

[72] Inventor **Hubert J. Schlafly, Jr.**
Fort Lee, N.J.
 [21] Appl. No. **812,282**
 [22] Filed **Apr. 1, 1969**
 [45] Patented **June 28, 1971**
 [73] Assignee **Teleprompter Corporation**
New York, N.Y.

2,927,311	3/1960	Donaldson	340/283
3,024,452	8/1962	Leonard	340/274
3,200,393	8/1965	Worley	340/276
3,404,393	10/1968	Blivice et al.	340/274
3,500,376	3/1970	Cooper	340/280

Primary Examiner—Donald J. Yusko

Assistant Examiner—J. Michael Bobbitt

Attorney—Pennie, Edmonds, Morton, Taylor and Adams

[54] **SECURITY MONITORING SYSTEM WITH
 TAMPERPROOF CABINET**
 5 Claims, 2 Drawing Figs.

[52] U.S. Cl. **340/276,**
 179/5, 340/216, 340/274, 340/275

[51] Int. Cl. **G08b 13/08,**
 G08b 19/00, G08b 25/00

[50] Field of Search..... 340/274,
 276, 258, 216, 416 (Inquired); 200/61.93, 61.58

[56] **References Cited**

UNITED STATES PATENTS

2,346,171 4/1944 Laford..... 340/276

ABSTRACT: A signalling system comprising remote and local indicators. The remote indicator being actuatable immediately upon the unauthorized tampering with the cover of the alarm cabinet. The local indicator being actuatable upon opening of a monitoring switch (attached to door) while the remote indicator is delayed, allowing time for an authorized person to reset the system before the remote signal is given. An automatic telephone transmitter may be employed to transmit a signal or message to a remote station.

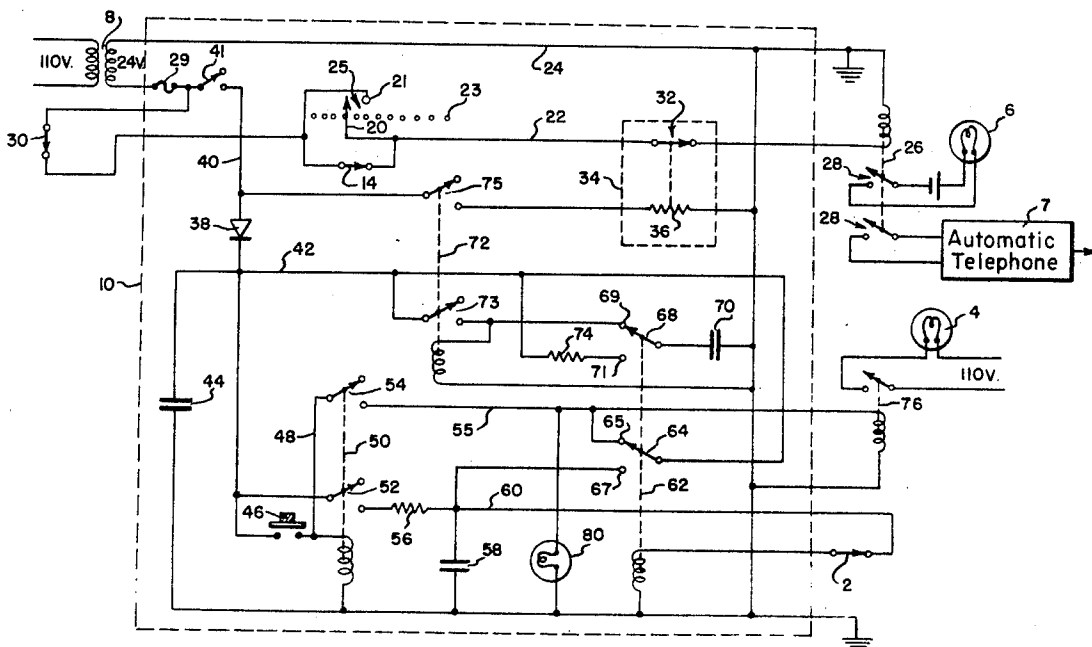


FIG. 1

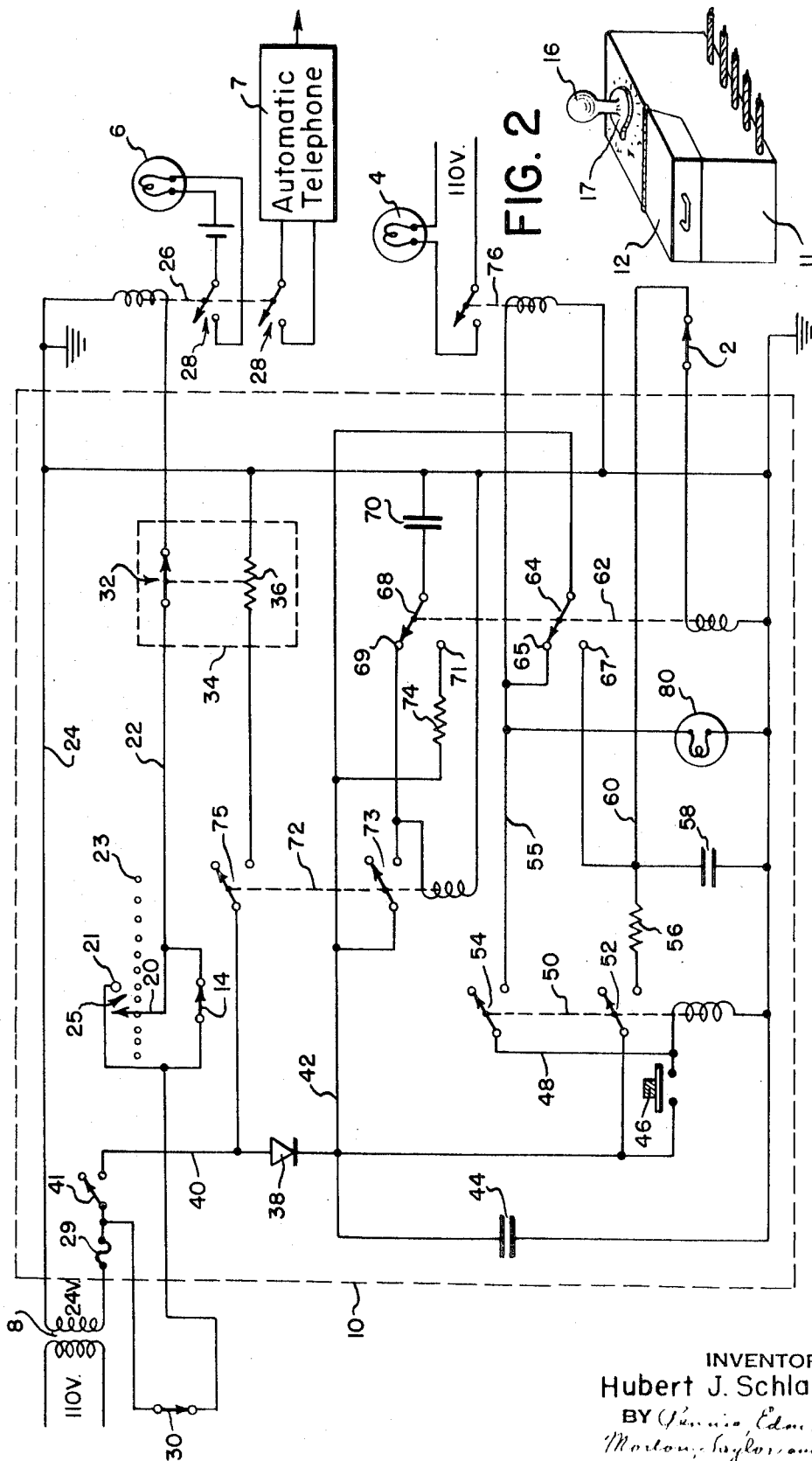
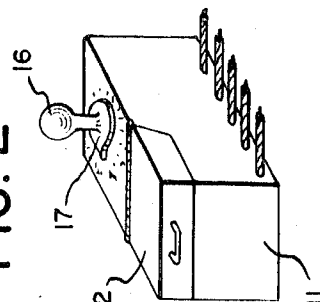


FIG. 2



INVENTOR
Hubert J. Schlafly, Jr.
BY *(Signature)*
Morton, Taylor, and Adams
ATTORNEYS

SECURITY MONITORING SYSTEM WITH TAMPERPROOF CABINET

The present invention relates to a signalling system, and more particularly to a signalling system usable as a burglar alarm. The system of the invention is of the fail-safe type, a malfunction or loss of power therein resulting in the sending of an alarm signal, just as does an intentional opening of the circuit for the purpose. The system is simple in operation, and is so constructed that an intentionally incorrect disabling of the system by one familiar therewith and performed under duress at the hands of an intruder cannot be detected and will result in the sending out of an alarm.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be further described with reference to the accompanying drawings in which:

FIG. 1 is a schematic diagram of an alarm system according to the invention, and

FIG. 2 is a view of a control box incorporating certain components of the alarm system of FIG. 1.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

In FIG. 1 a switch 2 is disposed to be closed in the closed or secure condition of the premises. A signalling device 4, for example a lamp as shown, may be disposed on the premises to indicate to the householder about to leave the premise that the system is in a "set" or preliminarily armed condition. A signalling device 6 may be disposed at a location remote from the premises to report an alarm, i.e. to indicate a breach of security at the premises. The signalling device 6 is shown as a lamp. It may of course take other forms. FIG. 1 shows in addition a signalling device 7 in the form of an automatic telephone transmitter, arranged to be actuated together with the device 6. The transmitter 7 may, with the relay 26 be disposed on the premises instead of at a remote location, to transmit a message identifying the premises and reporting an intrusion there. The devices 6 and 7 may of course be provided alternatively instead of cumulatively.

Except for the signalling devices 4, 6 and 7, and except for a power supply indicated at 8, the remainder of the system may be physically disposed on or in a cabinet or box indicated by means of the dash line 10 in FIG. 1. The cabinet is indicated at 11 in FIG. 2. The power supply 8 desirably supplies alternating current of low, nondangerous voltage such as 24 volts.

The box 11 may have a hinged cover 12 as indicated in FIG. 2. A handle 16 with a pointer 17 protrudes from the box 11 so as to be available for manipulation whether the cover 12 is open or closed, and is coupled to a movable switch contact 20 (FIG. 1). Switches 41 and 46 (FIG. 1) to be further described hereinafter can be operated only when the cover is raised. A lamp 80 may be provided, to be visible when the cover is raised.

The other components in the dash line box 10 of FIG. 1, i.e. those other than switches 41 and 46 and lamp 80, are disposed in a compartment or compartments of the box 11 which are inaccessible even when the cover is raised. Preferably box 11 is constructed so that these compartments cannot be easily forced.

Among these other components is a switch 14, coupled to the cover 12 to be closed when the cover is closed and to be open when the cover is raised. Also among these other components is the movable switch contact 20 which for one position of the handle 16 is engageable with a stationary contact 21. A plurality of detents 23, for example six or more, define fixed positions for the handle 16. In one of these, indistinguishable from the others by manipulation of the handle, contacts 20 and 21 engage with each other. For convenience, switch contacts 20 and 21 are identified collectively by reference character 25 and are collectively by reference character 25 and are collectively termed "switch 25."

The switches 14 and 25 are inserted in parallel in a conductor 22 which with a conductor 24 connects the low voltage output of power supply 8 to the actuating coil of a relay 26 having one or more pairs 28 of normally closed contacts, i.e. contacts closed for the deenergized condition of the relay. These contacts control the alarm devices 6 and 7, actuating them whenever relay 26 is deenergized.

A fuse 29 may be inserted in the conductor 22, which may moreover be led out of the control box 11 to a normally closed push-to-open pushbutton switch 30 disposed at a desired location on the premises. Also inserted in conductor 22 is a pair of normally closed contacts generally indicated at 32 on a time-delay relay indicated by means of a dash line box 34.

A rectifier 38 has one terminal connected via a conductor 40 and the manually operable switch 41 to the conductor 22. The opposite terminal of the rectifier is connected to a conductor 42, isolated from the opposite side of the power supply 8 (i.e. from grounded conductor 24) by means of a filter and storage capacitor 44. Thus when switch 41 is closed, a direct current voltage, which may be called B+ for convenience, is developed on the conductor 42.

Conductor 42 leads through a spring loaded normally open push-to-close pushbutton switch 46 and a conductor 48 to one end of the actuating coil of a relay 50. The other end of this coil is grounded. Relay 50 possesses two pairs 52 and 54 of normally open contacts. Contacts 52, when closed, connect conductor 42 to one end of resistor 56, the other end of which connects to a storage capacitor 58 leading to ground and also to a conductor 60. Conductor 60 leads through the switch 2 previously mentioned to one end of the actuating coil of a relay 62. The other end of this coil is grounded. Relay 62 possesses two movable contacts 64 and 68. Associated with contacts 64 and 68 are contacts 65 and 69, respectively, to which contacts 64 and 68 are normally closed. Also associated with contacts 64 and 68 are normally open contacts 67 and 71, respectively. Thus when the relay is energized, contacts 64 and 68 "make" or connect with contacts 67 and 71 respectively.

Contact 64 is connected to conductor 42 while contact 68 leads to one terminal of a capacitor 70, the other terminal of which is grounded. Contact 69 is connected to one end of the actuating coil of a relay 72, the other end of that coil being grounded. Contact 71 connects through a resistor 74 to conductor 42. Contact 65 connects to a conductor 55 leading to one end of the actuating coil of a relay 76, the other end of that coil being grounded. Contact 67 is connected to conductor 60.

Relay 72 possesses two pairs of normally open contacts. One pair 73, when closed, connects conductor 42 to contact 69. The other pair 75, when closed connects conductor 40 to the actuating coil or element 36 of time-delay relay 34, the other end of that coil being grounded. This actuating element may include a conventional relay coil with an associated thermal device to delay buildup of current in the coil, or it may include a clock motor which when energized opens the contacts 32 with a desirable delay, for example of the order of 30 seconds.

Relay 76 possesses a pair of normally open contacts which close when the relay is energized to complete the circuit for signalling device 4.

The indicator lamp 80 may be connected between conductor 55 and ground.

The operation of the system will now be explained. Although the system is not limited to such use, it may be employed in a burglar alarm. The explanation will be in terms of such an application. Let it be assumed that the switch 2 is coupled to the door of a dwelling, the switch being closed when that door is closed.

When the householder is at home and wishes to move freely in and out of the door to which the switch 2 is coupled without sending an alarm, he leaves switch 41 open and he also either keeps switch 25 closed by proper positioning of the handle 16 or he keeps the cover 12 closed so as to keep switch 14 closed,

or he does both. With switch 41 open, relay 34 is prevented from energizing to open its contacts 32, and with either or both of switches 14 and 25 closed, and with switch 30 closed, relay 26 is held energized so long as the power supply 8 is energized and so long as neither of conductors 22 and 24 to the coil of relay 26 is cut. Cutting of either of those conductors of course results in the transmission of an alarm since relay 26 will be deenergized thereby.

To place the system in operation, the householder first sets handle 16 to close switch 25. He then lifts the cover 12, thereby opening switch 14, and obtaining access to switch 41 and to pushbutton switch 46. He closes switch 41 so that B+ is applied to conductor 42. When B+ is applied to conductor 42, relay 76 is energized through the closed contacts 64 and 65 of the deenergized relay 62 and through conductor 55. Signalling device 4 is thereby actuated, indicating to the householder that the system is functioning. Signalling device 4 may for example take the form of a buzzer, or of a lamp positioned to be visible through a window from the exterior of the premises.

The householder then briefly presses pushbutton switch 46 to close its contacts. He then closes the cover 12 and sets the handle 16 to some position in which switch 25 is open.

The momentary closing of the switch 46 energizes relay 50 and a holding circuit for that relay is established at its contacts 54 from conductor 42 through the closed contacts 64 and 65 of deenergized relay 62, conductor 55, contacts 54 and conductor 48 to the coil of relay 50.

Closing of the contacts 52 on relay 50 causes current to flow from conductor 42 through the resistor 56, conductor 60, switch 2, and coil of relay 62 to ground. The current is limited by the resistor to a value lower than that required to operate relay 62, and a corresponding voltage, less than that on conductor 42, is stored in capacitor 58.

Upon leaving the premises, e.g. a house or apartment, the householder opens switch 2 by opening the door of the house. Switch 2 is reclosed when the householder closes the door behind him. While switch 2 was open capacitor 58 charged, through resistor 56, to the full voltage available on conductor 42. Hence on reclosing of switch 2 relay 62 is energized. Transfer of its contact 64 from contact 65 to contact 67 breaks the holding circuit for relay 50 and deenergizes relay 76 and hence lamp 4. If the lamp 4 is visible from the exterior, the householder has thereby an indication that the system is fully armed. Relay 62 is however held energized by the transfer of contact 64 to contact 67.

Transfer of contact 68 from contact 69 to contact 71 causes capacitor 70 to charge through resistor 74 to the full voltage on conductor 42.

If now switch 2 is again opened, either because the householder returns or because an unauthorized person opens the door, relay 62 is deenergized, thereby losing its own holding circuit at contacts 64 and 67. Relay 76 will be energized again by closing of contacts 64 and 65, activating the signalling device 4 and lighting the indicator lamp 80. These are reminders to the householder that in order to avoid the transmission of an unwanted alarm signal, he must secure the system before time-delay relay 34, which as will presently be explained is now energized, opens contacts 32.

Deenergization of relay 62 causes capacitor 70 to discharge through the actuating coil of relay 72, via contacts 68 and 69 of relay 62, causing relay 72 to energize. A holding circuit for relay 72 is established at its contacts 73, and its contacts 75 apply voltage to the actuating coil 36 of time-delay relay 34.

To forestall the giving of an undesired alarm the householder goes to the control box 11 (FIG. 2), sets the handle 16 to the position which closes switch 25, and then raises the cover 12 and opens switch 41. This removes voltage from time-delay relay 34, which resets, and the sending of an alarm is forestalled.

An unauthorized intruder, not knowing in what position of handle 16 the switch 25 is closed, would be unable except by chance to prevent the sending out of an alarm due to opening of switch 14 on raising of the box cover in order to forestall

the sending out of an alarm. Neither could he, by force or threat of force, prevent the householder from sending out an alarm. Raising of the cover with switch 25 open results in immediate transmission of an alarm, even before the opening of contacts 32.

The pushbutton switch 30, located for example in a bedroom of the dwelling, makes possible the instantaneous sending out of an alarm by the mere opening of its contacts, irrespective whether switch 41 is closed or open.

The switch 25 may of course be supplemented with additional switches in series therewith and in parallel with switch 14, each such additional switch having its own plural-position control handle, thus further reducing the chances of an accidental closing of the branch in parallel with switch 14 by an intruder familiar with the general nature of the system and intent on forestalling the transmission of an alarm.

Similarly, a plurality of switches 2 may be provided in series with each other, and coupled for example to the separate doors of the dwelling. The coupling of the surveillance switch or switches 2 to the doors or other elements of the premises to be monitored or placed under surveillance may of course be such that the switch will reclose after such door is opened, whether the door itself is reclosed or not.

The power supply 8, constituting a voltage source, and the load thereon, namely the coil of relay 26, may be disposed side-by-side either on the premises to be guarded or at the central station, if one is provided for an alarm signalling device such as the lamp 6. They may however be spaced remotely from each other. In either event, the conductors 22 and 24 constitute a transmission line to which that source and load are connected. This will be true even if the conductor 24 is replaced by earth. The transmission line includes over part of its length two branches in parallel, one containing the switch 14 and the other the switch 25. The transmission line includes a further switch, constituted in the example illustrated by the contacts 32. In the case of a two-conductor transmission line as shown, the switch provided by contacts 32 can be disposed in either conductor.

The handle 16 constitutes for the switch 25 a plural-position control having at least one position in which that switch is open and at least one position in which it is closed. Time-delay means comprising the mechanism 36 are provided to open the further switch contacts 32. Switch 2 constitutes a surveillance switch, and first, second and third relays 50, 62 and 72 are provided. Switches 41 and 46 constitute switch means to energize the first relay 50 and are accessible only on opening of the switch 14. The contacts 52, resistor 56, capacitor 58 and conductor 60 constitute means responsive to energization of the first relay 50 and to subsequent opening and reclosing of the surveillance switch 2 to energize the second relay 62. Capacitor 70, resistor 74 and the contacts of relay 62 constitute means responsive to energization of the second relay 62 and to a subsequent opening of the surveillance switch 2 to energize the third relay 72. The contacts of the third relay 72 constitute means responsive to energization of that third relay to energize the time-delay relay 34, and switch 41 constitutes means accessible only on opening of the switch 14 to deenergize the time-delay relay.

In FIG. 2 there are shown five cables emerging from the box 11. One of these carries the conductors 22 and 24 to the relay 26. Another carries them to the power supply 8. A third carries the conductor 22 to and from the switch 30. A fourth carries the conductor leading to and from the coil of relay 76, while the fifth carries the conductor 60 leading to and from the switch 2.

I claim:

1. A signalling system comprising a source of voltage, a load, a transmission line connecting the source and load, said transmission line having two parallel branches therein, two first switches, one in each of said branches, a plural-position control for one of said switches having at least one position in which said one switch is open and at least one position in which said one switch is closed, a further switch in said trans-

5

6

mission line, time-delay means to open said further switch, a surveillance switch, first, second and third relays, switch means accessible only on opening of the other of said two first switches to energize said first relay, means responsive to energization of said first relay and to subsequent opening and reclosing of said surveillance switch to energize said second relay, means responsive to energization of said second relay and to a subsequent opening of said surveillance switch to energize said third relay, means responsive to energization of said third relay to energize said time-delay means, and means accessible only on opening of the other of said two first switches to deenergize said time-delay means.

2. A signalling system according to claim 1 wherein said transmission line comprises two conductors.

3. A signalling system according to claim 2 in which one of said conductors is earth.

4. A signalling system according to claim 1 in which the transmission line includes a further manually operable, normally closed switch.

5. A signalling system according to claim 1 in which the load comprises a relay having normally closed contacts held open so long as said voltage source is activated and said transmission line is intact.

15

20

25

30

35

40

45

50

55

60

65

70

75