June 10, 1952 H. E. SEATON 2,600,132

ANNUNCIATOR SYSTEM

Filed Feb. 23, 1950 3 Sheets-Sheet 1

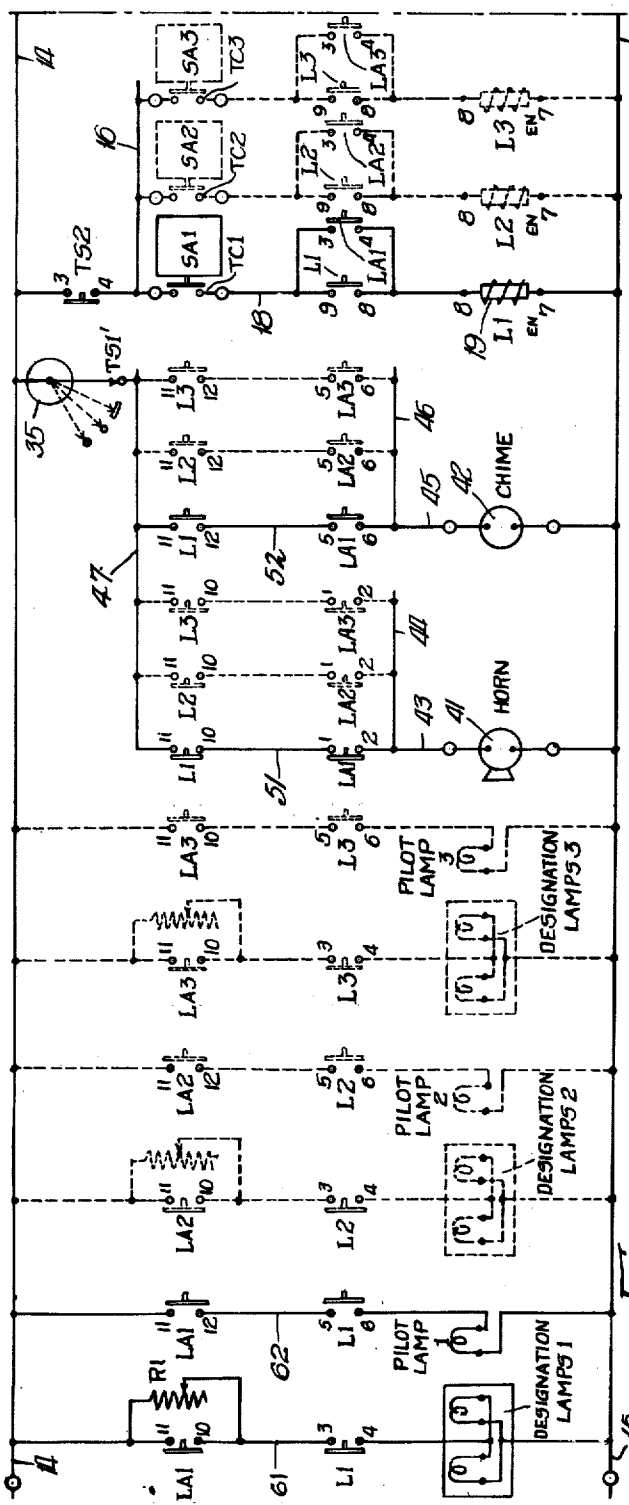
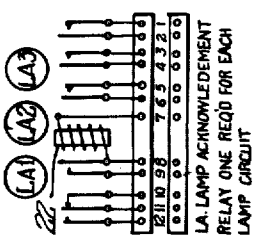
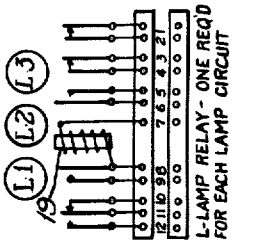


Fig. 1



LA. LAMP ACKNOWLEDEMENT RELAY ONE REQ'D FOR EACH LAMP CIRCUIT

Fig. 4



L-LAMP RELAY - ONE REQ'D FOR EACH LAMP CIRCUIT

Fig. 3

LEGENDS

- COIL FAST OPERATE, FAST RELEASE
- (a) MAKE CONTACT WHEN COIL ENERGIZES
- (b) BREAK CONTACT WHEN COIL ENERGIZES
- PUSH BUTTON SWITCH-MAKES WHEN OPERATED
- PUSH BUTTON SWITCH-BREAK WHEN OPERATED.

Fig. 2

INVENTOR.
Harold E. Seaton,
BY Brown, Jackson, Boettcher & Dienner
attys

June 10, 1952 H. E. SEATON 2,600,132

ANNUNCIATOR SYSTEM

Filed Feb. 23, 1950 3 Sheets-Sheet 2

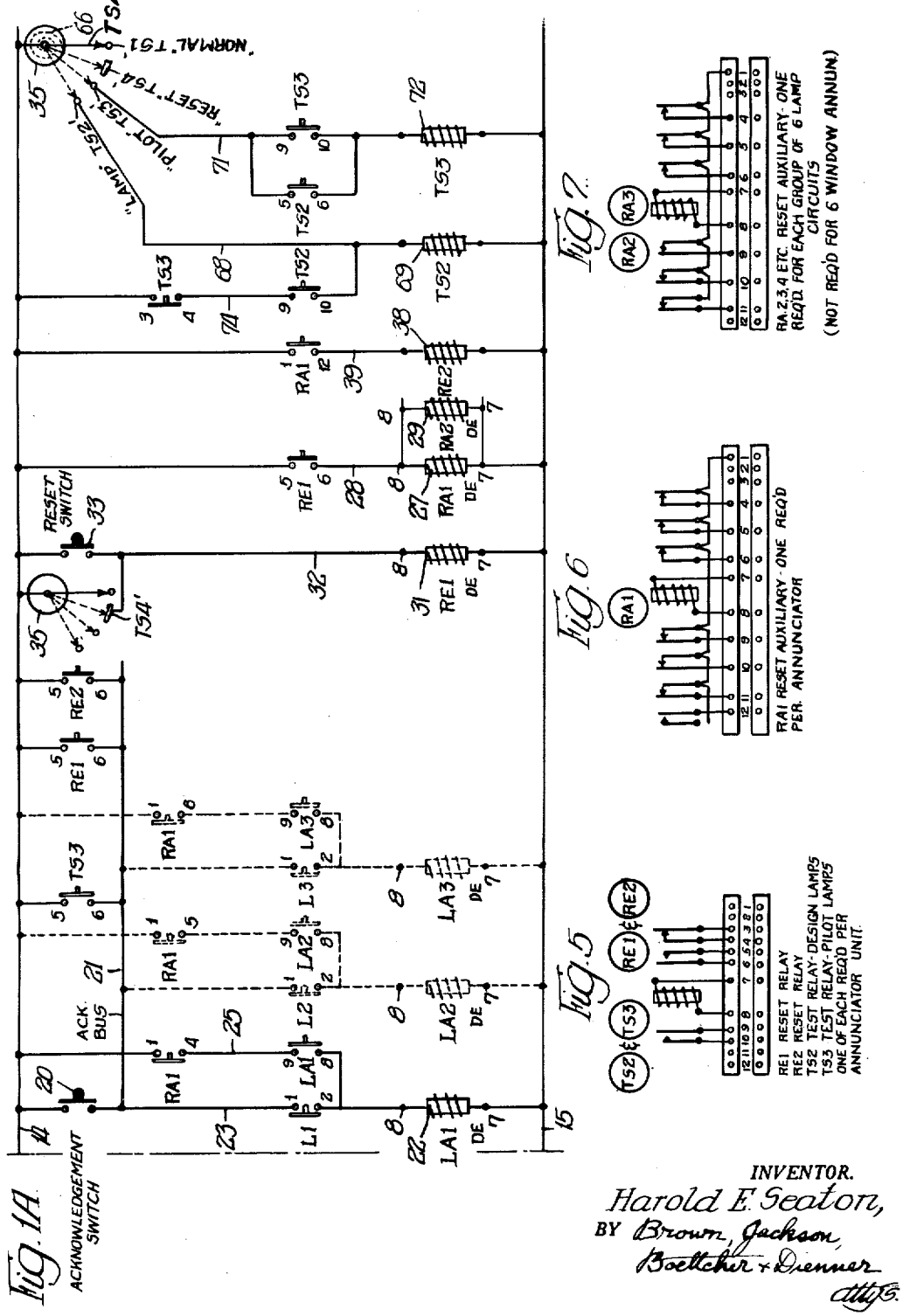


Fig. 1A

Fig. 2

Fig. 6

Fig. 5

INVENTOR.
Harold E. Seaton,
BY Brown, Jackson,
Boettcher & Dienner
attys.

June 10, 1952 H. E. SEATON 2,600,132

Filed Feb. 23, 1950 ANNUNCIATOR SYSTEM 3 Sheets-Sheet 3

Fig. 8.

BASIC OPERATION

TROUBLE:
1 TROUBLE CONTACTS TC1 OPEN
2 BRIGHT ILLUMINATION OF WINDOW DESIGNATION LAMP 1
3 ALARM HORN SOUNDS CONTINUOSLY

ACKNOWLEDGEMENT:
1 MANUAL OPERATION OF COMMON ACKNOWLEDGEMENT SWITCH 20
2 HORN IS SILENCED
3 DESIGNATION REDUCED TO DIM ILLUMINATION (ADJUSTABLE)

RETURN TO NORMAL:
1 TROUBLE CONTACTS CLOSE.
2 CHIME SOUNDS ONE STROKE (OR VIBRATES CONTINOUSLY IF REQUIRED)
3 SMALL PILOT LAMP LIGHTS BESIDE WINDOW DESIGNATION.
4 WINDOW DESIGNATION LAMPS GO OUT.

RESET:
1 MANUAL OPERATION OF COMMON RESET SWITCH 33
2 PILOT LAMP GOES OUT
3 CHIME IS SILENCED (IF CONTINOUS VIBRATING TYPE)

TEST
1 THE MANUAL OPERATION OF THE TEST SWITCH TO POINT "LAMP" CAUSES BRIGHT ILLUMINATION OF ALL WINDOW" DESIGNATION LAMPS"
2 THE MANUAL OPERATION OF THE TEST SWITCH TO POINT PILOT CAUSES ALL PILOT LAMPS TO LIGHT, BRIGHT LAMPS TO GO OUT.
3 THE MANUAL OPERATION OF THE TEST SWITCH TO POINT "RESET" CAUSES PILOT LAMPS TO GO OUT.
4 RELEASING THE HANDLE OF THE SWITCH CAUSES THE SWITCH TO RETURN TO NORMAL.

CIRCUIT OPERATION

TROUBLE:
1 RELAY "L1" DE-ENERGIZES, TRANSFERING ALL "L1" CONTACTS.
2 CONTACTS "L1" 3-4 CLOSE CIRCUIT.
3 CONTACTS "L1" 10-11 CLOSE CIRCUIT.

ACKNOWLEDGEMENT:
1 RELAY "LA1" ENERGIZES, TRANSFERING ALL "LA" CONTACTS.
2 CONTACTS "LA1" 1-2 OPEN CIRCUIT TO HORN.
3 CONTACTS "LA1" 10-11 OPEN SHUNT ON RESISTOR "R1".

RETURN TO NORMAL
1 RELAY "L1" ENERGIZES, TRANSFERING ALL "L1" CONTACTS.
2 CONTACTS "L1" 11-12 CLOSE CIRCUIT.
3 CONTACTS "L1" 5-6 CLOSE CIRCUIT.
4 CONTACTS "L1" 3-4 OPEN CIRCUIT

RESET:
1 RELAY "RE1" ENERGIZES, TRANSFERING ALL "RE1" CONTACTS.
RELAY "RA1" ENERGIZES, TRANSFERING ALL "RA1" CONTACTS.
RELAY "RE2" ENERGIZES, TRANSFERING ALL "RE2" CONTACTS.
* CONTACTS "RE1" 5-6 SHUNT ACKNOWLEDGEMENT SWITCH.
* CONTACTS "RE2" 5-6 SHUNT ACKNOWLEDGEMENT SWITCH.
RELAY "LA1" DE-ENERGIZES, TRANSFERING ALL "LA1" CONTACTS.
2 CONTACTS "LA1" 11-12 OPEN CIRCUIT.
3 CONTACTS "LA1" 5-6 OPEN CIRCUIT.

* RELAY "RE1" AND "RE2" ARE REQUIRED TO PROVIDE THE TIME DELAY NECESSARY TO MAINTAIN POLARITY ON THE LAMP ACKNOWLEDGEMENT BUS "ACK" 21 DURING THE RESET OPERATION. CONTACTS "RE1" 5-6 CLOSE BEFORE "RA" CONTACTS OPEN. CONTACTS "RE2" 5-6 OPEN AFTER "RA" CONTACTS RE-CLOSE

1 SWITCH CONTACTS TS1 OPEN COMMON BUS TO AUDIBLE ALARM SIGNALS.
RELAY TS2 ENERGIZES, TRANSFERING ALL TS2 CONTACTS.
CONTACTS TS2, 3-4 OPEN COMMON BUS TO ALL TROUBLE CONTACTS ALL "L" RELAYS DE-ENERGIZE.
CONTACTS TS2, 9-10 SEAL RELAY TS2 ENERGIZED THROUGH CLOSED CONTACTS TS3, 3-4.
CONTACTS TS2, 5-6 CLOSE THE CIRCUIT BETWEEN POINT TS3 ON TEST SWITCH AND COIL OF RELAY TS3.
2 RELAY TS3 ENERGIZES, TRANSFERING ALL TS3 CONTACTS
CONTACTS TS3, 9-10 MAINTAIN CLOSED CIRCUIT BETWEEN SWITCH POINT TS3 AND COIL OF RELAY TS3.
CONTACTS TS3, 5-6 CLOSE CIRCUIT TO ACK BUS AND ALL "LA" RELAYS ENERGIZE.
CONTACTS TS3, 3-4 OPEN CIRCUIT TO COIL OF RELAY TS2 AND THE RELAY DE-ENERGIZES TRANSFERING ALL TS2 CONTACTS BACK TO NORMAL. THE CLOSING OF CONTACTS TS2, 3-4 RECLOSE COMMON BUS TO TROUBLE CONTACTS ALL "L" RELAYS ENERGIZE.
3 RELAY TS3 DE-ENERGIZES, TRANSFERING ALL CONTACTS BACK TO NORMAL
THE CLOSING OF SWITCH CONTACT TS4 (MOMENTARILLY) CAUSES THE SAME OPERATION AS "RESET" FOR NORMAL OPERATION AS SHOWN ABOVE.
4 THE RETURN OF THE TEST SWITCH TO NORMAL RE-CLOSES THE COMMON BUS TO THE AUDIBLE ALARM SIGNALS.

INVENTOR.
Harold E. Seaton,
BY
Brown, Jackson, Boettcher & Dienner
attys

Patented June 10, 1952 2,600,132

UNITED STATES PATENT OFFICE

2,600,132

ANNUNCIATOR SYSTEM

Harold E. Seaton, Shelby, Ohio, assignor to The Autocall Company, Shelby, Ohio, a corporation of Ohio

Application February 23, 1950, Serial No. 145,812

14 Claims. (Cl. 177—311)

1

The present invention relates to annunciator systems for supervisory situations and the like wherein the annunicator apparatus gives audible and visual signal indications that a trouble condition has arisen in connection with certain supervised apparatus, or that there has been a change in a certain supervised condition or conditions. Such supervised conditions may be typically represented by pressure conditions, temperature conditions, liquid level variations, or innumerable other conditions which must be supervised for giving a quick and reliable signal indication of a change of condition.

Among the objects of the present invention are: to provide a simple, reliable and economical annunicator system for giving audible and visual signal indications in response to the operation of supervisory or trouble contacts which are actuated by the apparatus or condition being supervised; to provide an improved relay and circuit arrangement in such annunicator system whereby the operation of the supervisory or trouble contacts first causes the sounding of an audible alarm on a relatively loud signal device and the bright lighting of certain designation lamps; to provide an improved relay and circuit arrangement in the annunciator system whereby the subsequent manual operation of a common acknowledgement push-button switch causes the loud audible alarm to silence and the bright designation lamps to dim; to provide an improved relay and circuit arrangement in the system whereby the restoration of the supervisory or trouble contacts back to normal condition causes the dimmed designation lamps to go out, causes a pilot lamp to light, and causes an audible restore signal, different from the loud, audible alarm signal, to sound; and to provide an improved relay and circuit arrangement whereby the manual operation of a re-set push-button switch causes the pilot lamp to go out and silences the audible restore signal, such re-setting operation restoring the system to normal.

Other objects, features and advantages of the invention will be apparent from the following detail description taken in connection with the accompanying drawings illustrating one preferred embodiment of the invention.

In these drawings:

Figure 1 and 1*a* are coextensive portions of a circuit diagram embodying the invention;

Figure 2 is a list of legends applicable to the relays, contacts and switches of Figures 1–1*a*;

Figure 3 is a physical diagram showing the

2

operating relation and the electrical connections between the winding and contacts of each lamp relay;

Figure 4 is a similar diagram of each lamp acknowledgement relay;

Figure 5 is a similar diagram of each re-set relay and each test relay;

Figure 6 is a similar diagram of each re-set auxiliary relay;

Figure 7 is a similar diagram of each supplementary re-set auxiliary relay; and

Figure 8 is a chart showing the steps occurring in the basic operation and in the circuit operation.

Referring first to Figures 1 and 1*a*, all parts of the annunciator system are shown as being fed from an electrical supply line 14—15, and for simplicity of illustration and facility of understanding all of these parts are shown in an across-the-line relation between conductors 14—15, but it will be understood that the invention is not limited thereto. The supply line 14—15 can be either alternating current or direct current of suitable potential. My improved system is capable of handling a plurality of trouble conditions, and accordingly I have illustrated three sets of supervisory or trouble contacts designated respectively TC1, TC2 and TC3. In a typical supervisory system, these contacts might, for example, supervise pressure, temperature, liquid level, etc. The rectangles designated SA1, SA2 and SA3 diagrammatically represent supervised apparatus operatively connected to actuate these three sets of supervisory or trouble contacts. One terminal of each set of trouble contacts has connection with a bus 16 which, in turn, is connected with line conductor 14 through break contacts 3, 4 of a test relay TS2. The other terminal of each set of trouble contacts has connection through a separate conductor 18 with the other side 15 of the supply line. Arranged to respond to the three sets of trouble contacts TC1, TC2 and TC3 are three individual lamp relays L1, L2 and L3, each of which have the operating relation and electrical connections shown in Figure 3. The conductor 18 associated with each set of trouble contacts extends in series through the terminals and make contacts 9, 8 and thence through the normally energized winding 19 of its respective lamp relay for connection with the other supply line conductor 15. Associated with each lamp relay L1, L2, L3, etc. is a lamp acknowledgement relay LA1, LA2, LA3, etc., the operating relation and electrical connections of which are shown

in Figure 4. The make contacts 3, 4 of the associated lamp acknowledgement relay LA1, LA2, etc. are connected in shunting relation across the make contacts 9, 8 of the lamp relays L1, L2, etc.

Referring now to the manner in which the lamp acknowledgement relays LA1, LA2, LA3, etc. are energized, these all have multiple connection to an acknowledgement bus 21 which is adapted to be connected with supply line conductor 14 through an acknowledgement switch 20 and through the contacts of certain test relays and reset relays in parallel therewith, all of which will be later described. It will be understood that there is an individual lamp acknowledgement relay LA1, LA2, etc. corresponding to each set of trouble contacts TC1, TC2, etc. The normally deenergized winding 22 of each lamp acknowledgement relay LA1, LA2, etc. is adapted to be energized over conductor 23, which extends from the acknowledgement bus 21 through break contacts 1, 2 of the associated lamp relay L1, L2, etc., and thence to winding 22 of the lamp acknowledgement relay. Connected in shunting relation around the acknowledgement switch 20 and around the break contacts 1 and 2 of each lamp relay L1, L2, etc. is a jumper 25 which extends directly to the supply line conductor 14. Interposed in this jumper connection 25 are the make contacts 8 and 9 of the associated lamp acknowledgement relay LA1, LA2, etc. Also interposed in this jumper 25 are the break contacts 1, 4 (or contacts 1, 6 for relay LA2, or contacts 1, 6 for relay LA3) of the reset auxiliary relay RA1 (shown in Figure 6).

Referring now to this reset auxiliary relay RA1 (shown in Figure 6), the winding 27 thereof is connected across the supply line through conductor 28, interposed in which are the make contacts 5 and 6 of reset relay RE1. The windings 29 of the other reset auxiliary relays RA2, RA3, etc. (shown in Fig. 7) are connected in parallel across winding 27 so that the windings 27 and 29 of all reset auxiliary relays RA1, RA2, RA3, etc. are energized simultaneously.

Referring now to the reset relays RE1 and RE2 (shown in Fig. 5), the winding 31 of reset relay RE1 is adapted to be connected across the supply line 14, 15 through conductor 32. A manually operable reset switch 33 serves to connect conductor 32 to supply conductor 14. Conductor 32 is also adapted to be connected to supply conductor 14 through contacts TS4' of a test switch 35 in the performance of a testing operation, as I shall later describe. The winding 38 of reset relay RE2 is adapted to be connected across the supply line 14, 15 through conductor 39, interposed in which are the contacts 1, 12 of reset auxiliary relay RA1. Make contacts 5 and 6 of both reset relays RE1 and RE2, and make contacts 5 and 6 of test relay TS3 are all connected in parallel from supply conductor 14 to acknowledgement bus 21.

Referring now to the audible signalling apparatus, this comprises a relatively loud alarm signal device, such as a horn 41, and a more quiet audible restore signal, such as a chime 42, the latter being of either the single stroke or continuous vibrating type. The horn 41 is connected through conductor 43 with a horn energizing bus 44, and the chime 42 is connected through conductor 45 with a chime energizing bus 46. These two busses 44 and 46 are adapted to be connected with a main audible signal energizing bus 47 which is normally connected with supply line 14

through contacts TS1' of the testing switch 35. For each set of trouble contacts TC1, TC2, etc. there is provided a separate conductor 51 extending down from main bus 47 to the horn energizing bus 44, and also a separate conductor 52 extending down from bus 47 to the chime sounding bus 46. Interposed in the first conductor 51 (correlated to trouble contacts TC1) are the break contacts 11, 10 of lamp relay L1, and the break contacts 1, 2 of lamp acknowledgement relay LA1. Interposed in the first conductor 52 (correlated to trouble contacts TC1) are the make contacts 11, 12 of lamp relay L1 and the make contacts 5, 6 of lamp acknowledgement relay LA1. As clearly illustrated in Figure 1, this relation of conductors 51 and 52, together with lamp relay contacts and lamp acknowledgement relay contacts is multipled between main bus 47 and the horn energizing bus 44 and chime energizing bus 46 for each additional pair of trouble contacts, such as TC2, TC3, etc., as illustrated in dotted lines.

Referring now to the visual signalling apparatus, this comprises designation lamps and a pilot lamp arranged to respond to the operation of each set of trouble contacts TC1, TC2, etc., viz: a pair of designation lamps 1 and a pilot lamp 1 are arranged to respond functionally to trouble contacts TC1; a pair of designation lamps 2 and a pilot lamp 2 are arranged to respond functionally to trouble contacts TC2, etc.; this same arrangement being repeated for each additional set of trouble contacts. Each pair of designation lamps is interposed in a conductor 61 connected across the supply circuit, and each pilot lamp is interposed in a conductor 62 also connected across the supply circuit. Conductor 61 is controlled by break contacts 11, 10 of lamp acknowledgement relay LA1, and by the break contacts 3, 4 of lamp relay L1, both sets of contacts being interposed in series in this conductor. An adjustable resistor R1 is connected in shunt across contacts 11, 10 of lamp acknowledgement relay LA1, so that when these contacts open the designation lamps continue to burn, but with a dimmed brilliance, which can be adjusted to any desired value by adjusting the resistor R1. The conductor 62 of the pilot lamp is controlled by make contacts 11, 12 of lamp acknowledgement relay LA1, and by the make contacts 5, 6 of lamp relay L1, both interposed in series in conductor 62. It will be seen that this same combination of designation lamps and pilot lamps is multipled across the supply line for each additional set of trouble contacts TC2, TC3, etc., as illustrated in dotted lines.

Referring now to the test switch 35, this is preferably in the form of a manually actuated, spring return switch comprising a wiping contact arm TSA adapted to be rotated through the medium of a knob or the like. A return spring 66 normally tends to hold the contact arm TSA in a "normal" position in engagement with stationary contact TS1', as best shown at the right hand end of Figure 1A. This normal position normally supplies potential from supply conductor 14 to the main audible signal energizing bus 47, as shown in Figure 1.

In the performance of a testing operation, the testing switch is rotated manually to make engagement with the series of stationary testing contacts TS2', TS3' and TS4'. "Lamp" contact TS2' connects through conductor 68 with the winding 69 of test relay TS2, and "pilot" contact TS3' connects through conductor 71 with

the winding of test relay TS3 (Fig. 5). The other contact TS4' is adapted to establish a shunt across the contacts of reset switch 33, as previously described. A jumper 74 extends from conductor 68 to supply conductor 14, and interposed in this jumper are the make contacts 9, 10 of test relay TS2 and the break contacts 3, 4 of test relay TS3. Interposed in conductor 71 are the make contacts 9, 10 of test relay TS3, and connected in parallel across said latter contacts are the make contacts 5, 6 of test relay TS2.

The basic operation and the circuit operation of the entire system are tabulated in Figure 8, and attention is directed thereto for a detailed understanding of the operation. This also applies to the testing operations which can be performed by the manually actuated testing switch 35, the operations of which are also listed in Figure 8.

I also contemplate a further embodiment of my invention having a more simplified testing arrangement. In this embodiment the multiple point testing switch 35 and the two test relays TS2 and TS3 are completely eliminated, and instead of the bus 16 being connected to supply conductor 14 through contacts 3, 4 of test relay TS2, it is connected thereto through a normally closed push-button switch which cuts off the bus 16 from supply conductor 14 when the push button is depressed in the performance of a testing operation. In such embodiment, the main audible signalling bus 47 remains permanently connected to supply line 14 instead of being connected through point TS1' of the multiple point testing switch. Also, the testing connection from supply conductor 14 to acknowledgement bus 21 through contacts 5, 6 of test relay TS3 is eliminated, and the testing connection from supply conductor 14 to conductor 32 through switch point contact TS4' in shunt of reset switch 33 is eliminated. Otherwise the circuit remains the same. In such embodiment of my invention, the manual operation of the push-button test switch produces the same operations as the automatic opening of the trouble contacts. The acknowledgement switch 20 and the reset switch 33 are operated in the same sequence as for an actual trouble contact opening and reclosing.

It will be understood that the signalling apparatus, relays etc. can be mounted behind an instrument panel or housed in any suitable form of cabinet, provided with sight windows for the designation lamps containing lettered or numbered designations of the location of the trouble or type of trouble, and sight glasses for the pilot lamps etc.

While I have illustrated and described what I regard to be the preferred embodiments of my invention, nevertheless it will be understood that such are merely exemplary and that numerous modifications and rearrangements may be made therein without departing from the essence of the invention.

I claim:

1. In an annunciator system of the class described, the combination of supervisory contacts having a normal position and adapted to be placed in an abnormal position in response to a trouble condition or the like, audible signalling apparatus comprising a trouble sounding signal device and a restore sounding signal device, visual indicating apparatus comprising a designation lamp and a pilot lamp, an arrangement of relay and circuit means responsive to said supervisory contacts for causing said trouble signal device to give an audible indication and said designation lamp to give a visual indication when said supervisory contacts move into said abnormal position in response to a trouble condition or the like, an acknowledgement switch, an arrangement of relay and circuit means responsive to said acknowledgement switch for controlling said trouble signal device and said designation lamp, an arrangement of relay and circuit means responsive to the restoration of said supervisory contacts to normal position for operating said restore sounding signal device and said pilot lamp, a reset switch, and an arrangement of relay and circuit means responsive to said reset switch for controlling said restore sounding signal and said pilot lamp.

2. In an annunciator system of the class described, the combination of supervisory contacts having a normal position and adapted to be placed in an abnormal position in response to a trouble condition or the like, audible signalling apparatus comprising a trouble sounding signal device and a restore sounding signal device, visual indicating apparatus comprising a designation lamp and a pilot lamp, an arrangement of relay and circuit means responsive to said supervisory contacts for causing said trouble signal device to give an audible indication and said designation lamp to give a visual indication when said supervisory contacts move into said normal position in response to a trouble condition or the like, a manually actuated acknowledgment switch, an arrangement of relay and circuit means responsive to said acknowledgment switch for silencing said trouble signal device and for dimming said designation lamp, and an arrangement of relay and circuit means responsive to the restoration of said supervisory contacts to normal position for causing said restore signal device to sound and said pilot lamp to light.

3. In an annunciator system of the class described, the combination of supervisory contacts having a normal closed position and adapted to be placed in an abnormal open position in response to a trouble condition or the like, audible signalling apparatus comprising means operative to emit two distinctive sounds, one for designating a trouble condition and the other for designating a restored condition, visual signalling apparatus, an arrangement of normally energized relay and circuit means responsive to said supervisory contacts for causing the operation of said audible signalling apparatus to emit said trouble designating sound and also for causing the operation of said visual signalling apparatus when said supervisory contacts move into said abnormal open position in response to a trouble condition or the like, an acknowledgment switch, an arrangement of relay and circuit means responsive to said acknowledgment switch for modifying the operation of said audible signalling apparatus and of said visual signalling apparatus, and an arrangement of relay and circuit means responsive to the restoration of said supervisory contacts to their normal position for further modifying the operation of said audible signalling apparatus and of said visual signalling apparatus, a reset switch, and an arrangement of relay and circuit means responsive to said reset switch for discontinuing the operation of said audible signalling apparatus and of said visual signalling apparatus.

4. In an annunciator system of the class described, the combination of supervisory contacts

having a normal closed position and adapted to be placed in an abnormal open position in response to a trouble condition or the like, audible signalling apparatus, visual signalling apparatus comprising a trouble designating lamp and a pilot lamp, an arrangement of normally energized relay and circuit means responsive to said supervisory contacts for causing the operation of said trouble designating lamp and of said visual signalling apparatus when said supervisory contacts move into said abnormal position in response to a trouble condition or the like, an acknowledgment switch, an arrangement of relay and circuit means responsive to said acknowledgment switch for modifying the operation of said audible signalling apparatus and of said visual signalling apparatus, and an arrangement of relay and circuit means responsive to the restoration of said supervisory contacts to their normal position for further modifying the operation of said audible signalling apparatus and of said visual signalling apparatus.

5. In an annunciator system, the combination of supervisory contacts having a normal closed position and adapted to be placed in an abnormal open position in response to a trouble condition or the like, audible signalling apparatus, visual signalling apparatus, an arrangement of normally energized relay and circuit means responsive to said supervisory contacts for causing the operation of said audible signalling apparatus and of said visual signalling apparatus when said supervisory contacts move into said abnormal position in response to a trouble condition or the like, an acknowledgment switch, an arrangement of relay and circuit means responsive to said acknowledgment switch for modifying the operation of said audible signalling apparatus and of said visual signalling apparatus, a reset switch, and an arrangement of relay and circuit means responsive to said reset switch for discontinuing the operation of said audible signalling apparatus and of said visual signalling apparatus.

6. In an annunciator system, the combination of supervisory contacts having a normal closed position and adapted to be placed in an abnormal open position in response to a trouble condition or the like, audible signalling apparatus, visual signalling apparatus, an arrangement of normally energized relay and circuit means responsive to said supervisory contacts for causing the operation of said audible signalling apparatus and of said visual signalling apparatus when said supervisory contacts move into said abnormal open position in response to a trouble condition or the like, and an arrangement of relay and circuit means responsive to the restoration of said supervisory contacts to their normal position for modifying the operation of said audible signalling apparatus and of said visual signalling apparatus, a reset switch, and an arrangement of relay and circuit means responsive to said reset switch for discontinuing the operation of said audible signalling apparatus and of said visual signalling apparatus.

7. In an annunciator system, the combination of supervisory contacts having a normal closed position and adapted to be placed in an abnormal open position in response to a trouble condition or the like, audible signalling apparatus comprising a trouble sounding signal device and a restore sounding signal device, an arrangement of normally energized relay and circuit means responsive to said supervisory contacts for causing said trouble sounding signal device to give an audible indication when said supervisory contacts move into said abnormal open position in response to a trouble condition or the like, an acknowledgement switch, an arrangement of relay and circuit means responsive to said acknowledgement switch for controlling said trouble sounding signal device, an arrangement of relay and circuit means responsive to the restoration of said supervisory contacts to normal position for operating said restore sounding signal device, a reset switch, and an arrangement of relay and circuit means responsive to said reset switch for controlling said restore sounding signal device.

8. In an annunciator system, the combination of supervisory contacts having a normal position and adapted to be placed in an abnormal position in response to a trouble condition or the like, visual indicating apparatus comprising a designational lamp and a pilot lamp, an arrangement of relay and circuit means responsive to said supervisory contacts for causing said designational lamp to give a visual indication when said supervisory contacts move into said abnormal position in response to a trouble condition or the like, an acknowledgement switch, an arrangement of relay and circuit means responsive to said acknowledgement switch for controlling said designational lamp, an arrangement of relay and circuit means responsive to the restoration of supervisory contacts to normal position for operating said pilot lamp, a reset switch, and an arrangement of relay and circuit means responsive to said reset switch for controlling said pilot lamp.

9. In an annunciator system, the combination of supervisory contacts having a normal position to a trouble condition or the like, audible signalling apparatus, an arrangement of relay and circuit means responsive to said supervisory contacts for causing said audible signalling apparatus to give an audible indication when said supervisory contacts move into abnormal position in response to a trouble condition or the like, an acknowledgement switch, an arrangement of relay and circuit means responsive to said acknowledgement switch for modifying the operation of said audible signalling apparatus, an arrangement of relay and circuit means responsive to the restoration of said supervisory contacts to their normal position for further modifying the operation of said audible signalling apparatus, a reset switch, and an arrangement of relay and circuit means responsive to said reset switch for discontinuing the operation of said audible signalling apparatus.

10. In an annunciator system, the combination of supervisory contacts having a normal position and adapted to be placed in an abnormal position in response to a trouble condition or the like, visual signalling apparatus, an arrangement of relay and circuit means responsive to said supervisory contacts for causing said visual signalling apparatus to give a visual indication when said supervisory contacts move into said abnormal position in response to a trouble condition or the like, an acknowledgement switch, an arrangement of relay and circuit means responsive to said acknowledgement switch for modifying the operation of said visual signalling apparatus, an arrangement of relay and circuit means responsive to the restoration of said supervisory contacts to a normal position for further modifying the operation of said visual sig-

nalling apparatus, a reset switch, and an arrangement of relay and circuit means responsive to said reset switch for discontinuing the operation of said visual signal apparatus.

11. In an annunciator system, of the class described, the combination of supervisory contacts having a normal position and adapted to be placed in an abnormal position in response to a trouble condition or the like, audible signalling apparatus comprising a trouble sounding signalling device and a restore sounding device, visual indicating apparatus comprising a designation lamp and a pilot lamp, an arrangement of relay and circuit means responsive to said supervisory contacts for causing said trouble signalling device to give an audible indication and for causing said designation lamp to give a visual indication when said supervisory contacts move into said abnormal position in response to a trouble condition or the like, an acknowledgement switch, an arrangement of relay and circuit means responsive to said acknowledgement switch for controlling said trouble signalling device and said designation lamp, an arrangement of relay and circuit means responsive to the restoration of said supervisory contacts to normal position for operating said restore sounding signalling device and said pilot lamp, a reset switch, an arrangement of relay and circuit means responsive to said reset switch for controlling said restore sounding signal and said pilot lamp, and testing apparatus comprising a manual actuated multiple position testing switch together with relay and circuit means associated therewith whereby one position of said testing switch is operative to test said indication lamps, another position of said testing switch is operative to test said pilot lamps, and another position of said testing switch is operative to test the reset function performed by the operation of said reset switch.

12. In an annunciator system, the combination of supervisory contacts having a normal position and adapted to be placed in an abnormal position in response to a trouble condition or the like, visual indication apparatus comprising a designation lamp and a pilot lamp, an arrangement of relay and circuit means responsive to said supervisory contacts for causing said designation lamp to give a visual indication when said supervisory contacts move into said abnormal position in response to a trouble condition or the like, an acknowledgement switch, an arrangement of relay and circuit means responsive to said acknowledgement switch for controlling said designation lamp, an arrangement of relay and circuit means responsive to the restoration of said supervisory contacts to normal position for operating said pilot lamp, a reset switch, an arrangement of relay and circuit means responsive to said reset switch for controlling said pilot lamp, and testing apparatus comprising a manually actuated multiple position testing switch together with relay and circuit means associated therewith, whereby one position of said switch is operative to test said designation lamp and another position of said switch is operative to test said pilot lamp.

13. In an annunciator system, the combination of supervisory contacts having a normal position and adapted to be placed in an abnormal position in response to a trouble condition or the like, signalling apparatus comprising a primary signalling device and a secondary signalling device, an arrangement and relay and circuit means responsive to said supervisory contacts for causing said primary signalling device to give an alarm indication when said supervisory contacts move into said abnormal position in response to a trouble condition or the like, an acknowledgement switch, an arrangement of relay and circuit means responsive to said acknowledgement switch for controlling said primary signal device, an arrangement of relay and circuit means responsive to the restoration of said supervisory contacts to normal position for operating said secondary signalling device, a reset switch, and an arrangement of relay and circuit means responsive to said reset switch for controlling said secondary signalling device.

14. In an annunciator system, the combination of supervisory contacts having a normal position and adapted to be placed in an abnormal position in response to a trouble condition or the like, signalling apparatus comprising a primary signalling device and a secondary signalling device, an arrangement of relay and circuit means responsive to said supervisory contacts for causing said primary signalling device to give an alarm indication when said supervisory contacts move into said abnormal position in response to a trouble condition or the like, an acknowledgement switch, an arrangement of relay and circuit means responsive to said acknowledgement switch for controlling said primary signal device, an arrangement of relay and circuit means responsive to the restoration of said supervisory contacts to normal position for operating said secondary signalling device, a reset switch, an arrangement of relay and circuit means responsive to said reset switch for controlling said secondary signalling device, and testing apparatus operative to test said primary signalling device and said secondary signalling device.

HAROLD E. SEATON.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,395,826	Hopkins	Nov. 1, 1921
1,675,989	Oneal	July 3, 1928
2,215,187	Muehter	Sept. 17, 1940
2,420,481	Jackson et al.	May 13, 1947