March 16, 1948. F. C. W. STELTER 2,438,076

ELECTRICAL BURGLAR ALARM SYSTEM

Filed Aug. 3, 1945

FIG. 1.

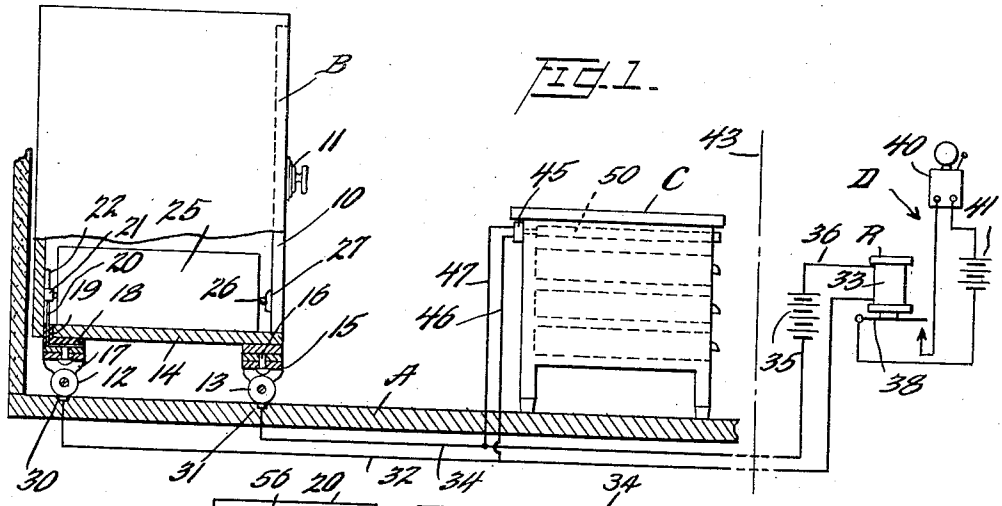


FIG. 2.

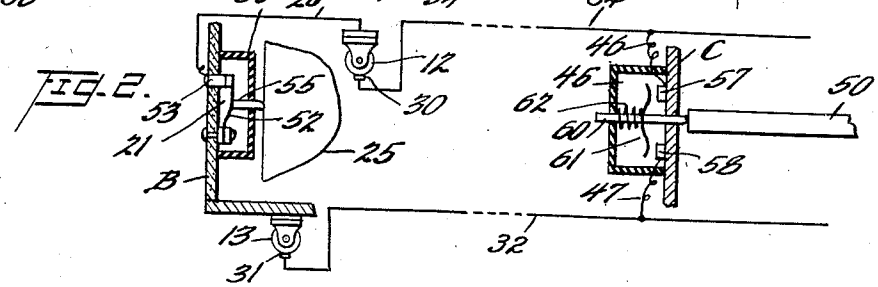


FIG. 3.

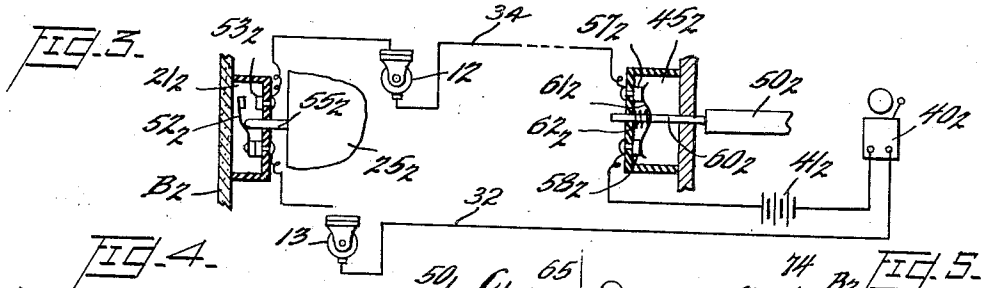


FIG. 4.

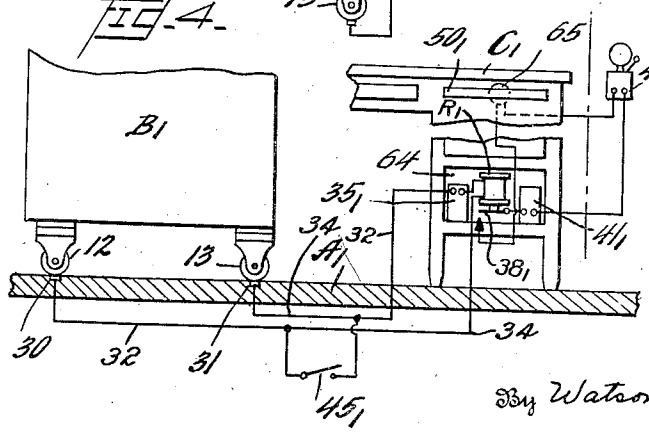
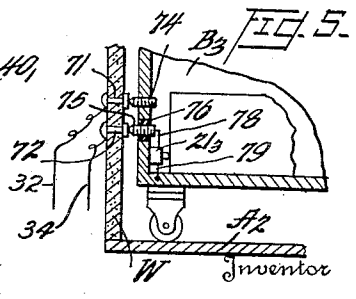


FIG. 5.



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ELECTRICAL BURGLAR ALARM SYSTEM

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3 Claims. (Cl. 177—314)

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This invention relates to burglar alarm systems and more particularly to such systems which are applicable to portable wheeled safes or the like.

The general object of the invention is to provide a novel and improved electric alarm of this type which is relatively inexpensive to install and maintain and which includes particularly effective means for concealing the wiring connected with the safe, and also secret means for controlling the opening and closing of the alarm circuit.

In its preferred embodiment, the invention contemplates the provision of alarm circuits for safes or cabinets in which the wiring is effectively concealed and in which contacts are made or broken by merely moving the safe from its normal position. Very small contact points are embedded in the floor, one beneath each of two of the supporting wheels or casters of the safe; and upon the slightest movement of the safe upon its wheels the contact is broken and the alarm set off. Means are also provided for actuating the alarm upon tampering with the contents of the safe, and control means are provided—preferably incorporated in a desk or other conventional piece of furniture in the same room—for rendering the system operative or inoperative, and also in some embodiments of the invention for actually setting off the alarm itself.

Other objects and features of novelty will be apparent from the following specification when read in connection with the accompanying drawings in which certain embodiments of the invention are illustrated by way of example.

In the drawings,

Figure 1 is a schematic view of an installation embodying the principles of the invention, a wall and floor of a room being shown in vertical section, a desk in side elevation, and the safe to be protected by the alarm system shown partly in side elevation and partly in vertical section;

Figure 2 is a diagrammatic view showing a safe switch and the desk control switch in section, the circuits being the same as those shown in Figure 1;

Figure 3 is a view similar to Figure 2 by illustrating an alternative wiring arrangement;

Figure 4 is a view similar to Figure 1 showing a variation in the disposal of the electrical units and in the placement of the control switch; and

Figure 5 is a detail vertical sectional view of a part of a safe showing another embodiment of the invention.

In Figure 1 of the drawings the reference character A is used to designate generally the floor of a room in which are disposed a safe B, which is

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to be protected from tampering or burglary by the novel alarm system, and a desk C which is involved in the controlling of such system as will be explained presently. The safe B is provided with a door 10 having a combination lock indicated at 11. The safe is preferably made of metal and is provided with the usual wheels or rollers, two of which are shown at 12 and 13. Three of the usual four rollers or wheels may be secured to the metal body 14 of the safe by means of the brackets or carriages 15 secured directly, as by means of the bolt 16, to the body 14 of the safe. However, at least one of the wheels is connected to the safe in such a way as to electrically insulate it therefrom. Such a roller is indicated at 12 where the bracket or carriage 17 is separated from the body 14 of the safe by means of the plates of insulating material 18. A small opening 19 is provided in the bottom of the safe adjacent the wheel 12 and a conductor 20 leads from the wheel supporting bracket 17 to the interior of the safe where it is connected with one terminal of the switch 21, the other terminal thereof being grounded to the wall of the safe by means of the conductor 22.

As shown in detail in other figures of the drawing, the switch 21 is adapted to be actuated by movement of the cash drawer 25 or other container or article within the safe. In the illustrated example, the drawer 25, which may be provided with the forward handle 26, is adapted to be retained in fully retracted position within the safe when the door 10 is closed, by means of the abutment 27 carried by the door and adapted to contact with a portion of the drawer 25, for example the handle element 26. With this arrangement, the closing of the safe door will always cause the drawer 25 to move rearwardly within the safe, if it has not already been so placed, and the switch 21 will be actuated in accordance with the setting of the alarm system. Then, if the safe is opened by an unauthorized person and the drawer 25 removed, the alarm will be set off. If desired the drawer 25 may be spring projected so that upon opening the door it will be automatically moved forwardly away from the switch 21 thus setting off the alarm when the safe door is opened.

One important feature of the present invention involves the provision of electrical contact between the safe and the alarm system which cannot be readily detected by a burglar. One of the first precautions that a burglar usually takes is to examine the safe and the surrounding areas for wire connections, and frequently

he moves the safe in order to make sure that there are no connections with any alarm system. In the present invention, there are set in the floor A of the room in which the safe is disposed, a pair of very small contact points 30 and 31, which need not be larger than the head of an ordinary nail. These points are spaced apart the exact distance between the centers of two of the wheels, for example the wheels shown at 12 and 13 in Figure 1. In this illustrated example of the invention, a conductor 34 leads from the contact point 30 to the magnet 33 of a relay R. A conductor 32 leads from the point 31 to a battery 35 and the conductor 36 completes the relay circuit. The switch of which the armature 38 of the relay R is a part, which switch is normally open, is disposed in series with the alarm bell 40 and the battery 41. The two batteries, the relay, and the alarm bell comprise the alarm sounding system D which is preferably disposed at a remote point from the room in which the safe or other receptacle to be protected is located. This is indicated by the broken line of separation 43 in Figure 1. It will thus be seen that if the relay circuit is interrupted by either rolling the safe so that the wheels 12 and 13 separate from the contact points 30 and 31, or by opening the switch 21 by removal of the drawer 25, the relay R will be de-energized, the armature 38 will close the switch and the alarm 40 will sound.

For the purpose of rendering the alarm system inoperative as during the day when frequent access to the safe is had and employees of the owner are in the vicinity, a control switch 45 is installed in the desk C, or in a table or other ordinary furniture of the room in which the safe B is disposed. Preferably the desk C should be one which is occupied by an employee or official during most of the period during which the office is open. The switch 45 is adapted to be opened during the period during which the alarm protection is most needed, for example at night, and its terminals are connected by means of the leads 46 and 47 with the conductors 32 and 34 respectively of the relay circuit. The switch 45 may be actuated by one of the sliding drawers of the desk or (as shown in Figure 1) by means of the sliding leaf or shelf 50. During the daytime, the shelf 50 may be so adjusted with relation to the switch 45 that the switch serves to short-circuit the conductors 32 and 34 and provide shunt means for keeping the relay R energized, regardless of the position of the safe or of the cash drawer 25 therein. This will of course prevent the alarm sounding when authorized persons open or move the safe. Upon closing the office, and after the safe has been secured for the night, the shelf 50 is adjusted with relation to the switch 45 so that the contacts are open, thus throwing the control of the alarm system on the receptacle contacts.

The above described system will also serve as a hold-up alarm during the daytime. For example, if the person occupying the desk C is threatened, when the safe B may be open, all he need do is to make a slight movement or adjustment of the shelf 50 so as to open the switch 45 and the alarm will sound.

Examples of detailed switching arrangements for effecting the purposes just described are shown in Figure 2 of the drawings. The same reference characters are employed as in Figure 1, and it will be readily seen that the wheel 13 is grounded to the safe B as is also the resilient contact arm 52 of the switch 21. The other contact 53 is insulated from the wall of the safe and is connected by means of the wire 29 with the wheel 12. The switch arm 52 is provided with a plunger or projection 55 which may extend through an opening in the cover 56 of the switch in a position to be abutted by the drawer 25. The drawer 25 is shown in retracted position and of course the contacts of the switch 21 are closed. The contact points 30 and 31 and their respective conductors 32 and 34 forming part of the relay circuit are also clearly indicated in Figure 2. The switch 45 secured to the desk C may contain spaced contact elements 57 and 59, these elements being connected respectively by means of the wires 46 and 47 with the conductors 32 and 34 as previously explained in connection with Figure 1. A plunger 60 forms a part of the switch mechanism 45 and carries a resilient contact arm 61, the plunger and arm 61 being urged in the right-hand direction as seen in Figure 2 by means of the compression spring 62. The shelf or tray 50 abuts the forward end of the plunger 60 when approaching its rearmost position and when it attains this position, movement of the plunger 60 serves to separate the spring contact arm 61 and the contact elements 57 and 59, and opens the switch.

Another embodiment of the invention involving a relay circuit and an alarm circuit is shown diagrammatically in Figure 4 of the drawings. The safe B_1 rests upon the floor A_1 and is arranged in the same way as indicated in Figure 1 of the drawings, the wheels 12 and 13 resting upon the concealed contact points 30 and 31 set into the floor A_1. In this embodiment, instead of being disposed at the remote point and being a part of the alarm assembly D, the relay R_1 together with the relay circuit battery 35_1 and the alarm circuit battery 41_1 are all housed within a drawer or compartment 64 in the desk C_1, the bell 40_1 being the only element of the alarm system disposed at a point remote from the receptacle to be protected. A shunt switch 45_1 may be disposed at any suitable point in the relay circuit to render the safe or cash drawer contacts ineffective, but this may be just as readily accomplished by means of the switch 65 disposed in the desk C_1 in a position with respect to the shelf 50_1 corresponding to that of the control switch 45 in the embodiment illustrated in Figures 1 and 2. However, this switch is in the alarm circuit in series with the relay switch and is adapted to be closed when the alarm is set and opened during business hours. Thus, when switch 65 is closed and the relay system is set, the relay switch which includes the armature 38_1 is open and will only be released by interruption of the relay circuit. During the daytime, switch 65 will be open rendering the alarm 40 ineffective even though the safe contacts are broken and the relay switch closed. In the event of a hold-up at times when the safe is being used, the occupant of the desk C_1 may manually actuate the switch 65 by a surreptitious movement of the shelf 50_1, to close the switch and complete the alarm circuit.

In Figure 3 of the drawings there is shown a simpler circuit which will be satisfactory for limited purposes, although it will not attain the complete objects of the invention as in the case of the earlier described embodiments. The safe B_2 having the wheels 12 and 13 is provided with a switch 21_2 which includes a spring contact arm 52_2 and a stationary contact 53_2, the two contacts being

connected electrically with the wheels 12 and 13 as indicated. An actuating plunger 55_2 is adapted to be moved rearwardly by retraction of the drawer 25_2 so that the circuit is broken when the drawer is in position. Attached to the desk C_2 is a switch 45_2 having stationary contacts 57_2 and 58_2 connected in series with the safe contacts, the battery 41_2, and the bell 40_2. The drawer or shelf 50_2 when pushed in causes the plunger 60_2 to move toward the left in Figure 3 until the spring contact arm 61_2 bridges the contacts 57_2 and 55_2 against the pressure of the spring 62_2. In this case the alarm will only be sounded upon disturbance of the drawer 25_2 and only when the setting switch 45_2 is closed. However, during the daytime when the drawer 25_2 is removed and switch 21_2 closed, the alarm may be purposely sounded by the manual retraction of the shelf 50_2.

In Figure 5 of the drawings there is shown an alternative means for electrically connecting the safe with the various circuits. The leads 32, 34 are connected to the pins 71 and 72 in the walls W of the room in which the safe B_3 is located.. Each of these contacts 71 and 72 is set in the wall surface and is adapted to register with corresponding contact elements carried by the safe. One of these elements designated 74 is threaded through the metal wall of the safe and the other element 75 is carried by the wall of the safe through the intermediary of an insulating bushing 76. A switch 21_3 is actuated by the drawer 25_3 in the same way as described in connection with earlier embodiments, the switch having one of its contacts connected to the pin 75 by means of the wire 78 and the other grounded to the safe wall by means of the wire 79. This arrangement may be employed in cases where it would be difficult to set electrical contacts in a floor. It is nearly always possible to set such contacts in the baseboard of a room regardless of the composition of the floor. This arrangement is not so effectively concealed as in the case of the earlier described embodiments but will be operative to a somewhat limited extent.

Various exchanges and alterations may be made in the embodiments illustrated and described herein without departing from the scope of the invention as defined by the following claims. For example, the circuits may be arranged to be energized by various acts of unauthorized intent against the receptacle to be protected, and the word "tampering" as used in the broader claims is intended to cover generically any and all such acts.

Having thus described the invention what is claimed as new and desired to be secured by Letters Patent is:

1. A combination alarm system adapted for protection of safes, cabinets, cash drawers, or the like against burglary when closed and unattended, as in the night time, and for protection against hold-ups when said receptacles are open for permissible access as during business hours; said system comprising, in combination: an electrical circuit including a source of current, an alarm signal, and contacts at the receptacle to be protected, adapted to be actuated from "alarm off" position to "alarm on" position upon attempts to move or burglarize the receptacle, a pair of positively controlled contacts in said circuit and concealed at a desk or like point of normal occupancy within view of the receptacle, and connections whereby relative movement of said contacts in one direction serves to render said first named contacts at the receptacle ineffective to energize the alarm signal, and relative movement in the other direction serves (1) to set the circuit for actuation by the contacts at the receptacle when said last-named contacts are in "alarm off" position and (2) to actuate the alarm signal itself when the receptacle contacts are in "alarm on" position; and concealed means operable by an apparently innocent movement of an occupant for actuating said positively controlled contacts particularly to effect said second-named purpose, whereby a hold-up of the occupant while the receptacle is not under the automatic protection of the alarm system, as during business hours, may be thwarted.

2. A combination alarm system adapted for protection of safes, cabinets, cash drawers, or the like against burglary when closed and unattended, as in the night time, and for protection against hold-ups when said receptacles are open for permissible access as during business hours; said system comprising, in combination: an electric circuit comprising a control sub-circuit which includes a source of current, a relay magnet, and contacts at the receptacle to be protected adapted to be actuated from "alarm off" position to "alarm on" position upon bodily removal of the receptacle or upon opening of the same, and an alarm sub-circuit which includes a source of current, an alarm signal, and a switch operated by said relay magnet; a pair of positively controlled contacts in one of said sub-circuits and concealed at a desk or like point of normal occupancy within view of the receptacle, and connections whereby relative movement of said contacts in one direction serves to render said first named contacts at the receptacle ineffective to energize the alarm signal, and relative movement in the other direction serves (1) to set the circuit for actuation by the contacts at the receptacle when said last-named contacts are in "alarm off" position and (2) to actuate the alarm signal itself when the receptacle contacts are in "alarm on" position; and concealed means operable by an apparently innocent movement of an occupant for actuating said positively controlled contacts particularly to effect said second-named purpose, whereby a hold-up of the occupant while the receptacle is not under the automatic protection of the alarm system, as during business hours, may be thwarted.

3. A protective system for metal wheeled safes, cabinets, or like heavy receptacles, which comprises, in combination, an electric circuit including a source of current, a relay magnet, and a plurality of contacts at the receptacle to be protected, certain of said contacts adapted to be broken upon bodily removal of said receptacle, said contacts comprising minute inconspicuous metal conductor points set in the floor upon which the receptacle rests, and spaced apart a distance equal to the space between the centers of two of the wheels of the receptacle, the receptacle being positioned so that said wheels normally rest respectively on said contacts, electrical insulation interposed between one of said wheels and the metal body of said receptacle, the other of said wheels being in electrical contact with said body, other of said contacts being disposed within said receptacle in a position to be actuated by the opening of the door of said receptacle or the removal of certain contents thereof, said last-named contacts serving to bridge the gap in between the metal body of the safe and the insulated wheel; all whereby the circuit will be

broken upon moving the receptacles thus de-energizing the relay magnet, an alarm circuit including a switch actuated by said relay magnet, an alarm signal, and a source of current.

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