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SIGNAL APPARATUS

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Fig. 1

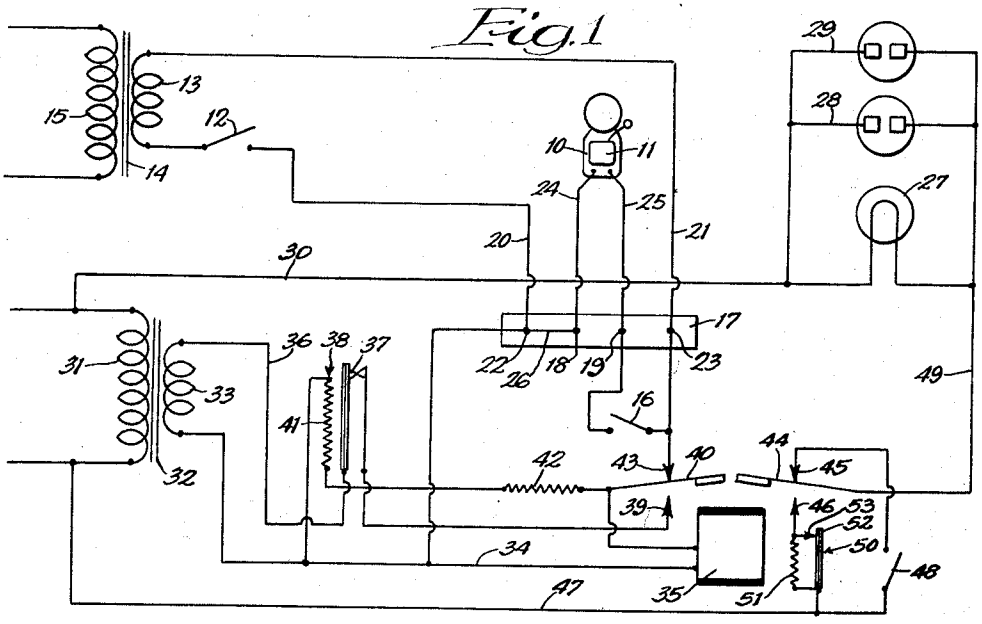
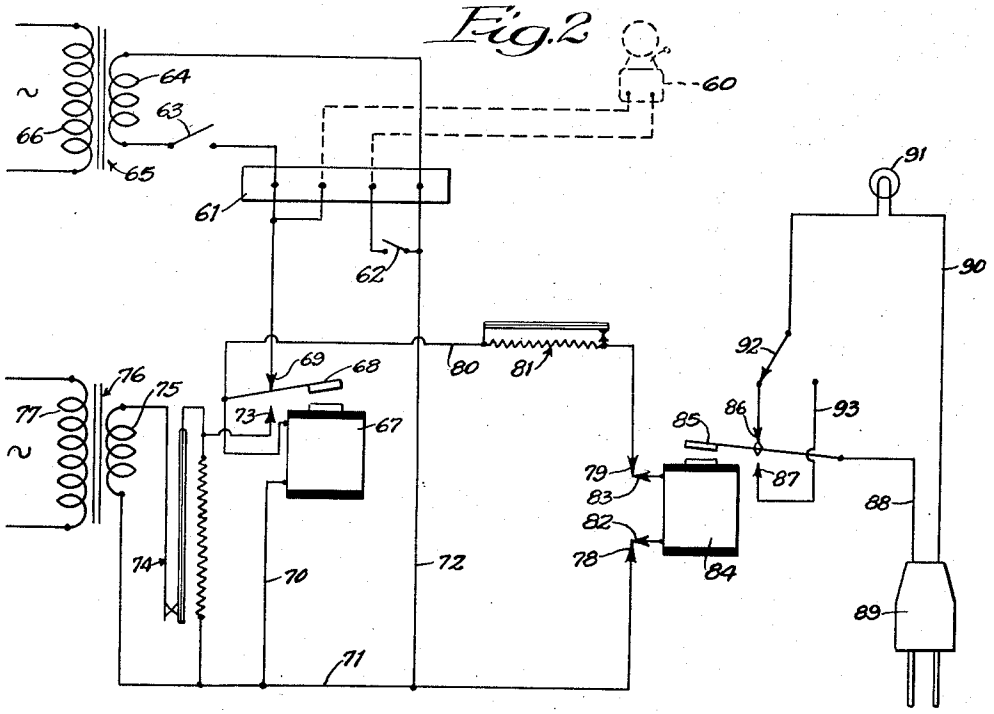



Fig. 2




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# SIGNAL APPARATUS

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This invention relates to signal apparatus operable to provide a signal or indication of a condition change in apparatus with which it is associated. The signal apparatus or annunciator is especially useful as a door announcer, but it will be apparent that it has numerous other applications.

Door announcers that are operative to provide an audible indication of the presence of someone at the door are widely used and serve their purpose satisfactorily. However, there are a vast number of persons that are hard of hearing and for these persons audible door announcers are practically useless. No satisfactory alternative for audible door announcers is known at present and there exists then a need for some means that is operable to indicate or announce to the hard of hearing the presence of someone at the door of their homes and that wishes to announce their presence to those within that may be hard of hearing.

It is accordingly an object of this invention to provide a means for satisfying this deficiency in the art. Another object of the invention is to provide signal apparatus operative to announce or to apprise of condition changes in systems with which the apparatus is employed, and that is particularly suited for use as a door announcer functioning in such embodiment to give a visual signal when the door button is depressed. Still another object is to provide signal or annunciator apparatus that is operative to provide a continuing indication of a momentary change in apparatus or systems with which it is used, as for example, when a doorbell button is momentarily depressed.

A further object is in the provision of signal apparatus operative to provide a flashing visual indication that some predetermined change has occurred in apparatus or systems with which the signal apparatus is employed, the flashing indication or signal being maintained where desired for some preselected period and thereafter automatically terminated. Still a further object is in the provision of signal apparatus or a silent announcer adapted for use in conjunction with the customary doorbell system, and which is operative upon the momentary depressing of the doorbell button to provide a flashing visual signal for a predetermined period far in excess of the period for which the doorbell button is depressed, the flashing indicator being selectively operable to interrupt a continuously energized light, for example, or to cyclically energize a light that is normally de-energized or extinguished. Yet a further object is to provide apparatus as described above in which a plurality of indicators may all be connected to the same apparatus and placed at various remote locations, and when desired to extend only very low voltage lines between the remote indicators and the main components of the apparatus. Additional objects and advantages will appear as the specification proceeds.

Embodiments of the invention are illustrated in the accompanying drawings, in which—



Figure 1 is a schematic circuit diagram showing one embodiment of the invention; and Figure 2 is a schematic circuit diagram showing a further embodiment of the invention.

As has been brought out hereinbefore, the signal apparatus or annunciator of this invention has extensive applications and can be used to give indications of condition changes of predetermined character in apparatus with which it is associated. The indicator is self sustaining, and to cause it to operate it is only required that the circuit be either momentarily or continuously completed by switch means which is controlled by the apparatus with which the signal device is arranged. A typical embodiment of the apparatus in association with a conventional doorbell system is shown in the drawings, and it should be appreciated that the doorbell system is simply exemplary of the many different systems with which the signal apparatus is useful. In describing the invention in detail reference will first be made to Figure 1.

Illustrated in Figure 1 is a conventional doorbell that is designated generally with the numeral **10**. The doorbell **10**, as is customary, has a low voltage coil **11** connected through a switch **12** with the secondary winding **13** of a transformer designated generally with the numeral **14** and that has the usual primary winding **15** connected to a suitable power source not shown, and which may be the 110 volt A.C. house line. The secondary winding **13** may provide 6 volts A.C. for the doorbell **10**, but it will be apparent that the doorbell might be designed to operate at some other voltage and conceivably could be operated directly from the power line to the house. A switch **16** is also provided in circuit with the doorbell **10** and when the switch **16** is closed the doorbell system operates in the usual manner. With the switch **16** open, as shown, the doorbell **10** is inoperative, and upon closing of the switch **12**, visual indications are provided rather than the audible signal normally furnished by the doorbell **10**.

For convenience in associating the signal apparatus with the doorbell or with some other system, a terminal strip **17** is provided having terminals **18** and **19** thereon. As is seen in Figure 1, the signal device is arranged with the doorbell simply by connecting the leads **20** and **21** to the terminals **22** and **23** rather than to the terminals of the doorbell, and by thereafter connecting the leads **24** and **25** to the terminals **18** and **19**. A jumper **26** extends between the terminals **18** and **22** for completing the circuit.

The switch **12** may be of any suitable type and may be manually actuated, as in the case of a doorbell button, or may be actuated in any other manner. For example, the switch **12** may be pressure sensitive and arranged to close and complete the circuit when the pressure in a given line exceeds some predetermined value. The switch **12** might also be controlled by a timer, for example, and it will be apparent that any other suitable means might be provided for actuating the switch.

An indicator or signal device **27** is provided in the circuit and in the specific illustration given, the device **27** is an electric light. Connected in parallel with the light **27** are a plurality of remotely located plugs or sockets **28** and **29** that may be adapted to receive a light or other indicator device that is operative to provide visual indications in a manner to be hereinafter described when the switch **12** is depressed.

One side of the indicator **27** is connected through a lead **30** to the primary **31** of a transformer **32**. The primary **31** will be connected to a power outlet in the house, and may be designed to operate at 110 volts A.C. The secondary winding **33** of the transformer **32** has one side

thereof connected to lead 34 to a solenoid 35. The other side of the secondary winding 33 is connected through lead 36 and the contacts 37 of a timer 38 and through contact 39 and movable solenoid arm 40 to the solenoid 35. The timer 38 is provided with a heater 41 that is connected between line 34 and through resistance 42 with the arm 40 of the solenoid. The timer 38 is operative to interrupt the circuit by breaking the contact terminals 37 upon heating of the heater 41 following the flow of current therethrough for a predetermined period of time.

As is seen in Figure 1, when the solenoid 35 is de-energized, the arm 40 thereof makes contact with the contact member 43 that in turn is connected to the terminal 23 on the terminal strip 17. The solenoid 35 is also equipped with a second movable contact arm 44 that engages contact member 45 when the solenoid 35 is de-energized and that is adapted to engage the contact member 46 when the solenoid is energized. Contact member 45 and the primary winding 31 of transformer 32 are connected together through lead 47 having a switch 48 interposed in circuit therewith. The movable arm 44 is connected through lead 49 to one side of the indicator 27. It will be apparent from an inspection of Figure 1 that the light or indicator 27 is energized when the solenoid 35 is de-energized and when the switch 48 is closed.

When desired, a flasher unit designated generally with the numeral 50 may be incorporated in the circuit so as to cause the indicator 27 to flash on and off when the switch 12 is depressed. The flasher unit 50 is provided with the usual heater member 51 that has one side thereof connected to the contact point 46 and at its other end is connected to the lead 47 and thereby to the primary winding 31 of transformer 32. The flasher is also equipped with the conventional contact arm 52 having one end thereof connected to lead 47 and the other end thereof adapted to be connected to the contact member 46 through the contact point 53.

In operation of the annunciator or signal apparatus, the circuits are connected as described hereinbefore. If it is desired to have the doorbell 10 energized when the switch 12 is depressed, the switch 16 will be moved to closed position. On the other hand, if the doorbell 10 is to be taken from the circuit, the switch 16 is moved to the open position, as is shown in Figure 1. When the switch 12 is depressed momentarily, a circuit is completed through the line 21, terminal 23, contact 43 and solenoid arm 40 to one side of the solenoid 35. The opposite side of the solenoid is connected through line 34, terminal 22, line 20 and switch 12 to the secondary 13 of the transformer 14. Thus, when the switch 12 is momentarily depressed, the solenoid 35 is energized.

Energizing the solenoid 35 causes the arms 40 and 44 thereof to swing downwardly and into engagement respectively with contacts 39 and 46. Such movement of the arm 40 breaks the circuit through the secondary winding 13 of the transformer 14, and it will be apparent that it is unimportant whether the switch 12 is thereafter permitted to open or remains in closed position. When the arms 40 and 44 are swung downwardly, the solenoid 35 remains energized for a circuit therethrough is completed by means of the lead 34, secondary 33 of transformer 32, lead 36, through the timer contacts 37 and through contact 39 and arm 40. Thus, the solenoid is maintained in an energized state independently of the position of the switch 12 following a momentary closing thereof. Since the solenoid is energized, the arm 44 thereof will be in engagement with the contact 46 and through leads 47, 49 and 30 the indicator 27 will be connected across the primary winding 31 of the transformer 32. Thus, the indicator will be energized.

The flasher unit 50 will function to cyclically make and break the circuit between leads 47 and 49 and, therefore, the indicator light 27 will flash on and off. It will be appreciated that the flasher unit 50 may be selected so that the light 27 flashes at any desired rate.

This condition of the circuit will be maintained until the timer 38, which provides contacts 37 in series with the solenoid 35 functions to break the contacts 37 and thereby interrupt the solenoid circuit and cause the solenoid to become de-energized. The timer 38 may be wholly conventional and may be arranged to interrupt the solenoid circuit after any desired lapse of time. In the specific embodiment shown in Figure 1, the timer is provided with a heater 41 that functions to break the contacts 37 after a current flow of predetermined magnitude has heated the member 41 to some predetermined value. Once the timer 38 functions to interrupt the solenoid circuit, the signal apparatus will remain de-energized until the switch 12 is again depressed.

The resistance 42 in series with the heater element 41 of the timer 38 is provided so that the magnitude of the current flowing through the member or element 41 can be regulated. That is to say, to change the time cycle of the timer 38 it is only necessary to alter the value of the resistance 42. It will be appreciated that initially the timer 38 may be selected so that the timed cycle thereof is keyed to fit the requirements of the signal system.

Where the signal apparatus is used in conjunction with a doorbell system, it would appear that a flashing indication that is maintained for a period of about one minute following the momentary depressing of the doorbell button 12 will provide a sufficient length of time to attract the attention of persons within the house. Therefore, the switch or timer 38 may have a cycle of about one minute. In a similar manner the cyclic opening and closing of the circuit through the flasher 51 may have any suitable period and the flasher 51 may be chosen accordingly.

The indicator light 27 can be arranged so that it is normally de-energized and flashes on and off only following a depressing of the doorbell switch 12, or it can be arranged so that it is continuously energized and flashes or is repetitiously de-energized following a depressing of the doorbell switch 12. These conditions are provided by selective positioning of the switch 48. When the switch is open, as is shown in Figure 1, the indicator light 27 is normally de-energized. On the other hand, when the switch 48 is closed, the indicator 27 is normally energized. Thus, the indicator light 27 may be used as a night light, for example.

The embodiment of the invention illustrated in Figure 2 is essentially the same as that described in detail with reference to Figure 1, except that the indicator or signal unit is arranged so that while still energized by a relatively high voltage, that is, the 110 volt A.C. line power, it is not necessary to connect the indicator with the other components of the apparatus by means of leads that carry 110 volts A.C. Thus, remotely located indicator units may be connected to the remaining elements of the signal apparatus through leads that carry, for example, 6 volts A.C.

For purposes of illustration, the signal apparatus is shown associated with a doorbell system that is shown in dotted lines and that is designated generally with the numeral 60. The doorbell is connected to a terminal strip 61 and through the terminal strip and switches 62 and 63 with the secondary 64 of a transformer 65 having a primary winding 66. The solenoid 67 is connected through its movable arm 68 and contact member 69 to the terminal strip 61 while the opposite side thereof is connected through line 70 and leads 71 and 72 to the terminal strip 61. It is apparent then that when the switch 63, which may be the doorbell button, is depressed that the solenoid 67 is energized.

When the solenoid 67 is energized the movable arm 68 thereof is drawn downwardly and into engagement with the contact member 73 which is connected through timer 74 with the secondary winding 75 of transformer 76, which is also provided with a primary winding 77 connected to an appropriate power outlet. The opposite

side of the solenoid 67 is connected through lead 70 and lead 71 with the secondary winding 75 of the transformer. It will be apparent then that the solenoid 67 remains energized after a momentary closing of the switch 63 until the circuit through the secondary winding 75 is interrupted by the timer 74 in the same manner hereinbefore described in detail.

Lead 71 terminates in a junction or terminal 78 that may comprise a part of a plug having a second terminal 79 that is connected through lead 80 and timer 74 with the secondary winding 75 of transformer 76. A flasher unit 81 may be interposed in the lead 80 so that the supply of power to the terminals 78 and 79 is cyclically interrupted. The flasher unit 81 corresponds to the unit 50 described in detail with reference to Figure 1, and therefore, a further description will not now be set forth in detail. The plug or junction provided by the terminals 78 and 79 is adapted to be connected with a plug provided by the terminals 82 and 83 that in turn are connected to a solenoid 84. The solenoid 84 has a movable arm 85 adapted to electrically engage the contact 86 when the solenoid is de-energized and to engage the contact 87 when the solenoid is energized. The arm 85 is connected through lead 88 with a plug 89 adapted to be inserted into a power outlet. A lead 90 is also connected with the plug 89 and with an indicator 91 that may be an electric light. The opposite side of the indicator 91 is connected to the movable arm of a switch 92. When the switch 92 is in the position illustrated in Figure 2 it is connected with the contact member 86 and when it is swung to the other of its positions it is connected through lead 93 with the contact member 87.

The operation of this embodiment is substantially the same as the operation of the embodiment illustrated in Figure 1. More specifically, when the switch 63 is depressed the solenoid 67 is energized and it remains energized after the switch 63 is released, for once energized it is connected across the secondary winding 75 of the transformer 76. The solenoid remains energized until the time cycle of the timer 74 elaspses and at that time the solenoid circuit is de-energized. The solenoid 84 is cyclically energized through the flasher unit 81, and when energized the arm 85 thereof makes electric contact with the member 87 which causes the circuit through the indicator light 91 to be interrupted. Thus, when the switch 92 is in the position shown in Figure 2, the indicator light 91 is continuously energized, and it is cyclically de-energized or extinguished as the solenoid 84 is cyclically energized through the flasher unit 81. On the other hand, when the switch 92 is swung into engagement with the other of its contacts, the indicator light 91 is normally de-energized and is cyclically energized as the circuit through the solenoid 84 is repetitiously completed and interrupted. Particularly with this form of the invention the indicator 91 might be an ordinary lamp, such as a reading lamp, and by proper positioning of the switch 92 the lamp could be used to fulfill its customary function and when the switch 63 is depressed the lamp would then flash and the presence of someone at the door would then be made apparent.

It will be appreciated that we have provided an annunciator or signal apparatus having many useful applications and that is particularly adapted for use in conjunction with conventional doorbell systems for apprising the hard of hearing that someone is depressing their doorbell button. The system provides an indication that lasts for a predetermined time of sufficient duration to permit a person's attention to be attracted by the visual indicator. At the same time, the flashing indicator does not remain energized indefinitely unless such condition is desired.

While in the foregoing specification embodiments of the invention have been illustrated and described in considerable detail for purposes of providing a complete and clear description of the invention, it will be apparent



to those skilled in the art that numerous changes may be made in these details without departing from the spirit and principles of the invention.

We claim:

1. An annunciator circuit of the character described, comprising a solenoid equipped with normally open and normally closed contact members and also with a movable arm for selectively engaging the respective contact members when said solenoid is energized and deenergized, a first source of power for energizing said solenoid and being connected thereto through said normally closed contact members, a second source of power for maintaining said solenoid in an energized condition after such energization thereof and being connected thereto through said normally open contact members, a switch in circuit with said first source of power for establishing such connection thereof with said solenoid to energize the same when the switch is closed, energization of said solenoid being effective to disconnect said first power source therefrom and at the same time to effect connection of said solenoid with said second power source whereby said solenoid then remains energized independently of the position of said switch subsequent to a momentary closing thereof, an indicator, circuit means for said indicator and comprising a power source therefor and being connected with said solenoid for control thereby, interrupter means in said circuit means for repetitively completing and interrupting the same when said solenoid is energized, and timer means in circuit with said second power source and solenoid for interrupting the connection of said second power source to said solenoid at the expiration of a predetermined time interval, said first source of power and switch therefor comprising a unitary signal system having its own standard indicator of a character differing from that of the aforesaid indicator and to be replaced thereby.

2. The circuit of claim 1 in which selector means are provided in said circuit means for determining the normal condition of said indicator as being selectively energized or deenergized, whereby said interrupter means is operative to repetitively deenergize or energize said indicator in accordance with the condition of said selector means.

3. In a signal device adapted for use as a door annunciator, a solenoid equipped with normally open contacts closed by the energization of the solenoid, a first low voltage circuit connected with said solenoid for energizing the same and having a doorbell switch therein for completing the circuit when the switch is closed, a second low voltage circuit connected with said solenoid through said contacts and defining a self-holding circuit therewith to maintain the solenoid in an energized state after it is initially energized by a momentary closing of said switch, an indicator, and a relatively high voltage third circuit connected with said indicator for energizing the same when said solenoid is energized, said third circuit being equipped with normally open switch means in series therewith controlled by said solenoid so as to be closed thereby when said solenoid is energized.

4. The device of claim 3 in which circuit interrupter means are connected with said third circuit for repetitively interrupting and completing the same when said solenoid is energized, and in which timer means are provided in said second circuit for interrupting the same after said solenoid has been energized for a predetermined period.


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