

March 29, 1938.

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2,112,228

SIGNALING APPARATUS

Filed Sept. 3, 1936

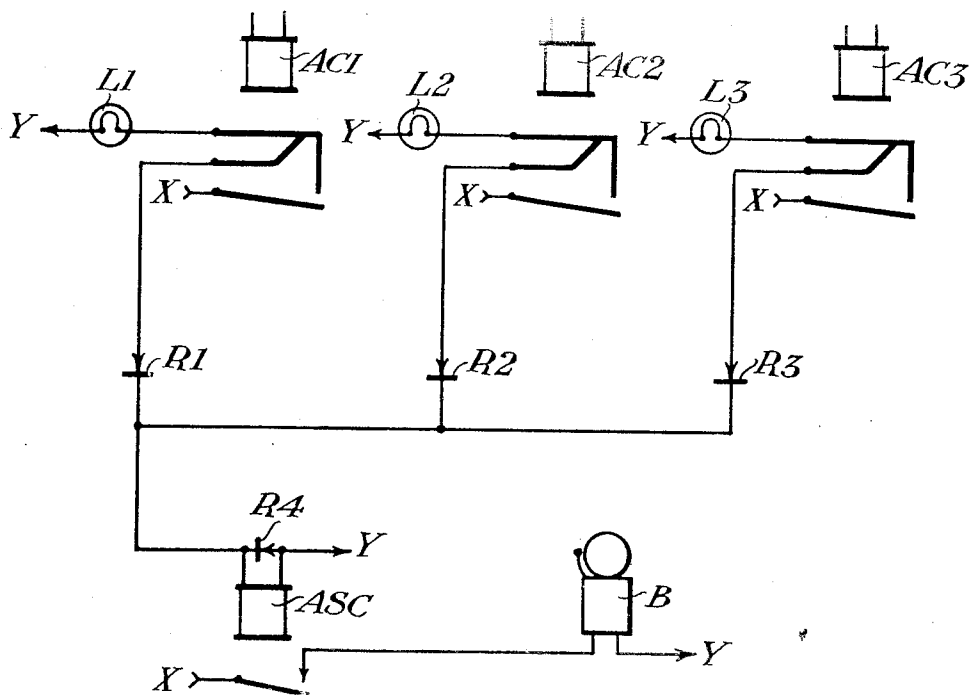


Fig. 1.

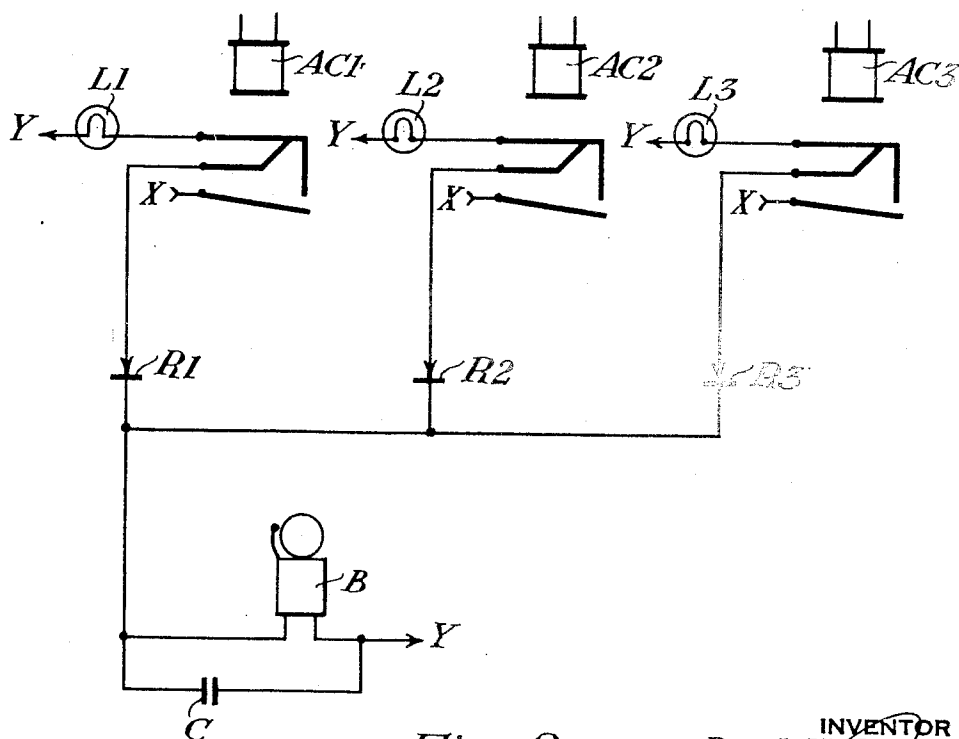


Fig. 2.

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2,112,228

SIGNALING APPARATUS

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Application September 3, 1936, Serial No. 99,257

8 Claims. (Cl. 177-333)

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 circuits and apparatus whereby a signal individual to an annunciator control relay and a second signal common to a plurality of annunciator control relays may be fully controlled by employment of annunciator relays having but a single make-before-break contact combination, so that a minimum amount of power will be required to operate the relays.

In the accompanying drawing, Fig. 1 shows one form of circuits and apparatus embodying my invention. Fig. 2 shows a modified form of the circuits and apparatus illustrated in Fig. 1, and also embodying my invention.

The present application is a continuation in part of my copending application Serial No. 28,879, filed June 28, 1935, for Signaling apparatus, in so far as the subject matter common to the two cases is concerned.

In Fig. 1 of the drawing, a group of three annunciator control relays AC1, AC2, and AC3 are shown, provided for selectively lighting associated signals, here shown as lamps L1, L2, and L3, respectively; and an auxiliary signal control relay ASC is shown and is provided for actuating a bell B, to give an audible alarm whenever any one of the annunciator control relays is picked up or released. The bell B may be of any suitable type such as will provide a satisfactory audible indication during the relatively short time interval during which the front contact of relay ASC remains closed.

It will be observed that when any annunciator control relay is picked up a circuit for its associated lamp is completed. For example, if relay AC1 is picked up, a circuit for its lamp L1 is completed from one terminal of a suitable current source, designated X, through the make contact of its make-before-break or continuity transfer contact combination and through its lamp to the other terminal of the same source, designated Y.

Whenever one of the annunciator relays is picked up or released, the normally open and closed contacts of its make-before-break combination are momentarily both closed. During this period a circuit, which will be traced later, is completed for the auxiliary signal control relay ASC, so that relay ASC will momentarily pick up and close the obvious circuit through bell B each time a make-before-break contact combination is actuated.

The rectifier R4, in multiple with the winding

of relay ASC, is provided to make relay ASC slow to release. This insures relay ASC being operated for the period necessary to effect operation of bell B.

The rectifiers R1, R2, and R3 are included in the respective operating circuits of relay ASC so as to prevent the signal lamps of non-operated annunciator relays from receiving operating current in multiple with relay ASC when one of the annunciator relays is being picked up or released. For example, if relay AC1 picks up, the operating circuit for relay ASC extends from a terminal X through the lower spring of its make-before-break combination, a portion of the upper spring of the combination, the middle spring of the combination and through rectifier R1 to the common portion of the operating circuits of relay ASC and through the winding of this relay to a terminal Y. The rectifiers R2 and R3 function as valves and as poled prevent a back flow of current through the break contacts of relays AC2 and AC3, and therefore prevent the lamps L2 and L3 from being lighted at this time. The rectifier R1 functions in the same capacity when one of the relays AC2 or AC3 is picking up or releasing. It is obvious that either of the relays AC2 or AC3 will control the relay ASC in the same manner as does AC1.

Referring to Fig. 2 of the drawing, the apparatus of this figure is similar to that shown in Fig. 1, with the exception that the bell control relay ASC and its associated rectifier R4 are eliminated and are replaced by a condenser C of relatively high capacity. The operation of the system of Fig. 2 is identical with that of Fig. 1 described above, with the exception that the annunciator energy which flows when one of the relays AC1, AC2, or AC3 is picked up is not used for picking up a control relay ASC, but is used to charge a condenser C which, in turn, discharges through the bell B to provide the audible signal.

It has been found on test that a 1000 microfarad electrolytic condenser (this value being used for purposes of illustration only) stores sufficient energy during the relatively short transfer interval to provide for operation of the bell over a considerable range of voltage at the source X-Y.

The broad idea of utilizing condenser means which acquire a momentary charge upon operating one of the control relays AC1, AC2, or AC3 and causing said momentary charge to produce operation of an indicating device was invented by John M. Pelikan and is disclosed in an application Serial No. 78,421 filed by him on May 7, 1936, for Signaling apparatus.

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 from the spirit and scope of my invention.

Having thus described my invention, what I claim is:

1. In combination, a group of separately operable signal control relays each having a make-before-break contact combination comprising a back contact and a front contact with a bridging contact member which causes both said front and back contacts to become momentarily closed during the operating stroke of the associated signal control relay, a signal for each of said relays having an operating circuit including the front contact of said make-before-break contact combination of its associated relay, an auxiliary relay, and a plurality of operating circuits for said auxiliary relay each controlled by its associated signal control relay and each including the front contact, the back contact, and the bridging contact member of the associated relay and each also including a rectifier so poled as to prevent back flow of current from one make-before-break contact combination to another, whereby said auxiliary relay will receive an impulse of operating current each time one of said signal control relays is operated.

2. In a signaling system, a group of separately operable relays each having a make-before-break contact combination comprising a back contact and a front contact with a bridging contact member which causes both said front and back contacts to become momentarily closed during the operating stroke of the associated signal control relay, a signal associated with each of said relays and having an operating circuit including the front contact of said make-before-break combination of its associated relay, an auxiliary signal control relay, a plurality of operating circuit paths for said auxiliary relay each controlled by its associated relay of said group and each including the front contact, the back contact, and the bridging contact member of the associated relay, and means associated with each of said circuit paths for preventing the energization of the signals associated with the remaining relays of said group during the operating stroke of a given relay of said group.

3. In a signaling system, a plurality of signal control relays, a signal individual to each relay and solely controlled thereby over an operating circuit which is connected with the operating circuit for another of the individual signals, a signal common to all of said relays, a governing relay for the latter signal having operating circuits each of which includes a portion of the operating circuit of one of said individual signals, and means independent of said control relays and included in each of the operating circuits of said governing relay for preventing the completion of an operating circuit through more than one of the individual signals by operation of any one of said control relays.

4. In a signaling system, a plurality of signal control relays, a signal individual to each relay and controlled solely thereby over an operating circuit which is connected with the operating circuit for another of the individual signals, a signal common to all of said relays, a governing

relay for the latter signal having operating circuits each of which includes a portion of the operating circuit of one of said individual signals, and a rectifier included in each of the operating circuits of said governing relay for preventing the completion of an operating circuit through more than one of the individual signals by operation of any one of said control relays.

5. In combination, a group of separately operable signal control relays each having a continuity transfer contact combination comprising a back contact and a front contact with a bridging contact member therebetween, a signal for each of said relays having an operating circuit including the front contact of said contact combination of its associated relay, an auxiliary signal, a condenser for operating said auxiliary signal, and a plurality of energizing circuits for said condenser each controlled by its associated signal control relay and each including the front contact, the back contact, and the bridging contact member of said contact combination of the associated relay and each also including a rectifier so poled as to prevent back flow of current from one said contact combination to another, whereby said condenser will receive an impulse of energy for operating said auxiliary signal each time one of said signal control relays is operated.

6. In a signaling system, a plurality of signal control relays, a signal individual to each relay and solely controlled thereby over an operating circuit which is connected with the operating circuit for another of the individual signals, a signal common to all of said relays, a condenser for operating said common signal having energizing circuits each of which includes a portion of the operating circuit of one of said individual signals, and means independent of said control relays and included in each of the energizing circuits of said condenser for preventing the completion of an operating circuit through more than one of the individual signals by operation of any one of said control relays.

7. In a signaling system, a plurality of signal control relays, a signal individual to each relay and controlled solely thereby over an operating circuit which is connected with the operating circuit for another of the individual signals, a signal common to all of said relays, a condenser for operating said common signal having energizing circuits each of which includes a portion of the operating circuit of one of said individual signals, and means included in each of the energizing circuits of said condenser for preventing the completion of an operating circuit through more than one of the individual signals by operation of any one of said control relays.

8. In a signaling system, a plurality of signal control relays, a signal individual to each relay and controlled solely thereby over an operating circuit which is connected with the operating circuit for another of the individual signals, a signal common to all of said relays, a condenser for operating said common signal having energizing circuits each of which includes a portion of the operating circuit of one of said individual signals, and a rectifier included in each of the energizing circuits of said condenser for preventing the completion of an operating circuit through more than one of the individual signals by operation of any one of said control relays.

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