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CALL OR WARNING SYSTEM

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Fig. 1.

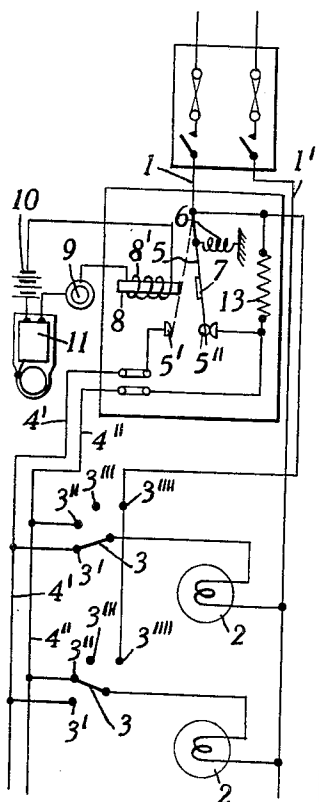


Fig. 2.

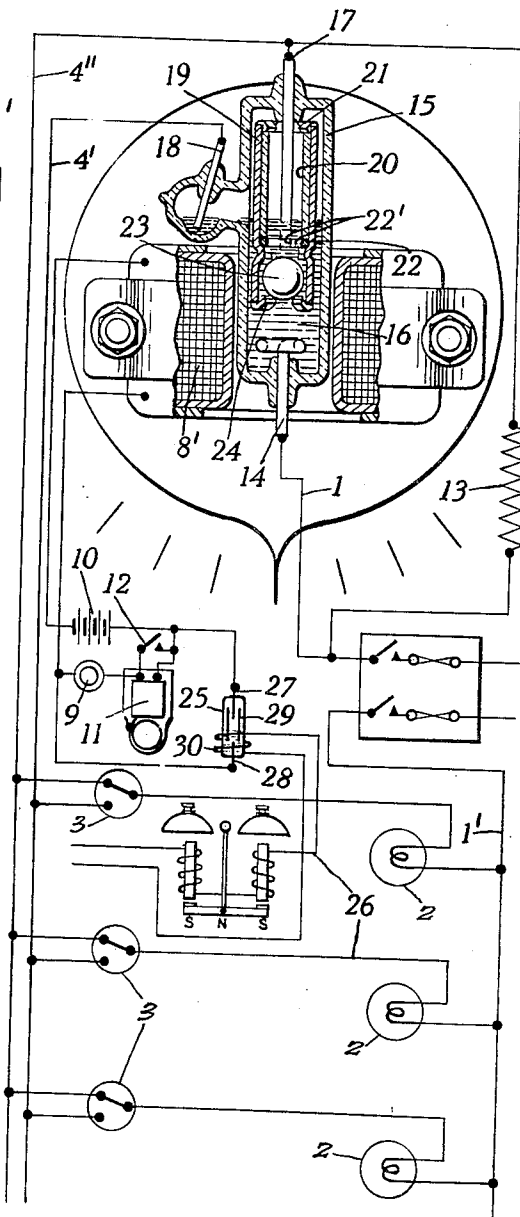
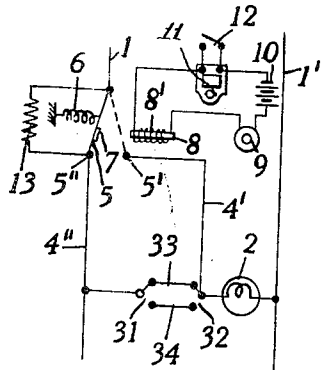


Fig. 3.



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## UNITED STATES PATENT OFFICE

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## CALL OR WARNING SYSTEM

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3 Claims. (Cl. 177—352)

This invention is concerned with a system for giving a call or warning in private dwelling or other houses, hotels, hospitals, factories, ships and similar establishments. Any such establishment is, for the sake of brevity, to be understood as being included under the general term "establishment" when used in the following description or claims. The invention employs electric lights installed in the establishment for lighting purposes, as distinct from an installation installed exclusively as a signalling system, and the term "electric lighting installation" is employed in the following description and claims in that sense. The lights may be those of the main electric lighting installation which is provided in the usual way and which is supplied either from electric lighting company's mains or from a private plant. The latter lighting installation is referred to in the following description as the "ordinary" electric lighting installation of the establishment. The switches which are provided for switching the lights on and off when required are referred to as the "on-off switches." As examples of the kind of call or warning more particularly contemplated by the invention may be mentioned that of a caller at the door of a house or hotel, or it may be a call to a maid or nurse as in a house, hotel, or hospital, that of a telephone bell, or a general warning to those working in a factory.

In the signalling system according to the invention, one or more of the lights of the electric lighting installation, which have one pole connected to a main conductor, are provided with means for connecting the other pole to either of two auxiliary conductors at will and this means constitutes the on-off switch for the light. Means is also provided which, though normally connecting the other main conductor to one of these auxiliary conductors, is capable of disconnecting it from that conductor and connecting it to the other. This last-mentioned means will usually be operated by the door-bell, call, telephone, or some other system operating from a distance. The result is that when the remote control system is operated and the connecting and disconnecting means consequently operated, those lights of the system that were switched on are extinguished and those lights that were switched off are switched on so as to give a call or warning. When the remote control system ceases to operate, the original conditions are restored. It is, however, preferable to provide means automatically restoring the disconnecting and connecting means to its original condition

after a certain interval independently of the remote control system, so that it is not possible to maintain the lights of the system extinguished or illuminated for more than a certain time even if the remote control system remains operative. Especially when the lighting system is the ordinary electric lighting installation, it is undesirable for it to be possible for the lights to be fully extinguished, and according to a further feature of the invention therefore a resistance may be provided in such a way that the lights are dimmed instead of being extinguished.

To emphasize the merits of the invention, it may be said that it is essentially concerned with giving warning by means of a lighting system provided in a house or other establishment. This warning may be transferred, so to speak, to the lights from a call bell system which may be that of the telephone or that of a caller at the door. Moreover, the arrangement is such that if a light of the system is on (as at night), it is dimmed or extinguished to give the signal, while if the same light is off (as during the daytime), it is brought on to give the signal. If there are two or more lights in the system and some happen to be in use while others are not, those that are in use are switched off or dimmed and those that are out of use are brought on when the signal is given. This is brought about entirely automatically when the signal is given by the call bell or other system. This is done by employing, for the usual on-off switches of each lamp, a two-pole switch which connects one pole of the lamp, either to one or the other of two auxiliary conductors, one of which is normally connected to the mains while the other is only connected to the mains when the signal is to be given.

In order that the invention may be clearly understood and readily carried into effect, it will now be described more fully with reference to the accompanying drawing, wherein:

Fig. 1 is a diagrammatic view illustrating one form of the invention;

Fig. 2 is a view partly in elevation and section, and partly diagrammatic, and showing a second form of the invention;

Fig. 3 is a diagrammatic view of a third form of the invention.

Referring first to Figure 1, 1 and 1' are the main conductors of the electric lighting installation which, as already indicated, may be the ordinary electric lighting installation of an establishment. 2 indicates the lights of the installation. One pole of each of the lights 2 is connected directly to the conductor 1'. The other

pole of each lamp is connected to the switch arm of a multi-way switch 3, having contacts 3' and 3'', which forms the on-off switch. The contact 3' of each on-off switch 3 is connected to an auxiliary conductor 4' and the contacts 3'' of each on-off switch to another auxiliary conductor 4''. 5 is the switch arm of another switch, to which arm the main conductor 1 is connected. The two contacts 5' and 5'' of the two-way switch 5 are connected to the two conductors 4' and 4''. The switch arm 5 is normally urged into contact with the contact 5'' by a spring 6. It is, however, provided with a magnetic armature 7 which can be attracted by a magnet 8 so as to move the switch arm 5 into contact with the contact 5'. The magnet 8 is an electromagnet, the winding 8' of which forms part of the circuit of the door-bell system of the establishment. This door-bell system consists of a bell-push 9 arranged outside the door of the establishment, a battery 10, and an electric bell 11, all connected in series with the winding 8'. A switch 12 is provided for short-circuiting the bell 11, which bell could, however, be omitted entirely if desired. A voltage-dropping device, shown as a resistance 13, is connected across conductor 4'', i. e. the conductor with which switch arm 5 normally makes contact, and the main conductor 1.

The system of Figure 1 operates as follows:

With the parts in their position shown, the lower light is switched on while the upper light is switched off by the on-off switches. If now there is a caller at the door of the establishment who presses bell-push 9, magnet 8 is energised by its winding 8' and attracts the switch arm 5 by means of the armature 7 so that switch arm 5 disconnects conductor 4'' from the main conductor 1, but connects conductor 4' with conductor 1. If the bell 11 is provided and switch 12 is open, the bell rings at the same time. When the switch arm 5 is moved over, the lower light 2, which was previously fully on, has the resistance 13 brought into its circuit so that it is dimmed, while the upper light which was previously off now has its circuit completed so that it lights. Each light therefore gives warning of the caller at the door. The lights return to their original conditions when the solenoid 3' is de-energised and the switch arm 5 is pulled back by the spring 6. The on-off switches 3 may, as shown, be provided with two other positions 3''' and 3'', the contacts of the latter being connected to the main conductor 1. These positions constitute another pair of "off" and "on" positions for the switches 3, which positions are however independent of the operation of the switch 5.

Figure 2 illustrates a system which is basically similar to that of Figure 1 except that in Figure 2 the two-way switch 5 is a mercury switch with provision for restoring the original state of affairs automatically after a predetermined interval, and that this switch is operated by the telephone system of the establishment and by the door-bell system of the establishment. Where applicable the same reference numerals have been used in Figure 2 as have been employed in Figure 1. The main conductor 1 is connected to the contact 14 fused through the wall of the mercury switch 15 so that it is permanently immersed in the body of mercury 16. An upper contact 17 normally dips into the mercury from above. A side contact 18 dips into a pool of mercury in a side limb of the closed main switch vessel 15, but this pool of mercury is normally above

the general level of mercury 16. The upper contact 17 is connected to conductor 4'' and the side contact 18 to conductor 4'. In the normal state of affairs, therefore, electrical connection is established by the mercury between main conductor 1 and auxiliary conductor 4''. The switch vessel 15 contains a tubular armature 19 of magnetic material. This armature has a tubular lining 20 of steatite or other insulating material, the upper edge of which abuts against turned-over lugs 21, and which is held in place by a spring ring 22 co-operating with an internal rib on the armature 19. The ring 22 forms a seating for a ball valve 23 normally held off this seating by the lower end of contact 17 as shown, and which is prevented from falling out of the bottom of the armature by turned lugs 24. The ends of the spring ring 22 are spaced apart when it is in position in the armature so as to form a gap 22' which forms a by-pass passage for the valve 23 when it is on its seating. The lower part of the switch vessel 15 is surrounded by the solenoid 3' which is connected to a door-bell circuit as in the arrangement of Figure 1. This circuit may, however, also be completed by the mercury switch relay 25 which is operated by the ringing circuit 26 of the telephone system of the establishment. The relay 25 consists of a closed vessel into which project contacts 27 and 28, the latter of which is permanently immersed in mercury contained in the vessel, from which mercury the contact 27 is however normally spaced. The vessel also contains a magnetic armature 29 which normally floats in the mercury in the position shown but which is drawn down when a solenoid 30 in circuit 26 is energised to cause the level of the mercury to rise and bridge the contacts 27 and 28. When the solenoid 3' is energised, either as the result of operation of the ringing circuit 26 due to an incoming telephone call or pressing of the button 20 by a caller at the door, it draws the armature 19 down. Soon after the armature begins to move, the valve 23 moves on to its seating 22. The opening 22' is so small that mercury does not flow through it into the tubular armature 19 at a rate fast enough to maintain the level of the mercury inside the armature at its original level. The mercury which is thus virtually imprisoned in the armature 19 by the ball 23 thus moves down until it moves away from the lower end of contact 17. The main conductor 1 is thus disconnected from the auxiliary conductor 4'. However, movement of the armature down causes the level of the mercury outside it to rise and this mercury eventually flows over into the pool of mercury into which the side contact 18 dips. The main conductor 1 is now connected to auxiliary conductor 4'. If the solenoid 3' remains energised, due for example to continued pressure on the push 9, the armature 19 remains down. While it is down, however, mercury slowly flows back into the armature 19 through the by-pass opening 22' until eventually the mercury outside the armature leaves the contact 18, and the mercury inside the armature has reached a high enough level for it to re-make contact with contact 17. Thus, after a predetermined interval, the original state of affairs is re-established automatically. When the solenoid 3' is de-energised, the armature 19 rises due to its buoyancy, the valve 23 coming away from its seat and allowing mercury to flow out of the armature 19 comparatively rapidly until the

parts are in the initial position illustrated in the drawing.

Figure 3 illustrates the application of the invention in a case where the electric lighting installation has a light that can be operated from either of two switches. This light may, for example, be one for illuminating a flight of stairs and the switches may be arranged one at the foot and one at the top of the flight. The main parts are similar and similarly denoted to those of Figures 1 and 2. Here, however, the one pole of the light 2 is connected to conductor 4'' by way of two two-way switches 31 and 32, and two conductors 33 and 34. The contact 5', with which the switch arm 5 is normally out of contact, is connected to the last-mentioned pole of light 2. The switch 5, which may be a mercury switch as described above, is such that contact is not established with 5' until after it has been broken with 5''. With this arrangement, if the two two-way switches 31 and 32 are in such a position that the light is off, the circuit is established through contact 5' of the two-way switch 5 when the door-bell system is operated so that the light 2 is brought on. If the two switches 31 and 32 are so positioned that the light 2 is on, as shown, and the door-bell system is operated, the circuit is first broken by the two-way switch 5 so as to bring the resistance 13 into circuit, or to extinguish the light if resistance 13 is omitted, and then a circuit with no resistance in it is shortly afterwards established through contact 5' of the two-way switch 5 so as to restore the light 2 to its original brilliance or to re-illuminate it. Where the lights are lit by alternating current, it is preferable to employ an inductive resistance 13 so as to prevent surging when the door bell is rung while the light is on.

It will be understood that the door-bell system and the telephone ringing circuit referred to above constitute remote control systems for the switch 5 as well as systems giving an audible call or warning. The bell may in either case, however, be put out of action or removed from the circuit if an audible signal is not desired at all, so that this system then becomes merely a remote control system for the means 5. These systems may either be systems already existing in the establishment or systems specially installed for the purpose of the invention.

It is to be understood that the claims are not limited to the constructions shown in the drawing since clearly modifications may be made and, therefore, the claims are intended to be construed to cover all such modifications as their language will allow in the light of the prior art.

I claim:

1. In a signalling system, a pair of main leads forming supply lines, a plurality of illuminating lamps each having a pair of terminals, one terminal of each lamp being connected to one of said leads, a movable main switch member having the second lead connected thereto, a pair of contacts between which said switch member is mov-

able whereby said second lead may be selectively connected to said contacts, a pair of conductors each extending from one of said contacts, a plurality of illuminating lamp switches each including a movable blade connected to the remaining terminal of a respective illuminating lamp and selectively connectable with said conductors, means yieldably holding said main switch member in engagement with one of said contacts, and a signalling circuit including electro-magnetic means operating when energized to move said main switch member into engagement with the remaining contact.

2. In a signalling system, a pair of main leads forming supply lines, a plurality of illuminating lamps each having a pair of terminals, one terminal of each lamp being connected to one of said leads, a movable main switch member having the second lead connected thereto, a pair of contacts between which said switch member is movable whereby said second lead may be selectively connected to said contacts, a pair of conductors each extending from one of said contacts, a plurality of illuminating lamp switches each including a movable blade connected to the remaining terminal of a respective lamp and selectively connectable with said conductors, means yieldably holding said main switch member in engagement with one of said contacts, a signalling circuit including electro-magnetic means operating when energized to move said main switch member into engagement with the remaining contact, and a third conductor extending from the second lead and including contacts in the paths of the blades of respective illuminating lamp switches.

3. In a signalling system, a pair of main leads forming supply lines, a plurality of illuminating lamps each having a pair of terminals, one terminal of each lamp being connected to one of said leads, a movable main switch member having the second lead connected thereto, a pair of contacts between which said switch member is movable whereby said second lead may be selectively connected to said contacts, a pair of conductors each extending from one of said contacts, a plurality of illuminating lamp switches each including a movable blade connected to the remaining terminal of a respective lamp and selectively connectable with said conductors, means yieldably holding said main switch member in engagement with one of said contacts, a signalling circuit including electro-magnetic means operating when energized to move said main switch member into engagement with the remaining contact, a third conductor extending from the second lead and including contacts in the paths of the blades of respective illuminating lamp switches, a resistance bridged around the main switch between the third conductor and the second conductor of said pair, and a circuit closing and opening device interposed in the last mentioned conductor and the third conductor.

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