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ELECTRIC BURGLAR ALARM SYSTEM WITH EXIT AND ENTRY DELAY

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Fig. 1.

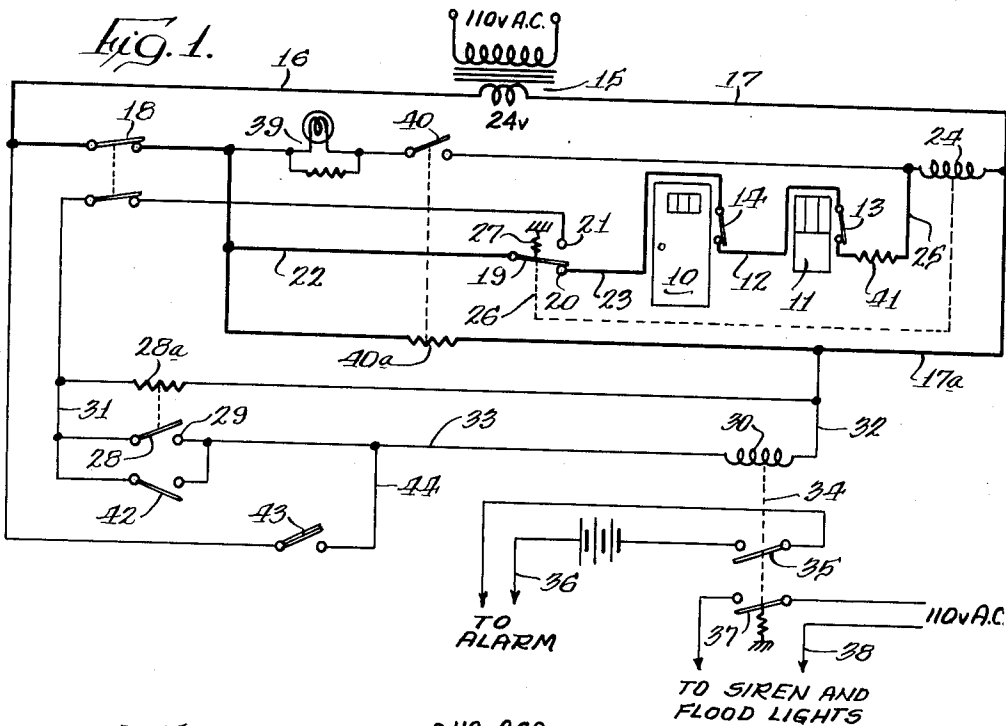
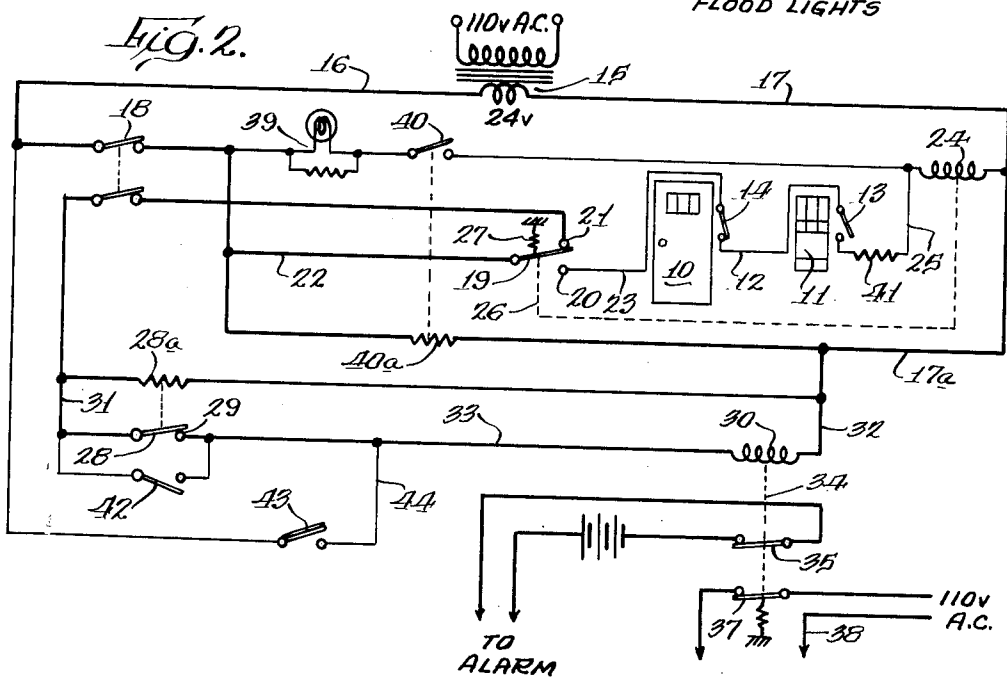


Fig. 2.



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ELECTRIC BURGLAR ALARM SYSTEM WITH EXIT AND ENTRY DELAY

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This invention relates to an electric burglar alarm system wherein an alarm condition is created by opening of detector switch contacts which are closed except when an access opening to the protected area or premises is opened or when articles on the premises such as railings, knobs, handles, screens and the like provided with such detector switches are touched or handled so as to interrupt flow of current through the circuit established by such contacts.

It is an important object of this invention to provide an alarm system of the character indicated wherein operation of a signal device in response to an alarm condition is automatically delayed for a departure time interval of predetermined duration beginning with initial energization of the circuit containing said detector switch contacts and delayed for a reentry time interval of selected duration beginning with the initial opening of the circuit established by such detector switch contacts incident to reentry to the protected area via an access opening after expiration of said departure time interval. By thus providing a delayed operation of the alarm devices of said system for such predetermined intervals of time, a manually operated switch for initiating flow of electric current through the circuit containing the detector switches may be made inaccessible from any location outside the area protected by the alarm system. The system is accordingly rendered less susceptible to detection or damage by a would-be intruder and yet allow authorized personnel to depart from and have reentry to the protected area via said access opening for the purpose of operating the main switch and thereby avoid activating the alarm devices incident to such use of the access opening by authorized personnel.

The present invention, both as to its organization and method of operation will be best understood by reference to the following specification taken in conjunction with the accompanying drawing in which:

FIG. 1 illustrates in schematic form an alarm system and apparatus included therein embodying the features of the present invention, and showing the system in a condition which prevails after expiration of the departure time interval and prior to commencement of the reentry time interval.

FIG. 2 is a similar view showing the system in a condition which prevails after expiration of the departure time interval and opening of the circuit containing one of the detector switches and thereby in alarm sounding action.

In a typical installation of a burglar alarm system incorporating the features of the present invention, as shown in FIGS. 1 and 2 of the drawings, the area or premises to be protected by said system includes a doorway or access opening 10 and a window 11. A conductor wire 12 connects a detector switch 13 having contacts which are closed except when the window 11 is opened and a detector switch 14 having contacts which are closed except when the doorway or access opening 10 is opened. The flow of electric current through the closed contacts of detector switches 13 and 14 is established through connections with a transformer 15 of suitable voltage. These connections include a lead 16 from one of the secondary terminals of the transformer 15 and a lead 17 from the other secondary terminal of

the transformer and a master or main switch 18 which is operable to open or close the flow of current from the transformer 15 via said leads 16 and 17. A two position switch 19 having contacts 20 and 21 is connected to main switch 18 via a conductor 22 and a contact of detector switch 14 is connected to contact 20 of switch 19 via a conductor 23. A relay 24 has one terminal thereof connected to lead 17 from transformer 15 while the other terminal of relay 24 is connected to a contact of detector switch 13 via a conductor 25. Thus while the operating arm of switch 19 is engaged with contact 20 and while the main switch 18 is in "on" position, current travels through the contacts of detector switches 13 and 14 via contact 20 of switch 19 and relay 24.

While relay 24 is energized, a movable armature 26 controlled by the relay, is operative to attract and hold the operating arm of switch 19 in engagement with contact 20. The armature 26, in thus holding the arm of switch 19 in engagement with contact 20 overcomes the force of a spring 27 which is otherwise effective to move and hold the operating arm of switch 19 in engagement with contact 21. Accordingly, when flow of current to relay 24 is disrupted to deenergize the relay, armature 26 is released whereupon spring 27 causes arm of switch 19 to break engagement with contact 20 and to have engagement with contact 21. When contact 21 of switch 19 is thus engaged by the arm of said switch, electric current is supplied via a lead 31 to a normally open switch 28 having an operating arm movable toward and away from engagement with a contact 29. When switch 28 is closed by engagement of contact 29 by the arm of said switch, a second relay 30 is energized via current supplied through switch 28 and a lead 33 connecting one terminal of relay 30 to switch 28 and a lead 32 connecting the other terminal of relay 30 to lead 17^a forming an extension of lead 17. When thus energized by closing of switch 28, relay 30, through its armature 34 attracts and holds the operating arm of a normally open alarm switch 35 to operate an alarm device such as a battery operated bell 36 and also closes a normally open alarm switch 37 to operate an additional alarm or signal 38 such as a siren or flood light.

As heretofore indicated, an alarm system incorporating the features of this invention contemplates the use of a main switch, such as switch 18, which is confined to a location inside the protected premises. It is thus desirable to provide means for preventing any signal operating action for a departure time interval during which authorized personnel may open the doorway 10 for the purpose of allowing exit from the premises protected by the system after operating the main switch 18 to "on" position. To this end, the present invention uses a branch circuit between the lead 22 and the relay 24 which contains an indicator lamp 39 and a timed delay switch 40 which maintains a closed circuit condition under the control of a suitable timing device such as a thermal time delay unit. After the main switch 18 is put into "on" condition, switch 40 is accordingly closed for a time interval of selected duration, as for example 90 seconds, beginning with the operation of switch 18 to "on" position. During such interval, opening of the doorway 10 and consequent interruption of current to relay 24 via the detector contacts 13 and 14 is ineffective to operate switch 19 since relay 24 is effective during this interval to hold the operating arm of switch 19 in engagement with contact 20. This time interval to accommodate departure of authorized personnel from the protected premises after operating main switch 18 to "on" position may of course be varied to suit specific conditions. Reference numeral 41 designates a suitable resistance in the line between detector switch 13 and relay 24 which is effective to maintain a supply of current sufficient to il-

illuminate the lamp 39 and thereby furnish a signal that the departure interval has not expired. It will, of course, be understood that when switch 40 is opened in response to the action of the thermal time delay unit, the lamp 39 will be extinguished and the relay 24 thereafter energized only as long as the detector switches 13 and 14 are closed.

For the purpose of preventing action of the system to operate the alarms for a reentry time interval of selected duration, the present invention also includes a suitable timing device such as a thermal time delay unit 23^a which is energized by current delivered to lead 31 via switch 19 when the arm of switch 19 is engaged with contact 21. Unit 23^a is effective to maintain switch 23 open for a selected time interval, as for example 30 seconds, and thereby prevent energization of relay 30 during such interval and as a consequence, authorized personnel is able to reenter the protected premises via the doorway 10 and thereby reach the main switch 18 to turn the same to "off" position and thus deactivate the system. Thus the opening of doorway 10 and resulting opening of switch 14 associated with doorway 10 is ineffective to initiate action at the relay 30 during such reentry time interval because of the control provided by the time delay unit 23^a.

While the doorway switch 14 and window switch 13 are shown and described herein as typical detector switches for use in an alarm system incorporating the features of this invention, it is to be understood that any desired number of other contact making or breaking devices may be added in series with the switches 13 and 14 according to the requirements of each specific alarm system installation.

When circumstances are such that the premises are occupied by authorized personnel and it is desired to provide for instant closing of the circuit supplying current to relay 30, a manually operated "no delay" switch 42 may be connected to leads 31 and 33 in parallel relation to switch 23, as shown in the drawings, and thus render the system effective to sound alarm devices 36 and 38 instantaneously with opening of a detector switch, after expiration of the departure time interval established by the time delay unit 40^a.

It will be noted that relay 30 may also be energized to sound and operate alarms 36 and 38 to signal existence of a fire on the protected premises via a circuit leading directly from transformer 15 rather than via main switch 18. Such a circuit includes suitable temperature responsive switching units of which detector switch 43 is an example and having connections to relay 30 via a lead 44 joining lead 33 from relay 30.

Transmission of signals from the alarm system of this invention to police or fire department headquarters may of course be established by means of suitable connections between terminals on the alarm system at the premises protected by such system and facilities provided at such police or fire department location.

While there have been described what are at present considered to be a preferred embodiment of this invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the invention, and it is, therefore, aimed in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What is claimed is:

1. An electric burglar alarm system, said system having serially connected detector switches including a de-

tector switch opened and closed under control of opening and closing of an access opening through which entry to and exit from the confines of the premises guarded by said system is available and which is closed except when said opening is open, a source of current, control means totally inaccessible from any location outside the premises guarded by said system including a main switch for stopping and starting flow of current from said source to said detector switch, a lock up switch operable between a first position engaging a first contact and a second position engaging a second contact and biased toward said second position, a first relay, connections between said relay and said main switch to establish a circuit including said detector switch to energize said relay while said detector switch is closed and said main switch is in "on" position, said relay being operative while energized to hold said lock up switch in said first position, time delay means operable in response to energization of said first relay when said relay is initially energized to prevent deenergization of said first relay pending expiration of a first time interval of predetermined duration notwithstanding opening of said detector switch during such interval, a second relay, connections between said second relay and said second contact of said lock up switch to establish a circuit to energize said second relay upon deenergization of said first relay, time delay means operable to prevent energization of said second relay pending expiration of a second time interval of predetermined duration notwithstanding deenergization of said first relay during said time interval, an electrically operable alarm and a normally open alarm operating switch which closes under control of said second relay when said second relay is energized.

2. An electric burglar alarm system according to claim 1 wherein deenergization of said first relay is controlled by time delay means included in a circuit containing a pilot light operable to stay lighted only while said first relay is energized.

3. An electric burglar alarm system according to claim 1 wherein each of said time delay means includes a thermally responsive time delay switch.

4. An electric burglar alarm system according to claim 1 wherein a manually operated switch is connected to said second relay which is effective to energize said second relay instantaneously with deenergization of said first relay.

5. An electric burglar alarm system according to claim 1 wherein said source of current includes a transformer and said second relay is connected to a terminal of said transformer via a fire detector switch operable to energize said second relay notwithstanding an alarm condition initiated by deenergization of said first relay.

References Cited by the Examiner

UNITED STATES PATENTS

1,365,693	1/21	Hess	340-276
2,250,828	7/41	Foss	340-276
2,250,834	7/41	Howton	340-276
2,724,823	11/55	Toepfer	340-276
2,892,181	6/59	Benson et al.	340-276
2,943,308	6/60	Westphal	340-227
3,087,145	4/63	Fruh	340-276

FOREIGN PATENTS

1,027,065	5/53	France.
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