May 28, 1940. A. CIANCHI 2,202,188

WARNING SYSTEM OF DWELLING HOUSES, HOTELS, AND SIMILAR ESTABLISHMENTS

Filed March 21, 1935 4 Sheets-Sheet 1

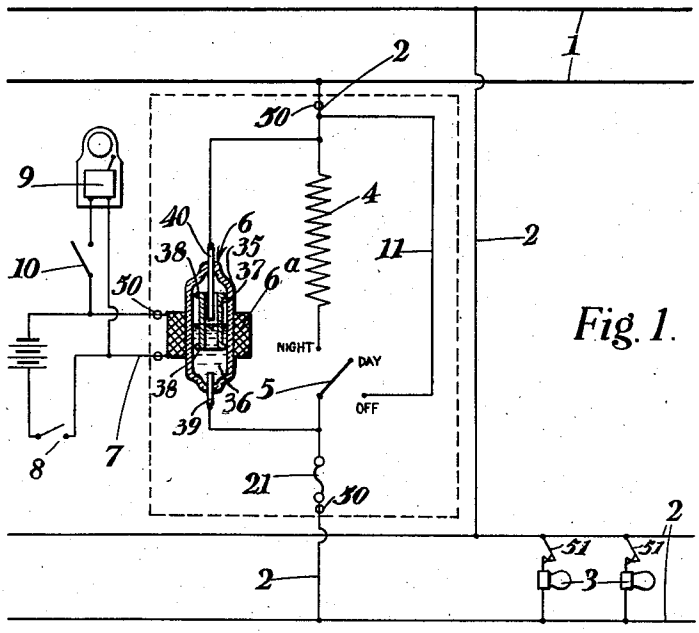


Fig. 1.

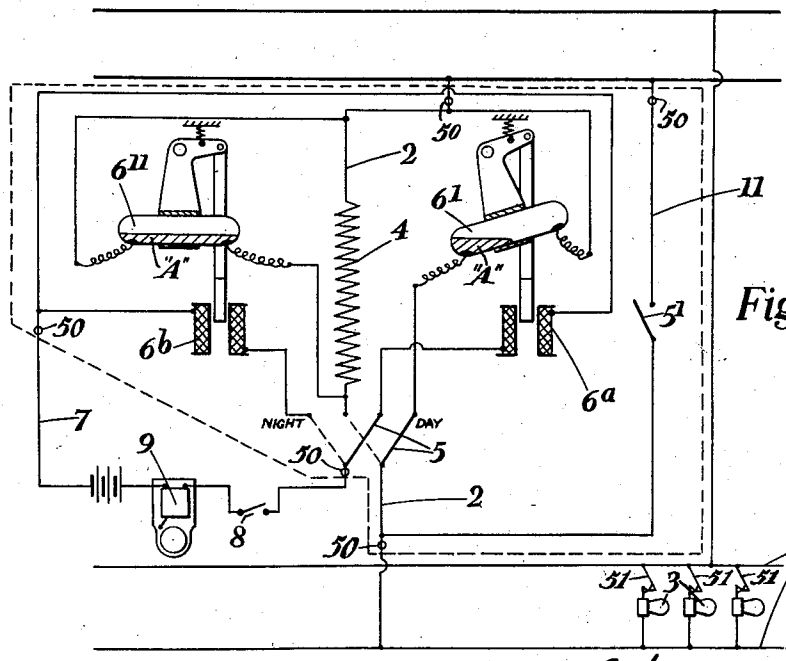


Fig. 2.

INVENTOR

Alfredo Cianchi

BY

Thurs. Appleman.

ASSOC. ATTORNEY

May 28, 1940. A. CIANCHI 2,202,188

WARNING SYSTEM OF DWELLING HOUSES, HOTELS, AND SIMILAR ESTABLISHMENTS

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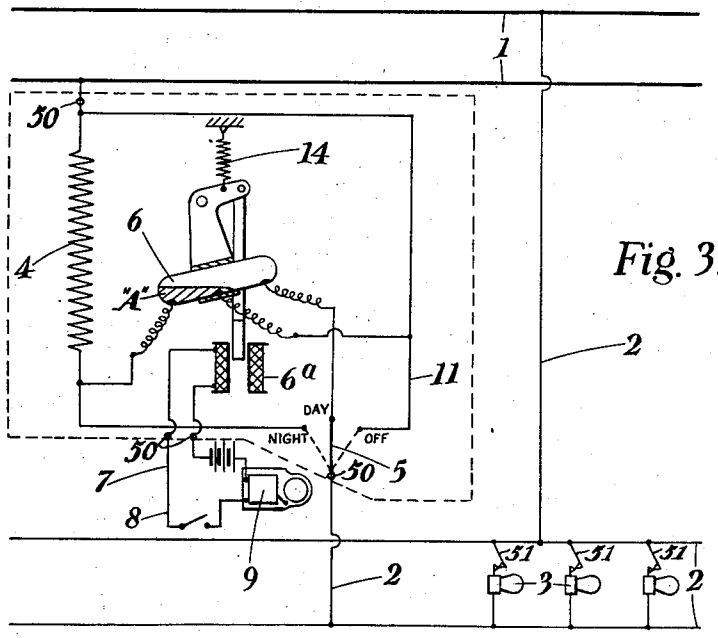


Fig. 3.

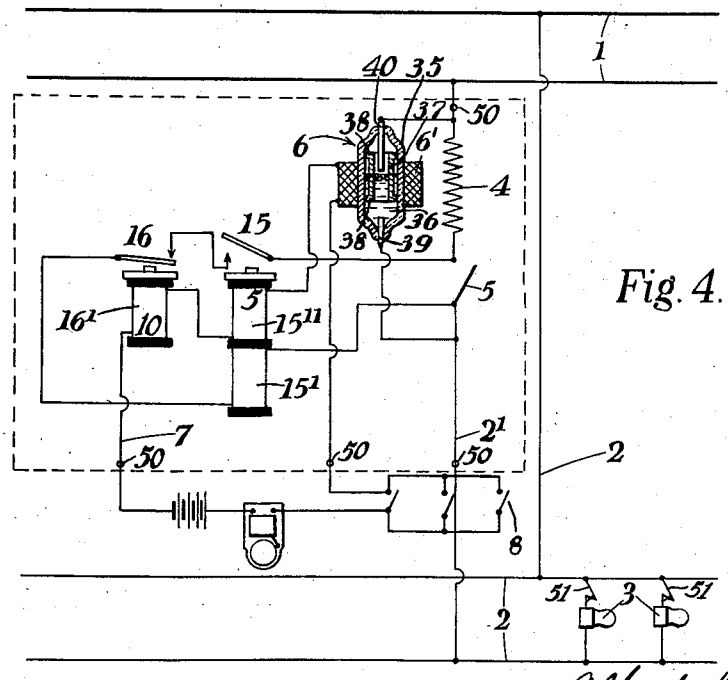


Fig. 4.

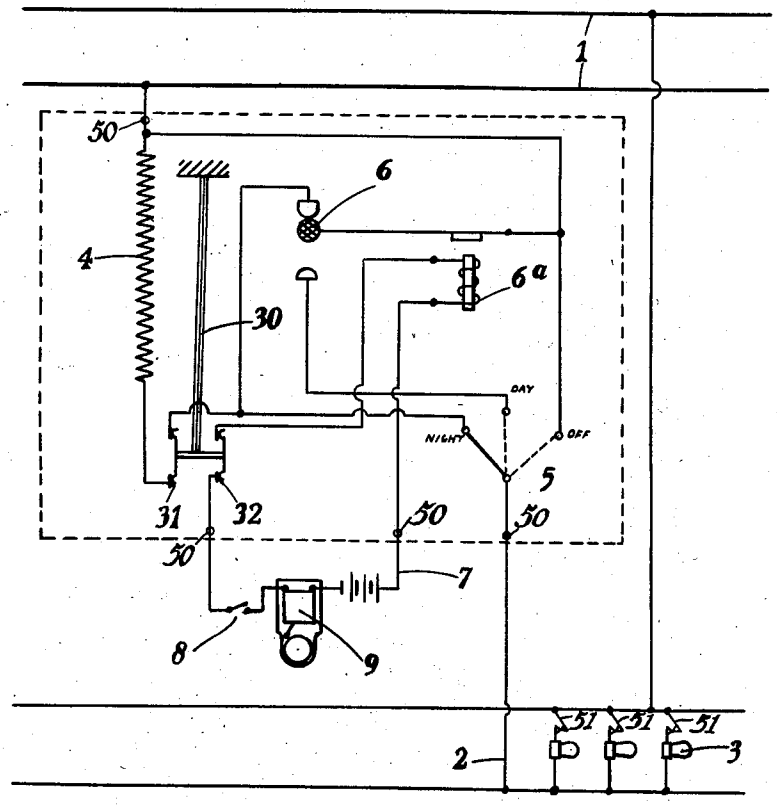
INVENTOR
Alfredo Cianchi
BY
Thurs. Appleman.
Assoc. ATTORNEY

May 28, 1940. A. CIANCHI 2,202,188

WARNING SYSTEM OF DWELLING HOUSES, HOTELS, AND SIMILAR ESTABLISHMENTS

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Fig. 5.



INVENTOR
Alfredo Cianchi
BY
Frank S. Andrews
ATTORNEY

May 28, 1940. A. CIANCHI 2,202,188

WARNING SYSTEM OF DWELLING HOUSES, HOTELS, AND SIMILAR ESTABLISHMENTS

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Fig. 6.

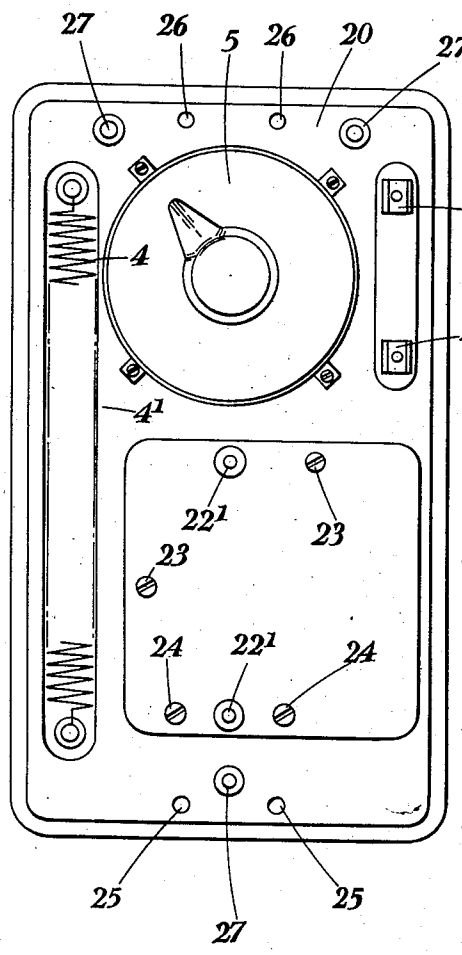
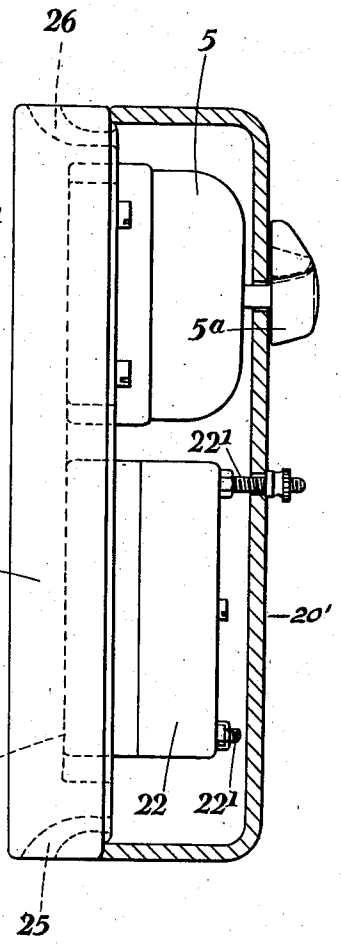


Fig. 7.



INVENTOR
Alfredo Cianchi
BY
Francis Anderson
ATTORNEY

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UNITED STATES PATENT OFFICE

2,202,188

WARNING SYSTEM OF DWELLING HOUSES, HOTELS, AND SIMILAR ESTABLISHMENTS

Alfredo Cianchi, London, England

Application March 21, 1935, Serial No. 12,311
In Great Britain March 29, 1934

4 Claims. (Cl. 177—352)

This invention is concerned with an electrical call or warning system for use in private dwelling or other houses, hotels, hospitals, factories and similar establishments that are provided with an electric lighting circuit in the usual way which is not normally in operation during the day and is supplied either from electric lighting company's mains or from a private generating plant. Any such establishment is, for the sake of brevity, to be understood as being included under the general term "establishment" when used hereafter. As examples of the kind of call or warning more particularly contemplated by the invention may be mentioned that of a caller at the entrance door of a house or hotel, or it may be a call to a maid or nurse as in a house, hotel or hospital, or a general warning to those working in a factory. Hitherto systems for giving visual calls or warnings of this kind have necessitated the installation of a lighting circuit specially for the system.

The chief object of the invention is to provide a visual call or warning system in a house or like establishment without necessitating the installation of a special lighting circuit and which therefore will be cheap and easy to instal at little inconvenience. Broadly speaking this object is attained according to the present invention by making use of the ordinary electric lighting system of the house or like establishment and combining with it and a door-bell, call or other signalling system, apparatus whereby on actuation of the signalling system, for example by a caller at the entrance door, the lights in the house or like establishment may be caused to flicker if they are in use (as at night) or may be caused to come on during the day. The lights may be caused to flicker by actually breaking and making the circuit one or more times. It will, however, in general be undesirable to make or break the lighting circuit while the lights are in use and it is preferred to effect flickering by brightening or dimming the lights by excluding or including a resistance in or from the circuit one or more times. The call or warning system according to the invention is particularly applicable where it is a question of giving a call or warning to a deaf person, although, of course, it is applicable anywhere where it is desired to avoid noise, in which case the bell which may be provided in the signalling system is put out of action. The apparatus which is combined with the ordinary electric lighting circuit and the signalling system is conveniently constructed in the form of a unit so that it can be readily installed. The invention also includes other features which will be described below and claimed.

In order that the invention may be fully understood and readily carried into effect, a number of illustrative examples of call or warning systems and an example of a unit in accordance with it will now be described in detail. These are illustrated in the accompanying drawings, in which:

Figures 1, 2, 3, 4 and 5 are circuit diagrams of five different arrangements;

Figure 6 is a plan of a unit with its cover removed; while

Figure 7 is a side elevation of the unit with the cover shown in section.

Referring to Figure 1 of the drawings, **1** indicates the electric light company's mains, **2** the existing wiring of the house-circuit with its lamps **3**. A resistance **4** connected in series with a hand-operated switch **5** is connected in one of the mains leads **2** of the house-circuit (preferably on the house-circuit side of the main fuse) and the resistance **4** and switch **5** (the "day or night switch") are shunted by a second switch **6**. The switch **6** shown in this example comprises a sealed tubular upright glass vessel **35** enclosing a quantity of mercury **36** and a tubular iron armature **37** which normally floats in the mercury **36** but is capable of sliding up and down inside the vessel **35**. The armature **37** has radial projections **38** at the top and bottom which come against the inside surface of the vessel **35** and maintain the armature in an upright position as it slides. An electrode **39** passes through the wall of the vessel at the bottom, in which wall it is fused, and projects into the mercury **36**. Another electrode **40**, co-axial with the electrode **39** and with the vessel and armature, passes through the top of the vessel and down into the armature to within a short distance of the surface of the mercury **36**. A solenoid **6***a* surrounds the vessel **35**. It is so disposed that, when energised, it draws the armature **37** further down into the mercury causing the level of the mercury to rise and make contact with the lower end of contact **40** and thus to bridge contacts **39** and **40**. When the solenoid **6***a* is de-energised, the armature **37** rises due to its buoyancy, the level of the mercury falling clear of contact **40** to disestablish electrical connection between **39** and **40**. The solenoid **6***a* is connected in a circuit **7** which can be closed by pressure on a bell-push to energize the solenoid so as to cause the mercury

to rise and short-circuit resistance 4 and switch 5. The circuit 7 may, as already indicated, be the door-bell circuit, the circuit of a call system, or some other signalling system. Switch 5 is left open during the day as indicated and the ordinary switch 5I of a light or lights 3 is left on, so that when the push 8 is pressed to close switch 6 the break introduced into the lighting circuit by the open switch 5 is bridged by way of the switch 6 and the light 3 is illuminated to give the warning. At night, switch 5 is kept closed so that the resistance 4 is then in circuit in the lighting system. Now when the push 8 is pressed the resistance 4 is short-circuited by the closing of switch 6 so that the light 3 brightens to give the warning. Switch 6 opens when the push is released. An electric bell 9 may be provided in addition so that it is also operated when the push 8 is pressed. As shown, it may be connected in parallel with the circuit by which the push 8 operates switch 6 and an auxiliary switch 10 provided whereby the bell 9 can be put into or out of operation as desired. In addition it is convenient to provide means for putting the apparatus out of action if desired. This consists of a connection 11 between the mains end of resistance 4 and a third contact for switch 5 whereby the normal connection between the mains and the lamps is virtually re-established. The apparatus may be provided with its own fuse, as shown at 21.

The apparatus included within the dotted rectangle in Figure 1 may be combined in a unit as explained below with reference to Figures 6 and 7, in which case the unit would be provided with terminals or other means for connecting it to the associated circuits at the points denoted by 50 in Fig. 1.

The lights 3 could alternatively be caused to flicker at night, on operation of the signalling system, by including (instead of excluding) a resistance in one of the lighting system leads, this resistance being normally out of the lighting system circuit, which resistance is then bridged by a low resistance conductor, the operation of the warning system during the daytime remaining as described above with reference to Figure 1. Such an arrangement is illustrated in Figure 2. Here two switches 6' and 6'' are provided, with a switch 5 so that one or the other can be connected across a break in one of the leads 2 of the lighting system. These switches may be of the kind described with reference to Figure 1 or, as indicated, of the tilting mercury type, and the aforesaid switch 5 also connects the energising winding of the appropriate switch to the circuit 7 of the bell or other signalling system. One switch 6' is normally open but closes when its winding 6^a is energised. This switch is brought into circuit during the daytime when the switches 5I of one or more lights 3 are kept closed. The other switch 6'' is normally closed but opens when its winding 6^b is energised. This second switch 6'' is connected across a resistance 4 in a main lead 2 and is brought into circuit during the nighttime so that when the bell-push 8 is then pressed, the mains current is compelled to pass through the resistance whereby a drop of volts is produced to cause the light 3 to be dimmed. Here again the apparatus may be shunted by a connection 11 and switch 5' so that it can be put out of action when it is not wanted, but the switch 5' for that purpose is here separate from the day or night switch 5. The switch 5 when it is in the position shown, has introduced a break into the lighting circuit, but its arm is then in contact with a second contact by means of which the switch arm is itself employed to bridge the break when the signalling system 7 is operated.

Figure 3 illustrates an arrangement which is similar to that of Figure 2 except that the two switches 6' and 6'' are combined into a single three-contact mercury switch 6 of the tilting type operated by a single solenoid 6^a and that the switch 5' has been combined with the day or night switch 5. As will be seen, the switch 6 is normally held by the spring 14 in a tilted position in which the resistance 4 is short-circuited but when the bell-circuit 7 is closed to energise the solenoid the switch is tilted so as to break the short-circuiting connection of the resistance 4 but to re-establish a direct connection from the mains to the electric lights 3. With the switch in the night position this has the effect of putting the resistance 4 in series with the lamps to cause them to dim, the aforesaid direct connection being then broken at the day or night switch 5. When that switch is in the day position the tilting of the mercury switch causes the lights 3 to come on. The switch 6 of Figure 3 could be replaced by an equivalent switch having solid contacts throughout, as illustrated in Fig. 5, which is described below. This might consist of a contact urged into an elevated position against a second contact by a spring and capable of being pulled down away from the second contact and against a third by the solenoid 6^a.

The circuit 7 of the signalling system could be the circuit of the call system employed in a house, hotel, hospital or the like for calling a maid or nurse from any room in which she may happen to be working. In that case the switch 6 would be operated from the circuit of the call system so that, even if the bell of this system is retained and the maid does not hear it, her attention will be attracted no matter in what room she may be when the call system is operated by flickering of the light at night-time or by the light coming on in the day-time. The maids would, of course, be instructed to put the light switch of the room in which they are working into the "on" position when they enter the room. The usual indicator showing the room in which the bell-push has been pressed could still be employed. There is, however, the difficulty that in any such system a maid or other person using a particular room may wish to have the light on in that room even during the day.

This difficulty is overcome according to a further feature of the present invention, by so arranging matters that the light in any room may be permanently switched on or off by appropriate manipulation of the bell-push in that room. For example, the arrangement may be such that continued pressure on the bell-push for five seconds switches the light on, while pressure for ten seconds switches it off again. This can be brought about by arranging for the day or night switch 5 actually or virtually to be changed from the "day" to the "night" position and back again as the result of this pressure. One of the ways in which this may virtually be done is illustrated in Figure 4. The end of the resistance 4 and the light main 2' to which it is connected directly at night by the day or night switch 5, are connected to a series circuit of two delayed-action electromagnetically-operated switches 15 and 16 and a winding 15'. This winding is one of two 15' and 15'' on the magnet core of the delayed-

action switch 15. This switch 15 is normally open but is closed if its magnet remains energised for, say, five seconds. The second delayed-action switch 16 is normally closed but is opened if its magnet remains energised for, say, ten seconds. The second winding 15'' on the core of switch 15 and the winding 16' on the core of switch 16 are connected in series in the circuit of the call system which also includes the winding 6' of switch 6. Neither of the switches 15 and 16 is actuated if one of the bell-pushes 8 is pressed for a short time (i. e. less than five seconds) in order to summon a maid. If the bell-push is pressed for more than five seconds, however, switch 15 closes and completes the circuit between the end of the resistance 4 and the light mains 2' so that the lights 3 come on. As this circuit includes the winding 15' on the magnet core of switch 15, this delayed-action switch 15 remains closed and the lights remain on. It will be understood that the main current passing through this first winding is very small (because of the much lower resistance of the parallel path through switch 6) while switch 6 is closed, as it is all the time the push is pressed. Accordingly switch 15 might return to the open position unless switch 6 opens before switch 15 is able to do this so as to cause the main current to pass only through the winding, and it is to be understood that the switches are arranged to respond accordingly. If now a bell-push is pressed for ten seconds and released, the second delayed-action switch 16 opens and breaks the circuit so that the light goes off and switch 15 returns to its normal open position. Switch 16 returns to its normal closed position when the push is released and all the parts are then in their initial positions. Of course, momentary pressure on the bell-push when the lights are already switched on by switch 15 will operate switch 6 in parallel with resistance 4 and cause the lights to flicker so as to summon a maid, for the day or night switch is now virtually in the "night" position.

The armatures of the delayed-action switches 15 and 16 shown will be retarded in some suitable manner to give the required delay. It will be understood, however, that other means might be employed. For example, two thermal switches which are heated while the circuit 7 is operative and with the required times of operation could be employed: or two mercury switches of the kind in which the mercury flows through an orifice in order to establish or break contact could be used. Instead of virtually changing over the day or night switch as described above, it could actually be moved from one position to the other, for example by electromagnetic means controlled from the signalling system in the manner described above or from a system specially provided for the purpose.

It may be desirable to take steps to ensure that the resistance 4 cannot remain in circuit, and therefore the rise or drop of voltage cannot persist, for more than a definite time even if the signalling system continues to be operated as, for example, if pressure is maintained on the bell-push 8 or this bell-push sticks. This may be done by providing means whereby the circuit 7 or the connection between the resistance and the mains is automatically broken or the switch 6 is restored to its initial condition after a predetermined interval. Figure 5 illustrates an arrangement in which the first and third of these expedients are both employed. Incidentally this figure also illustrates an arrangement in which the mercury switch 6 of the preceding figures has been replaced by a switch having solid contacts. The parts common to this figure and the other figures have been given the same reference numerals. It will be seen that the switch arm of switch 6 is normally in contact with the upper of two solid contacts but that it can be drawn away from the upper contact and against a lower contact when the solenoid 6^a is energised as a result of pressure on the bell-push 8. A thermo-element 30 which is shown in the form of a bimetallic strip is arranged adjacent to the resistance 4 so as to be heated by it when the resistance is in circuit. The end of this thermo-element carries the contact arms of two switches 31 and 32 which, when the element is cold, are closed. The arrangement is such that when the resistance 4 has been in circuit for the predetermined interval, the heat generated is sufficient to cause the element 30 to move to open both switches 31 and 32 and this leads, as will be seen, to the opening of the circuit 7 of the signalling system, and to the breaking of the connection between the resistance 4 and the mains. Naturally any one or combination of the three expedients mentioned might be employed. Instead of employing a flat thermo-element 30 as diagrammatically illustrated, a thermo-element of the helical type of the kind associated with thermal-operated switches now obtainable commercially, could be employed. In either case the thermo-element might be arranged inside the resistance 4.

Figures 6 and 7 illustrate the manner in which the apparatus combined with the electric light and signal systems of the house may be constructed as a unit. The unit illustrated in Figures 6 and 7 consists of the parts shown within the dotted rectangle of Figure 1, although the parts shown within the dotted rectangle of any of Figs. 2 to 5 could similarly be combined into a unit having terminals or other connecting means at points corresponding to the points denoted by 50 in those figures. These parts are mounted on or in a base 20 which may be moulded in porcelain. For the sake of clearness the connections between the various parts have been omitted in Figures 6 and 7 but they can be seen in Figure 1. The resistance 4 is housed in a depression 4' in the porcelain base as also are a pair of clips 21' for a fuse. The lower parts of the combined day or night and on-off switch 5 and a box 22 containing the mercury switch 6 and its solenoid 6^a are also received in depressions in this base. The box 22 is split, the upper part forming a cover and its parts are held together by bolts 22', the end of one of which projects through a hole in a cover 20' for the whole unit which is secured in place by a nut on the outer end of this bolt. The spindle of the three-position switch 5 also projects through the cover and the operating knob 5^a is provided on the outside, the three points to which the switch may be moved being indicated on the cover. The cover portion of the box 22 carries terminals 23, 24 connected on the inside to the switch and solenoid. The solenoid terminals 24 are provided with leads which pass out through holes 25 at one end of the porcelain base while the leads to the mains pass out through holes 26 at the other end of the base. The base is also provided with holes 27 for securing it to an upright surface such as that of a wall. It is merely necessary to secure the unit in a convenient position

adjacent to the ordinary electric lighting system of the house or like establishment and to connect the main leads from the unit in series in one of the main leads of the system and to connect the leads from the solenoid terminals in series or parallel in the circuit of an existing or specially installed door-bell, call or other signalling system. It will, of course, be understood that the unit, instead of consisting of the apparatus illustrated within the dotted rectangle of Figure 1, would in the cases of the systems shown in Figures 2 to 5, include the apparatus shown within the dotted boundary in those figures. The main leads to the unit could conveniently be provided with a plug to plug in place of an existing fuse, the fuse being then replaced by the fuse 21 in the unit: with such an arrangement the apparatus could be combined with only part of the lighting system or even with only one light. Alternatively the unit may be connected in series in the main lead after the existing fuse, but the fuse in the unit could still be retained to protect the apparatus in it. Where it is a question of installing the apparatus according to the invention at the same time as the electric lighting system, this apparatus could be combined into a unit with the main fuse(s) or cut-out(s) and main switch of the lighting system, (which might be enclosed in a cast metal box as is usual) so that it would then merely be necessary to fit this unit in the usual position occupied by the main fuse and switch and connect it by the leads or terminals which would be provided on it between the outer mains and the wiring system of the house or like establishment and to the existing or specially installed door-bell, call or other signalling system.

The box 22 containing the switch 6 and its operating solenoid could be made readily interchangeable so that a defective switch could easily be replaced or a switch easily replaced by one of greater capacity. For this purpose the contacts 23 and 24 could be connected to blades engaging between clips fixed on the porcelain base, the connections to the other parts being then made to these clips. Alternatively contact strips on the side of the box could slidably engage spring contacts on the base, or plugs and sockets could be employed. In these cases the cover-securing bolt is, of course, better made separate and secured direct to the base.

The base and cover of the unit could be made of pressed or cast metal or the material known under the registered trade mark "Bakelite" instead of porcelain, in which case it will probably be preferable not to sink the parts, particularly the resistance, into the base. Any of the forms of unit could include a transformer by means of which a bell could be operated from alternating current mains. The switch 6 and its solenoid could, of course, be mounted directly on the base if interchangeability is not desired and it need not then be enclosed in a box, in which case it is desirable fully to insulate the solenoid and its leads. For example, the solenoid might be embedded in a mass of moulded insulating material.

Provision might also be made for varying the resistance 4 to suit different loads. It might have two or more tappings which could be connected to contacts of the switch 5. In any case the bell or other signal system need not operate the switch 6 or 6' or 6'' directly, but through a relay.

It has already been explained that the signalling system could be a door-bell or call system. The call system employed for calling maids in a house or hotel has been referred to above as an example of such a call system but, of course, the system might be some other call system such as that of a lift so that the liftman's attention would then be attracted not by the ringing of the bell but by flickering of the lift light when it is in use or by its coming on when it is not normally in use. It might, however, be some other system, such as a burglar alarm system. In such a case it might be desirable to cause the warning to persist and this might be done by arranging for the signalling system to set into operation a rotary contact device or a thermal switch so as to cause repeated flickering of the lights. The device could be put out of operation by a hand-operated switch. A similar arrangement could, of course, be employed in the case of other signalling systems although in some instances it would be preferable to stop the device automatically, e. g. by means of a thermal switch, after a predetermined time. The signalling system might also be one which is operated on the ringing of a telephone bell, for example as a result of magnetic induction by the ringing current or the action of the sound of the bell on a microphone or other sound-responsive device so that the fact that the telephone bell is ringing is announced by the lights of the lighting system. The term "signalling system" has been employed for convenience to distinguish from the whole system according to the invention and which has been referred to as a "call or warning system" and the term "signalling system" is to be understood as including a door-bell or call system or a burglar alarm system or any system such as that responsive to a telephone bell which has just been described.

It is to be understood that other means for reducing or increasing the value of the current flowing in the lighting system such as an inductance or condenser could, where applicable, be substituted for the resistance 4, and the term "impedance" when used in the claims is to be understood as including any such means. The expression "means for changing the value of the current flowing in said lighting system" is to be understood as including any such means as well as means for cutting off the current altogether; and the expression "changing the value of the current" is also to be understood as including cutting off the current altogether. In general it may be said that a plain resistance consisting of a coil of wire as shown in Figure 6 may be employed.

I claim:

1. In combination with the ordinary electric lighting system of an establishment, a switch in a lead thereof, an impedance in parallel with said lead and shunted when said switch is closed, a signaling system, means in said signaling system and actuated by operation thereof to open said switch whereby to establish the lead serially through said impedance, and thermally operated means operable by heat from said impedance to interrupt operation of said signaling system after a period of its continuous operation.

2. In combination with an establishment ordinary electric lighting circuit including a lamp and a local switch therefor, a main switch in one lead of the circuit, an impedance in said lead in series with one contact of said main switch, a shunt circuit in parallel with said lead around the impedance, an independent signaling circuit,

and a control switch in said shunt circuit operable by activation of said signaling circuit.

3. In combination with an establishment ordinary electric lighting circuit including a lamp and a local switch therefor, a main switch in one lead of the circuit, an impedance in said lead in series with a contact of said main switch, a normally open shunt circuit in parallel with said lead and shunting both said impedance and main switch, an independent signaling circuit, and means in said signaling circuit actuated by operation thereof to close said normally open shunt circuit.

4. In combination with an establishment ordinary electric lighting circuit including a lamp and a local switch therefor, said circuit including two parallel branches, a double throw switch including contact means closed when said switch is in a first position and contact means closed when said double throw switch is in a second position, connections to said first mentioned contact means whereby said circuit is completed through the first of said parallel branches when said double throw switch is in said first position and through the second of said parallel branches when said double throw switch is in said second position, an impedance in said first branch, a shunt circuit in shunt with said impedance, a relay having normally closed contacts, the contacts being in said shunt circuit, a second relay having normally open contacts, the normally open contacts being in the second branch, a normally open signalling circuit including connections to said relays and contacts whereby said signalling circuit includes the coil of the first relay when the double throw switch is in the first position and includes the coil of the second relay when said double throw switch is in said second position.

A. CIANCHI.