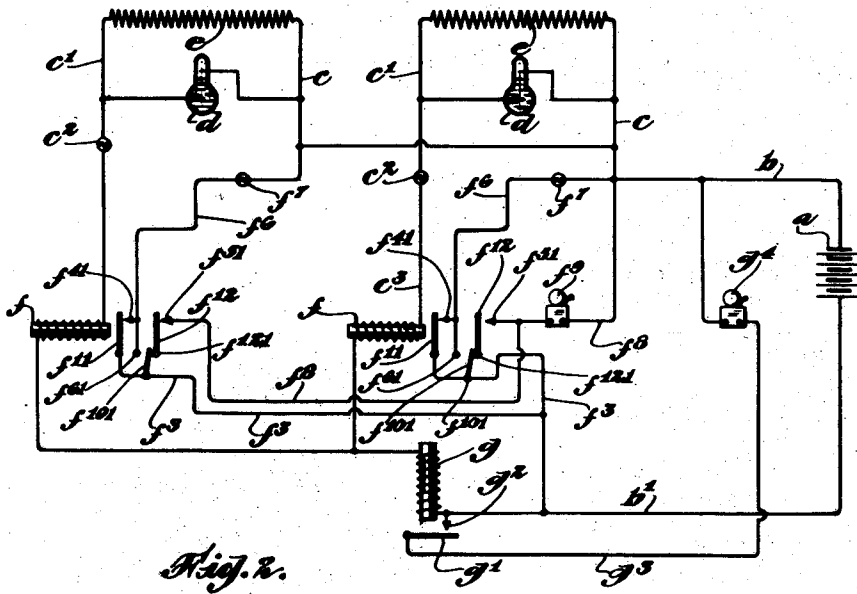
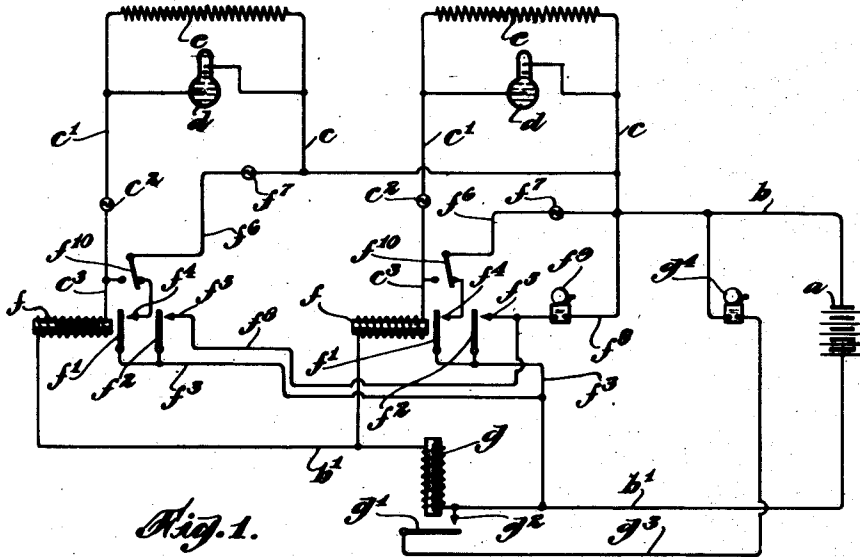


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SUPERVISED ELECTRIC SYSTEM

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SUPERVISED ELECTRIC SYSTEM

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This invention relates to alarm systems, for fire, burglary, etc., in which a thermostat or other circuit closer is connected across the two main leads of the electric alarm, and a resistance is connected across the main leads beyond the circuit closer or series of circuit closers, so that under normal conditions a supervisory current flows through the resistance and the trouble relay serving to energize the trouble relay which normally holds open the circuit of the trouble alarm, while upon the operation of a thermostat or other circuit closer the full current causes the alarm relay to close the circuit of the main alarm through fire, burglary, or other principal alarm. In case of derangement of the alarm circuit, as by the breaking of one of the leads, for example, the trouble relay is deprived of current and permits the trouble alarm circuit to be closed. Heretofore such alarm systems have been so constructed and arranged that in case of derangement of one of the several circuits which may be connected to the single alarm, such as a bell, the bell will be operated but no indication will be given as to which one of the several circuits is deranged. Furthermore, the bell will continue to ring until the trouble is cleared, or the bell circuit is opened manually. If the bell circuit is opened there is no certainty that it will be closed again after the trouble is cleared and there may be thereafter, therefore, no supervision of the remaining circuits, that is, no means by which derangement of such other circuits will be indicated. The purpose in view in the present invention is to overcome these practical difficulties in the operation of the system and to provide means whereby the particular circuit which has become deranged shall be indicated and shall continue to be indicated by a visual indicator even after the audible trouble alarm or bell has been stopped, and whereby the audible alarm or bell shall continue to be so connected as to sound on the derangement of any other circuit. The invention will be more fully explained hereinafter with reference to the accompanying drawing in which:

Figure 1 is a diagrammatic representation of an alarm system constructed and arranged in accordance with the invention.

Figure 2 is a similar view illustrating a modification.

In the system shown the battery *a* is connected through a feeder *b* with the main leads *c* of the several local circuits, of which two are represented. Thermostats or circuit closers *d*, of which there may be several in each local cir-

cuit, are connected across the main leads *c*, *c*¹, and outside of the most remote circuit closer a resistance *e* is also connected across the main leads. The return lead *c*¹ of each local circuit, including an alarm lamp or other visual indicator *c*², is connected by a wire *c*³ through the coils of an underload trouble relay *f*, back to the return leg *b*¹ of the main circuit, which includes the coils of an overload or main alarm relay *g* which controls the alarm circuit and for convenience may be called the alarm relay to distinguish it from the trouble relay above mentioned.

When the system is in normal condition, with no circuit closer closed, the current which flows through the resistance *e* and the coils of the trouble relay *f* is sufficient to energize the relay *f* but is not sufficient to energize the relay *g* which has a different winding. Each trouble relay *f* controls two contacts *f*¹ and *f*², both being connected on one side, through the wire *f*³, with the return leg *b*¹ of the main circuit. The armatures or movable contacts *f*¹ and *f*² cooperate respectively with contacts *f*⁴ and *f*⁵, the former of which is connected by a wire *f*⁶, including a local visual indicator, such as a lamp *f*⁷, with the main leads *c* of each local circuit. The other contact *f*⁵ is connected through a wire *f*⁸ and an audible alarm, such as a bell *f*⁹, with the leg *b* of the main circuit. At *f*¹⁰, in each line *f*⁶, is a switch, manually controlled and of the usual toggle variety, incapable of remaining in an intermediate position, which serves to connect the line *f*⁶, with its visual indicator *f*⁷, either with the relay controlled contact *f*⁴ or with the main lead *c*¹, *c*³ of each local circuit. So long as the system is normal each local trouble relay *f* holds the movable contact *f*¹ away from the fixed contact *f*⁴, but should the local circuit become deranged so as to prevent the flow of current the relay *f* will release the movable contacts *f*¹ and *f*² and permit current to flow through the visual trouble signal *f* of the corresponding local circuit, and through the audible signal *f*⁹ which is common to all of the local circuits. The audible signal, if it be a bell, will continue to ring until the break in the local circuit is repaired and the relay *f* again picks up the movable contact or until, as contemplated, the switch *f*¹⁰ is moved toward the left to establish connection between the line *c*³ and the line *f*⁶, thus again causing a current to flow through the relay *f* whereby the relay *f* picks up its movable contacts, thereby opening the circuit through the audible signal *f*⁹. As a result, the local visual indicator or lamp *f*⁷ will remain lighted to indicate a derangement of the circuit and it will remain

lighted even after the local circuit trouble has been repaired, so as to indicate that the local circuit is still cut off from the audible trouble signal f^9 . To extinguish the lamp f^7 the switch f^{10} is moved toward the right to establish connection with the fixed contact f^1 . Since the local circuit trouble has been repaired, current will again flow through the relay f so that the movable contacts will remain up and the local circuit will again be in condition to indicate derangement. The relay g is not energized by the current which flows when the system is in normal condition, but if any one of the circuit closers d in any of the local circuits is operated, as by the outbreak of fire or the intrusion of a burglar, the resistance e will be short circuited and the current will flow, energizing the relay g and causing it to pick up its armature or movable contact g^1 and close the circuit through the fixed contact g^2 and through the line g^3 and main audible alarm or bell g^4 conveniently referred to as the fire alarm. The current, under these conditions, also operates the corresponding local circuit visual indicator or lamp c^2 .

It will be seen that the system, as described, will indicate which of any number of local circuits is deranged, and will permit the common audible circuit alarm or bell to be stopped by bypassing the current through the trouble relay f and causing it to pick up its armatures and so open the circuit to the bell, and will not cut out the bell in any local circuit other than that in which trouble has been indicated, the bell in every other local circuit being always so connected as to operate in the event of derangement of that local circuit. After the break in the local circuit has been repaired the lamp f^7 in that circuit will remain lighted when the local relay is again energized and will remain lighted thereafter until the switch f^{10} is thrown to the right to interrupt the current through the lamp.

It will be seen that the modified system shown in Figure 2 is identical with that shown in Figure 1 except for the arrangement of each visual indicator f^7 and corresponding switch f^{10} with respect to the relay f and its contacts f^1 and f^2 , as the parts are shown in Figure 1. In the system as shown in Figure 2 each trouble relay f controls two contacts f^{11} and f^{12} which cooperate respectively with contacts f^{41} and f^{51} , the former f^{41} being connected, as before, by a wire f^6 through a lamp f^7 , with the main leads c of the local circuit, the other, f^{51} being connected, as before, through a wire f^8 and bell f^9 , with the leg b of the main circuit. The manually controlled toggle switch f^{101} is in this instance connected into the leg f^3 and is adapted to establish connection therefrom either to the terminal f^{61} of the wire f^6 or with the heel f^{121} of the contact f^{12} . With this arrangement, in the event of failure of the supervisory current in the local circuit, as for example, by the breaking of a wire, the relay f will be de-energized, allowing its armatures to close the contacts at f^{41} and f^{51} whereby circuits are closed through the trouble lamp f^7 of the corresponding local circuit and the trouble alarm f^9 . The circuit through the trouble alarm bell may be opened by moving the switch f^{101} to the left to establish contact at the point f^{61} . The lamp f^7 remains lighted even during the movement of the switch f^{101} because of the contact established at the point f^{41} . As soon as the derangement of the local circuit is repaired the relay f will be energized and will pick up its movable contacts, but the lamp f^7 will continue to be lighted by reason of the connection estab-

lished by the switch f^{101} , at the point f^{61} , thus indicating that the local circuit is still cut off from the trouble alarm f^9 . The lamp f^7 can then be extinguished by moving the switch f^{101} to the right to establish connection at the point f^{121} , whereby the local circuit is once more placed in a condition to indicate derangement. It will be noted that in this arrangement no current is caused to flow through the trouble relay f until the derangement has been repaired, while in the arrangement shown in Figure 1 current is bypassed through the lamp f^7 and the relay f . A further difference is that with the arrangement shown in Figure 2 the lamp f^7 remains lighted even while the switch f^{101} is being moved from one contact to the other, while with the arrangement shown in Figure 1 the lamp f^7 is temporarily extinguished during the movement of the switch.

I claim as my invention:

1. In an electric alarm system of the type wherein a plurality of circuits are provided each of which includes a source of electrical energy and a relay coil, the combination of two circuits controlled by each relay and independent of the plurality of circuits, one of each of the last named circuits including signalling means of a substantially non-objectionable nature to the senses, and the other thereof including signalling means having a signalling effect of a nature objectionable to the senses, and a switch and connections to close the circuit through a first signalling means and disconnect the second signalling means from actuation by a particular local circuit whilst leaving the second signalling means connected for actuation by any one of the remaining local circuits, said connections maintaining the circuit through the first signalling means closed until the last named switch is opened.

2. In an electric alarm system of the type wherein a plurality of circuits are provided each of which includes a source of electrical energy and a relay coil, the combination of two circuits controlled by each relay and independent of the plurality of circuits one of each of the last named circuits including signalling means of a substantially non-objectionable nature to the senses, and the other thereof including signalling means having a signalling effect of a nature objectionable to the senses, and a switch and connections to close the circuit through a relay and a first signalling means and disconnect the second signalling means from actuation by a particular local circuit whilst leaving the second signalling means connected for actuation by any one of the remaining local circuits, said connections maintaining the circuit through the first signalling means closed until the last named switch is opened.

3. In an electric alarm system of the type wherein a plurality of circuits are provided each of which includes a source of electrical energy and a relay coil, the combination of circuits controlled by the relay coils including signalling means of a substantially non-objectionable nature to the senses, second circuits controlled by the relay coils including signalling means having a signalling effect of a nature objectionable to the senses, circuit closing means in the last named circuits operated by said relays, and additional circuit closing means in a circuit including a first signalling means to maintain the first signalling means in an energized condition and disconnect the second signalling means from actuation by a particular local circuit whilst leaving the second signalling means connected for actuation by any one of the remaining local circuits, said connections

maintaining the circuit through the first signalling means closed until the last named closing means is opened.

4. In an electric alarm system of the type
5 wherein a plurality of circuits are provided each
of which includes a source of electrical energy
and a relay coil, the combination of auxiliary
circuits controlled by the relay coils including sig-
nalling means of a substantially non-objection-
10 able nature to the senses, second circuits controlled
by the relay coils including signalling
means having a signalling effect of a nature objectionable
to the senses, circuit closing means in
the last named circuits operated by said relays,
15 additional circuit closing means in the auxiliary
circuits including the first signalling means and
including means to effect deenergization of the
second signalling means with respect to a particular
local circuit whilst leaving the second signalling
20 means connected for actuation by any one
of the remaining local circuits and to maintain
the first signalling means in energized condition,
said connections maintaining the circuit through
the first signalling means closed until the last
25 named closing means is opened.

5. In an electric alarm system of the type
wherein a plurality of local circuits are provided
each of which includes a source of current and a
relay coil, and having a visual signal for each
30 local circuit and an audible signal common to all
of the local circuits, the combination of two cir-

cuits controlled by each relay, a visual signal in
one of the circuits and the audible signal in the
other of the circuits, a switch, and connections to
disconnect the audible signal from actuation by
a particular local circuit and to maintain the connection
5 to a visual signal corresponding to the
relay that has operated closed, the audible signal
remaining connected for actuation by any one
of the remaining local circuits, said connections
maintaining the circuit through the first signalling
10 means closed until the last named switch is
opened.

6. In an electric alarm system of the type
wherein a plurality of local circuits are provided
each of which includes a source of electrical energy
and a relay coil, the combination of a plurality
15 of auxiliary circuits each including independent
signalling means of a substantially non-objectionable
nature to the senses, a plurality of second auxiliary
circuits including common signalling means having a
signalling effect of a nature objectionable to the
20 senses, all said auxiliary circuits being independent
of the plurality of local circuits, circuit closing
means in the auxiliary circuits including the first
signalling means
25 including means to disconnect the second signalling
means with respect to a particular local circuit,
said closing means maintaining the circuit through
the first signalling means closed
30 until opened.

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