—

1. In a traffic controlling system, the combination with a distant traffic controlling device, of a local central office, a source of direct current at said office, a circuit connecting said office and said distant traffic controlling device for controlling said device through the medium of said source, a first direct current relay at said office included in said circuit, a transformer bridged across said relay, a second direct current relay, a rectifier connected to rectify alternating current supplied by said transformer and apply the rectified current to said second relay, a control relay at said traffic controlling device included in said circuit, means for energizing said circuit from said source at said office to control said control relay, a normally closed traffic controlled contact adjacent said control relay in said circuit opened under certain traffic conditions to effect deenergization of said first relay, a filter permitting the flow of alternating current bridging said control relay and contact, and means for introducing alternating current into said circuit at said traffic controlling device under other traffic conditions to effect energization of said second relay.

2. In a traffic controlling system, the combination with a distant traffic controlling device, of a local central office, a source of direct current at said office, a circuit connecting said office and said distant traffic controlling device for controlling said device through the medium of said source, a first direct current relay at said office included in said circuit, a transformer bridged across said relay, a second relay energized from said transformer, a control relay at said traffic controlling device included in said circuit, means for energizing said circuit from said source at said office to control said control relay, a normally closed traffic controlled contact adjacent said control relay in said circuit opened under certain traffic conditions to effect de-energization said first relay, a filter permitting the flow of

alternating current bridging said control relay and contact, and means for introducing alternating current into said circuit at said traffic controlling device under other traffic conditions to effect energization of said second relay.

3. In a traffic controlling system, the combination with a distant traffic controlling device, of a local central office, a source of direct current at said office, a circuit connecting said office and said distant traffic controlling device for controlling said device through the medium of said source, a first direct current relay at said office included in said circuit, a transformer bridged across said relay, a second direct current relay, a rectifier connected to rectify alternating current supplied by said transformer and apply the rectified current to said second relay, a control relay at said traffic controlling device included in said circuit, means for energizing said circuit from said source at said office to control said control relay, a normally closed traffic controlled contact adjacent said control relay in said circuit opened under certain traffic conditions to effect de-energization of said first relay, a filter permitting the flow of alternating current bridging said control relay and contact, and means for inducing alternating current into said circuit at said traffic controlling device under other traffic conditions to effect energization of said second relay, said bridge including the transformer, and said filter bridging said relay and contact, each constituting a unit tuned to resonance at the frequency of said alternating current.

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