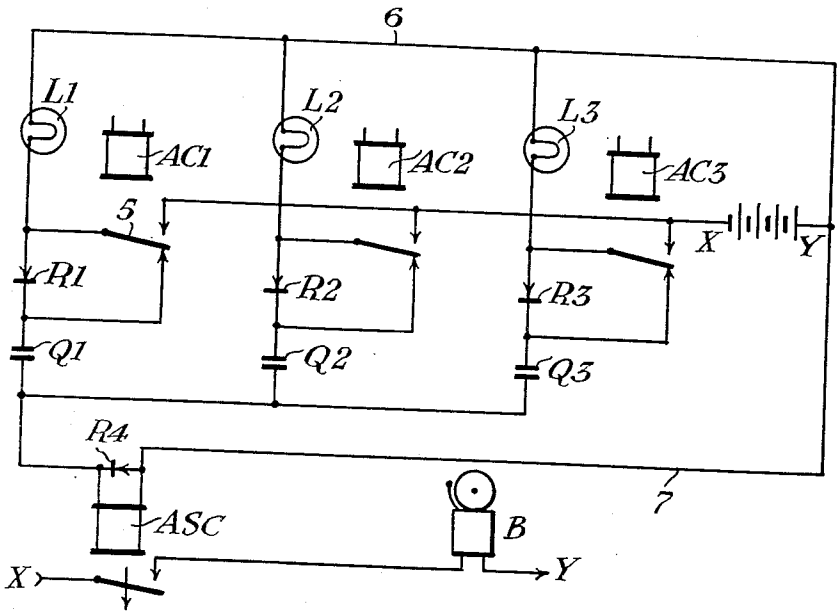
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SIGNALING APPARATUS

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SIGNALING APPARATUS

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My invention relates to signaling apparatus, and more particularly to signaling apparatus involving annunciator circuits.

One of the objects of my invention is to provide apparatus whereby a signal individual to an annunciator control relay and a second signal common to a plurality of annunciator control relays may be controlled by annunciator relays each having but one contact finger of the usual construction, so that the apparatus will be economical both in cost and in current consumption.

The system shown in this application is an improvement on the system shown in United States Patent No. 2,112,228, issued March 29, 1938, to Paul H. Crago and assigned to The Union Switch Signal Company.

The accompanying drawing is a diagrammatic view illustrating one form of apparatus embodying my invention.

Referring to the drawing, the reference characters AC1, AC2, and AC3 each designate one relay of a group of annunciator control relays. The relays AC1, AC2, and AC3 may, for example, be controlled by traffic conditions in corresponding sections of railway track; that is, the relays AC1, AC2, and AC3 may become picked up or released according as the associated track section is occupied or unoccupied, respectively. Associated with each annunciator control relay is a visual signal, here shown as a lamp, and respectively designated by the reference characters L1, L2, and L3. The reference character ASC designates an auxiliary signal control relay which is governed by the annunciator control relays and which is provided for actuating an audible signal, here shown as a single stroke bell B, to give an audible alarm whenever any one of the annunciator control relays becomes picked up.

It will be observed that, whenever any annunciator control relay is picked up, a circuit for the associated lamp is completed. For example, when relay AC1 becomes picked up, a circuit for its lamp L1 will be completed over a path which passes from one terminal X of a suitable current source through front point of contact 5 of relay AC1 and the lamp to the other terminal Y of the same source.

Whenever one of the annunciator relays is picked up, a circuit, which will be traced later, is completed for the auxiliary signal control relay ASC, so that relay ASC will become picked up momentarily to supply energy to bell B from terminals X and Y. For example, one such circuit for relay ASC may be traced from terminal X through front point of contact 5 of relay AC1, rectifier R1, condenser Q1, and relay ASC to terminal Y. It is apparent that since the above traced circuit includes a device having capacity, here shown as the condenser Q1, current will flow through the relay ASC only until such time as the condenser becomes charged. This feature, therefore, provides for a momentary pickup of the relay ASC. In other words, the operation of relay ASC is essentially momentary in character because the relay is energized by the charging current of the condenser Q1 which current will cease to flow when the condenser becomes charged. The rectifier R4, in multiple with the winding of relay ASC, causes the relay to be slow in releasing so that the relay ASC will be certain to remain in its picked up condition for a period necessary to effect operation of the bell B. Even though the auxiliary relay ASC is slow in releasing, it is intended that, under normal conditions, the operation of control relays AC1, AC2, and AC3 will be in such sequence that relay ASC will have ample time to release before another control relay becomes picked up. If relay ASC is not released when another control relay becomes picked up, the bell B would, of course, fail to indicate that another control relay had become picked up but the failure of bell B to register would not be particularly serious because the indication lamp L associated by such other control relay would provide an indication of the condition of that relay. The rectifier R4, also, as will be explained later, provides a shunt path around the relay ASC so that the condensers may be discharged without such discharge current passing through the relay ASC.

Each of the relays AC1, AC2, and AC3 when picked up, will cause the associated lamp L to become energized and a momentary operation of the bell B in a manner similar to that just described for the relay AC1.

It will be apparent, therefore, that, if relays AC1, AC2, and AC3 are controlled by traffic conditions in corresponding track sections as hereinbefore pointed out, the bell B will provide a momentary audible signal whenever any of the track sections become occupied and the lamps L1, L2, and L3 will provide a constant visual signal of the occupied or unoccupied condition of the track sections.

The rectifiers R1, R2, and R3 are included in the respective operating circuits of relay ASC so as to prevent a charged condenser of an ener-

gized annunciator relay from discharging into another condenser when the annunciator relay associated with the latter condenser becomes picked up. For example, if relay AC2 picks up when relay AC1 is already picked up, condenser Q1, due to rectifier R1, cannot discharge into condenser Q2. This feature insures that discharged condensers cannot become partially charged by the charged condensers and thereby reduce the voltage of the impulse of energy supplied to the relay ASC.

The shunt circuits around the rectifiers including the back contacts of the annunciator relays are provided to insure a quick discharge of the condensers when the associated annunciator relay is released. For example, when relay AC1 is released, condenser Q1 will be discharged over a path which may be traced from one terminal of condenser Q1 through back point of contact 5 of relay AC1, lamp L1, wire 6, wire 7, and rectifier R4 to the other terminal of condenser Q1. This discharge of current through lamp L1 is merely incidental and will not interfere with the proper operation of the system because a momentary flash, which may be caused by the discharge current, will not be confused with a steady lighting of the lamp.

Each of the shunt paths, therefore, provides for a quick discharge of the associated condenser so that the relay ASC will be certain to receive an impulse of energy sufficient to operate the relay upon each operation of the annunciator relays.

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 combination, a plurality of circuits each including a condenser, a plurality of control relays one for each circuit, each of said relays having a contact having a normal position and an operated position, means effective when the contacts of said control relays are in their operated positions to supply energy to the associated circuit to charge the corresponding condenser, a winding of an auxiliary relay included in all of said circuits and consequently momentarily energized while any of the condensers are being charged, and a plurality of rectifiers one included in each circuit poled to prevent the discharge of the associated condenser into another condenser, the contact of each of said control relays being operative when and only when it is in its normal position to establish a circuit shunting the rectifier in the circuit which said control relay controls to thereby discharge the condenser in said circuit.

2. In combination, a plurality of circuits each including a condenser, a plurality of control relays one for each circuit, each of said relays having a contact having a normal position and an operated position, means effective when the contacts of said control relays are in their operated positions to supply energy to the associated circuit to charge the corresponding condenser, a winding of an auxiliary relay included in all of said circuits and consequently momentarily energized while any of the condensers are being charged, a plurality of rectifiers one included in each circuit poled to prevent the discharge of the associated condenser into another condenser, the contact of each of said control relays being operative when and only when it is in its normal position to establish a circuit shunting the rectifier in the circuit which said control relay controls to thereby discharge the condenser in said circuit, an audible signal controlled by said auxiliary relay, and a plurality of visual signals one governed by each control relay.

3. In combination, a plurality of control relays, each of said relays having a contact having a normal position and an operated position, a plurality of circuits one for each control relay and each including a condenser, means effective when the contacts of said control relays are in their operated positions to supply energy to the associated circuit to charge the corresponding condenser, a winding of an auxiliary relay included in all of said circuits and consequently momentarily energized while any of the condensers are being charged, a plurality of rectifiers one included in each circuit and poled to prevent the associated condenser from discharging into the other condensers, another rectifier bypassing said auxiliary relay winding, said other rectifier being poled to prevent flow of current in the direction to effect charging of said condensers, and a plurality of discharge circuits one for each condenser and all including said bypassing rectifier.

4. In combination, a condenser, a circuit including said condenser, means including a source of direct current for at times supplying unidirectional current to said circuit to charge said condenser, a relay winding connected in said circuit and consequently momentarily energized by the charging current of the condenser, an asymmetric unit connected across said relay winding and poled opposite to the direction of charging current flow in said winding, and means including said asymmetric unit for discharging said condenser when said source of energy is disconnected from said circuit.

5. In combination, a plurality of control relays each having a contact having a normal position and an operated position, a plurality of circuits one for each control relay and each including a condenser, means effective when said control relay contacts are in their operated positions to supply energy to the associated circuit to charge the corresponding condenser, a winding of an auxiliary relay included in all of said circuits and consequently momentarily energized while any of the condensers are being charged, a plurality of rectifiers one included in each circuit and poled to prevent the associated condenser from discharging into another condenser, another rectifier bypassing said auxiliary relay winding, said other rectifier being poled to prevent flow of current in the direction to effect charging of said condensers, and a plurality of discharge circuits one for each condenser, the contact of each of said control relays being operative when and only when it is in its normal position to establish a discharge circuit for the condenser in the circuit controlled by such control relay, each such discharge circuit including said bypassing rectifier and also including means to bypass the rectifier incorporated in the circuit of the condenser.

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