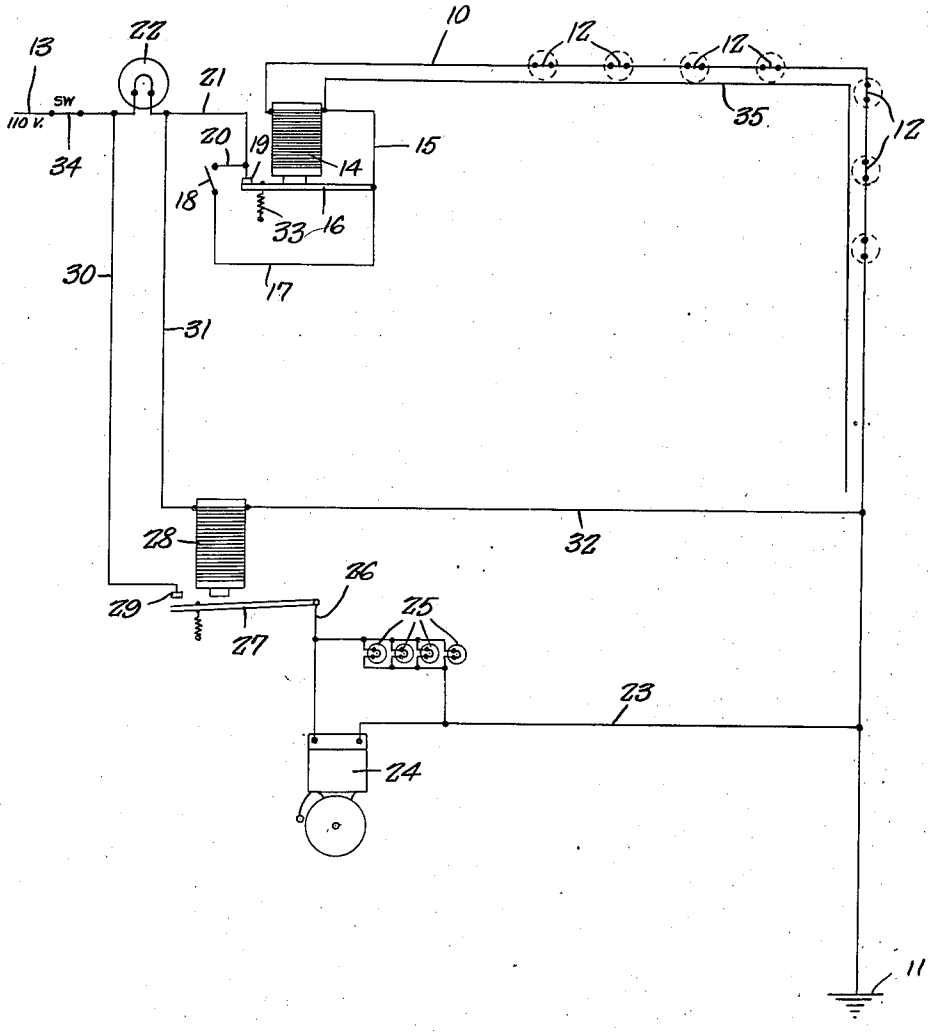
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CLOSED CIRCUIT ALARM

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WITNESS

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CLOSED CIRCUIT ALARM

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1 Claim. (Cl. 177—314)

This invention relates to closed circuit alarms and has for an object to provide a protective system of this type in which opening of the closed circuit by any one of a number of intruder tripped switches, or actuation of thermostatic breakers, energizes a normally open alarm circuit, the arrangement being such that the alarm circuit cannot be again deenergized until the normally closed circuit is again completed and an electromagnetic switch therein reset.

A further object is to provide a normally open circuit in the nature of a wire assembled with, but insulated from, the normally closed circuit, and adapted to ground the electromagnetic switch and permit energizing of the alarm circuit in the event a surreptitious attempt is made to sever the normally closed circuit wire by a knife or other cutting tool which must bridge and connect the open circuit wire with the closed circuit wire, which latter is grounded, during the cutting operation.

A further object is to provide apparatus of this character which will be formed of a few strong, simple and durable parts, which will be inexpensive to manufacture, and which will not easily get out of order.

With the above and other objects in view, the invention consists of certain novel details of construction and combinations of parts hereinafter fully described and claimed, it being understood that various modifications may be resorted to within the scope of the appended claim without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawing forming a part of this specification the figure is a diagrammatic view showing the circuits and electrically operated apparatus of a closed circuit alarm constructed in accordance with the invention.

Referring now to the drawing in which like characters of reference designate similar parts in the view, 10 designates a normally closed circuit that extends around a building or area to be protected and is grounded at one terminal, as shown at 11. The circuit includes a plurality of circuit breakers 12 which may be intruder tripped switches, thermostatic breakers, or other devices adapted to open the circuit when displaced from normal circuit closing position. The circuit is energized from a 110 volt source of current, such as a wire 13 connected to a fuse block or other device.

An electromagnetic switch 14 is connected between the closed circuit and the source of current supply. The switch is in the nature of a relay having one end of its coil connected to the closed circuit 10. The other end of the coil is connected by a wire 15 to the armature 16 of the relay and a wire 17 connects a switch 18 in parallel with the armature. The armature forms a conductor, as is usual, and when the coil is energized, engages a fixed contact 19 which is connected to the switch by a conductor wire 20 and is connected to the source of current by a conductor wire 21 which includes a low wattage device, such as a lamp 22.

The switch 18 may be a push button switch. When the push button switch is closed, even momentarily, current will flow through the wire 21, wire 20, switch 18, wire 17, wire 15, coil 14 of the relay, and closed circuit 10 to the ground 11. The relay coil is thus energized to move the armature 16 into circuit closing position with the contact 19 whereupon current will flow through the wire 21, contact 19, armature 16, wire 15, coil 14, and closed circuit 10 to the ground so that this circuit remains closed when the push button switch is released.

A normally open alarm circuit 23 is connected to the ground 11 and includes an electrically operated bell 24, or other alarm device, and a bank of lamps 25, if desired, connected in parallel with the alarm circuit 23 and a conductor wire 26 which is connected to the armature 27 of a relay 28. The armature is moved to circuit closing position with a fixed contact 29, as will be presently described. The contact is connected by a wire 30 to the source of current 13. A wire 31 is connected to the wire 21 on the opposite side of the low wattage device 22 from the wire 30 and is connected to one end of the coil of the relay 28. A wire 32 is connected to the other end of the coil and to the ground 11.

The coils of both relays are high resistance coils, but an important feature of the invention is that the coil of the relay 14 is of lower resistance than the coil of the relay 28.

An important feature of the invention is that the voltage across the relay 28 will be substantially increased upon opening of the relay 14, due to the low wattage device connected to the relay 14, so that the relay 28 will be sufficiently energized to attract its armature and close the alarm circuit.

In operation, the current divides at the low wattage device 22 and flows through the coil 14 of the low resistance relay and through the coil of the high resistance relay 28 so that both coils are simultaneously energized, but the coil of

the high resistance relay 28 is not sufficiently energized to move the armature 27 to circuit closing position, and consequently while the protective circuit 10 remains closed at the contact 19 due to the relay coil 14 attracting the armature 16, the alarm circuit 23 will remain open since the relay coil 28 is not sufficiently energized to move the armature 27 to circuit closing position against the contact 29.

When the closed circuit 10 is broken at one of the circuit breakers 12, the coil of the relay 14 will be deenergized and the armature 16 will be moved to open circuit position in relation to the contact 19 by the armature spring 33. The full voltage current now flows through the coil of the relay 28 and energizes the coil sufficiently to move the armature 27 to circuit closing position with relation to the fixed contact 29 and energizes the bell 24 and warning lamps 25. The alarm circuit cannot be opened to prevent sounding of the alarm even should the circuit breaker be reset to normal position because the circuit through the coil of the relay 14 cannot be reestablished to move the armature 16 to circuit closing position until the push button switch 18 is again pushed to momentarily close the circuit, above traced, through the coil of the relay 14 to reset the armature 16 in circuit closing position. Hence the alarm will be sounded until the circuit through the coil of the relay 28 is broken manually, and this is accomplished through the medium of a switch 34 which interrupts the current supply circuit between the source 13 and wire 30.

An open circuit 35 has one terminal connected to that terminal of the coil 14 of the low resistance relay to which the wire 15 is connected, said wire being connected to the switch 18 as above described. The open circuit wire 35 is wrapped around the closed circuit 10, but is insulated from the latter. Should an attempt be made to sever the closed protective circuit 10 by severing the same by a knife or other cutting tool, the wire 35 will be simultaneously cut and since the knife blade must bridge both wires during the cutting operation, the coil 14 of the relay will be grounded by the blade of the knife bridging the wire 35 and closed circuit 10, which latter is grounded and consequently the armature 16 will drop to open circuit position with the result as above described that the high resistance electromagnetic coil 28 will be energized to move the armature 27 to closed circuit position against the contact 29 and energize the alarm bell and signal lamps.

From the above description it is thought that the construction and operation of the invention will be fully understood without further explanation.

What is claimed is:

In alarm apparatus, a normally open alarm circuit, an alarm device in the circuit, a relay having contacts in the alarm circuit and having a coil, a source of electricity grounded on one side and connected to one of said contacts, a normally closed protective circuit grounded at one end and connected to the source of electricity in parallel with said coil of the alarm circuit relay, a circuit breaker in the closed protective circuit, a low wattage device in the closed protective circuit, a normally open protective circuit extending coincident with the closed protective circuit and insulated from the closed protective circuit, a relay having a coil of less resistance than the alarm circuit relay coil connected to and located between said protective circuits and said source of electricity, the second named relay having contacts in the closed protective circuit adapted to be opened by deenergizing of the coil of the second named relay when the closed protective circuit is interrupted at said circuit breaker or when the open protective circuit is surreptitiously cross connected with and grounded by the open protective circuit through the medium of a metal cutting tool, and a normally open manually controlled switch connected to said source of electricity and to the coil of the second named relay in a shunt circuit around the contacts of the second named relay, closing of the manually controlled switch energizing the coil of the second named relay to reestablish the circuit closing position of the contacts of the second named relay and close the closed protective circuit, the arrangement being such that when the closed protective circuit is opened the full voltage from the source of electricity flows through the coil of the first named relay to energized the relay and move the contacts thereof into circuit closing position to energize the alarm circuit.

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