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1,500,805

J. J. DUFFIE

VAULT PROTECTION SYSTEM

Filed March 3, 1921

2 Sheets-Sheet 1

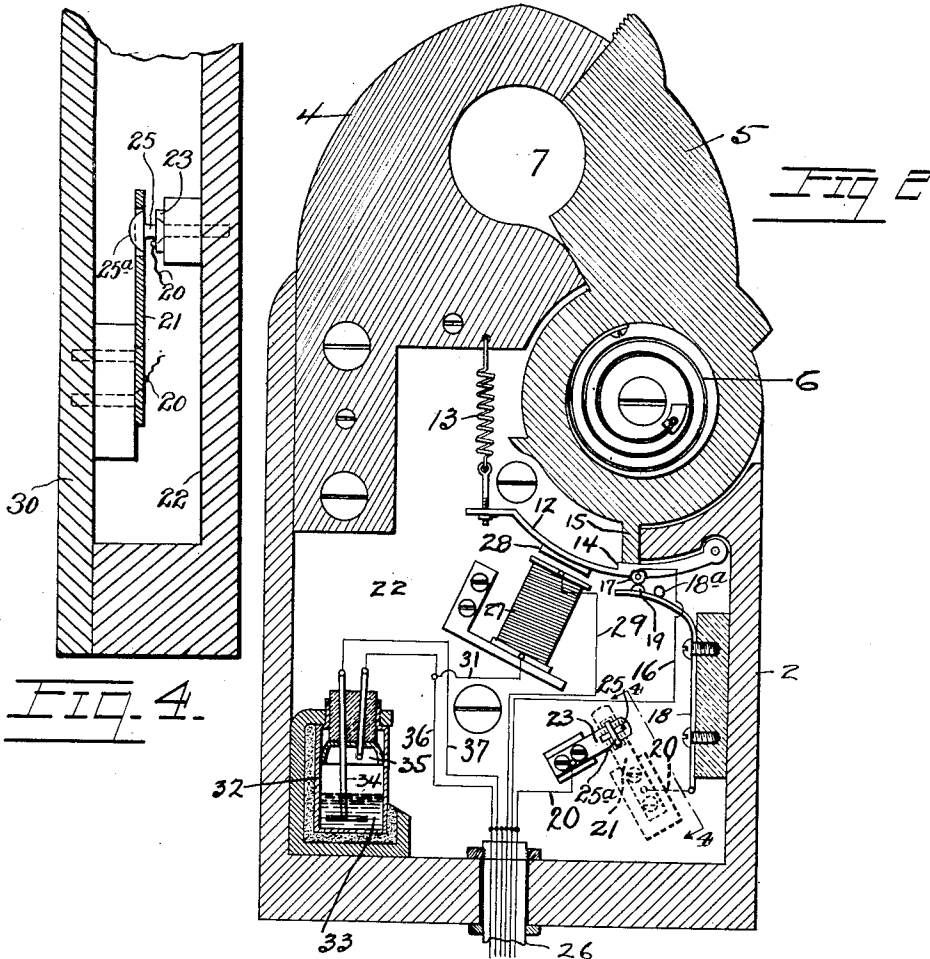
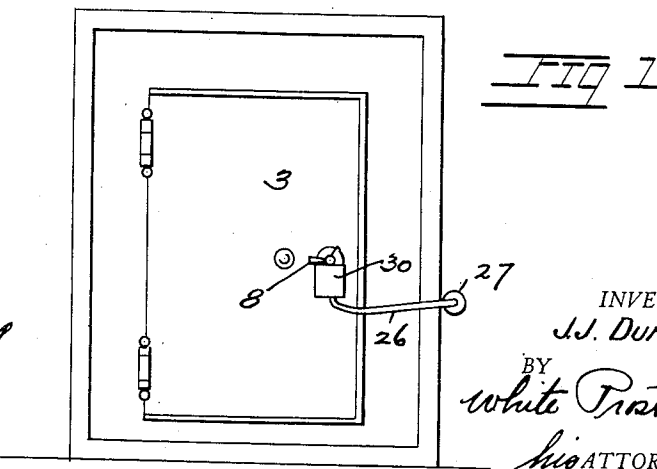


Fig. 4.



WITNESS
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July 8, 1924.

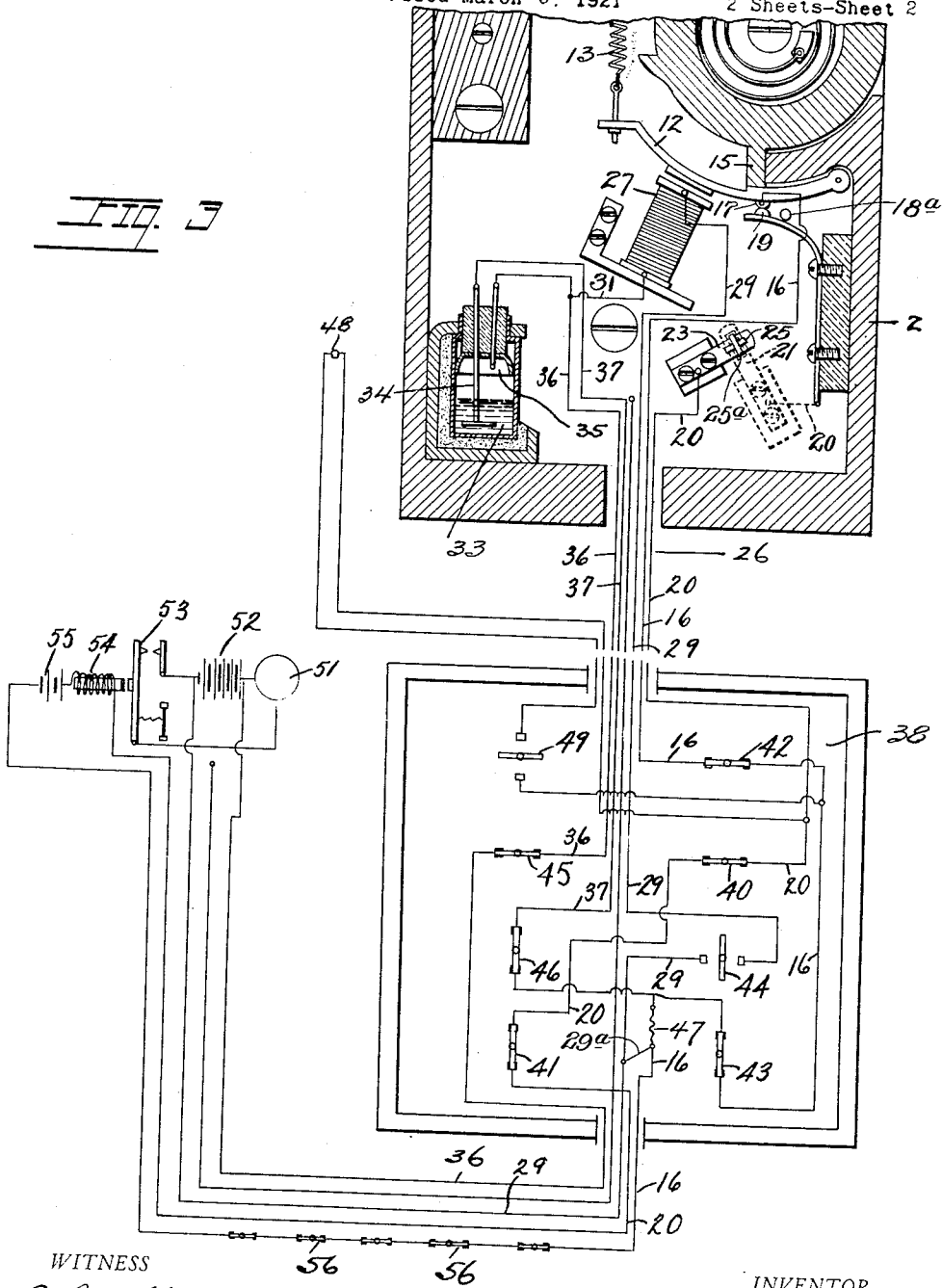
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VAULT PROTECTION SYSTEM

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

JOHN J. DUFFIE, OF BERKELEY, CALIFORNIA.

VAULT PROTECTION SYSTEM.

Application filed March 3, 1921. Serial No. 449,438.

To all whom it may concern:

Be it known that I, JOHN J. DUFFIE, a citizen of the United States, and a resident of Berkeley, county of Alameda, and State of California, have invented a certain new and useful Vault Protection System, of which the following is a specification.

The invention relates to a protection system for vaults, safes and other depositories which is operative to sound an alarm when an endeavor is made to open the vault door or tamper with the lock.

An object of the invention is to provide a protection system which may be applied at small cost to any vault or safe.

Another object of the invention is to provide a protection system embodying both normally open and normally closed electrical circuits, so that the alarm will be sounded if an attempt is made to tamper with the system.

A further object of the invention is to provide a protective system in which the alarm may be sounded at any time that dangerous or threatening conditions arise.

The invention possesses other advantageous features, some of which, with the foregoing, will be set forth at length in the following description, where I shall outline in full, that form of the invention which I have selected for illustration in the drawings accompanying and forming part of the present specification.

In said drawings I have shown one embodiment of my invention, but it is to be understood that I do not limit myself to such form, since the invention, as set forth in the claims, may be embodied in a plurality of forms.

Referring to said drawings:

Figure 1 is a front elevation of a vault showing the device forming part of the system secured thereto.

Figure 2 is a vertical section through the device which is attachable to the vault door.

Figure 3 is a diagrammatic representation of the system.

Figure 4 is a detail sectional view on the line 4-4 of Fig. 2.

In the system of my invention, I provide a normally open electric circuit and a normally closed electric circuit, and a signal which is operative to sound an alarm when the closed circuit is open or the open circuit closed.

The wires forming these circuits are

grouped together in a cable, so that it is impossible to differentiate them. The system also includes a casing which is attachable to the shank of the vault door handle and the cable connected to the casing passes across the jamb of the door and is anchored in the wall or floor adjacent the jamb so that the door cannot be opened when the casing is in place, without severing the cable, which action would sound the alarm. The casing further includes means for closing the alarm circuit if it is tilted from its normal pendant position or if an endeavor is made to disassemble the casing. The alarm and the operating batteries are usually enclosed in a housing arranged at a conspicuous and inaccessible place on the front of the building in which the vault is located, so that they cannot be tampered with without observation.

The casing 2 which is attachable to the vault door 3, is of heavy metal construction and is provided with a projecting hook portion 4 which may be integral with or rigidly secured to the casing. Pivotaly mounted in the casing is a hook closing member 5 which is normally pressed into engagement with the hook by a spring 6, the hook and the closing member forming a socket 7 in which the shank of the door handle 8 is disposed when the casing is in place on the vault door. In operation the closing member is pulled back, opening the socket, and the hook is then slipped over the handle shank and the closing member permitted to spring back, holding the shank in the socket.

A signal circuit is controlled by the movement of the closing member and this circuit may be rendered inoperative by a person knowing the arrangement of the particular installation, to enable the casing to be removed from the door without sounding the alarm. It is to be understood that each particular installation will have a different arrangement of control elements, so that knowledge of the arrangement of the elements of one system will not permit unlicensed operation of any other system, without detection. When the casing is attached to the door, the signal circuit controlled by the closing member is rendered operative, so that any attempt to move the closing member with respect to the casing, will sound the alarm. Arranged in the casing adjacent the closing member, is a lever 12 which is normally pulled upward by the spring 13.

The lever is provided with a shoulder or raised portion 14 and this is engaged by a finger 15 on the closing member, when such member is in fully closed position, to hold the lever depressed. Upon the initial opening movement of the closing member, the finger moves from the shoulder, permitting the lever 12 to be moved upwardly by the spring 13, thereby separating the contacts 17, 19, the free end of the spring 18 being restrained by the stop pin 18^a. A normally closed electric circuit is controlled by the lever 12, and upward movement of the lever serves to open said circuit. One wire 16 of said circuit is connected to a contact 17 arranged on and insulated from the lever 12 and the other wire 20 is connected to a bracket 18 having a contact 19 normally engaging contact 17. The bracket 18 is insulated from the casing and is slightly resilient for reasons that will appear hereinafter. Arranged in the wire 20 is a circuit closer which is so arranged that it is opened when an attempt is made to open the casing. The casing is closed at the front by the cover plate 30 which is suitably and rigidly held in place. Secured to the front plate, within the casing and insulated from the plate, is a resilient member or flat spring 21 to which the wire 20 is connected. Secured similarly to the back plate 22 is a flat spring 23 to which the wire, forming a continuation of wire 20 is secured, and between the ends of the springs there is interposed a metallic bar 25 which may be provided with a projection or tongue 25^a adapted to project through a slot in the spring 21, and which is held in place by the pressure of the springs 21 and 23. If the front plate is removed, however, the pressure of the springs is removed and the bar falls, opening the circuit. The wires 16 and 20 lead into the cable 26 which extends from the casing across the crack or jamb of the door through an anchorage 27 in the adjacent wall.

Means are provided for depressing the lever 12 after it has sprung upward due to movement of the closing member, when it is desired to again close the normally closed circuit. Arranged below the lever is an electromagnet 27 which cooperates with an armature 28 on the lever, to depress the lever when the electromagnet is energized. The circuit of the electromagnet includes the wire 29 which forms one of the conductors of the cable 26 and the wire 31 which connects with one of the wires of a normally open circuit, which will now be described.

Means are provided for sounding an alarm in the event that the casing is tilted from its normal pendant position. Arranged in the casing is a receptacle 32 of glass or other non-conducting material containing a quantity of mercury 33. One terminal 34 of a signaling circuit extends into the mercury

and the other terminal 35 is disposed above the mercury. When the casing is tilted, the mercury establishes contact with the two terminals, closing a circuit from battery 52 through the fusible link 47, by way of the short bridge wire 29^a, causing said link to fuse, thereby opening the closed circuit through conductor 16, thus deenergizing the relay 54, and causing the signal to be sounded. The wires 36 and 37 of the mercury switch circuit form two of the conductors of the cable, the wire 31 being connected to the wire 36.

Connected in the wires of the cable is a control board 38, on which is arranged a plurality of snap switches there being at least one switch in each circuit, and when the system is set in operative position, certain switches must be closed and certain other switches must be open. The closing or opening of any of the switches will cause the alarm to be sounded, and the proper position of the switches is known only to the person or persons authorized to open the vault. The switches are enclosed so that their condition cannot be observed. Arranged in the wire 20 are two switches 40 and 41 which are normally closed and in the wire 16 are two switches 42 and 43 which are also normally closed. Arranged in the wire 29 is a switch 44 which is normally open; in the wire 36 is a switch 45 which is normally closed and in the wire 37 is a switch 46 which is normally closed. After passing the switch 46, the wire is connected to the wire 16, in which there is arranged a fusible link 47, the purpose of which will hereafter be described. A vault light 48 is provided for illuminating the vault when the door is open and the circuit of this light is connected to the wires 16 and 20 of the normally closed circuit. A normally open switch 49 is arranged in the circuit of the vault light.

The cable leads from the control board 38 to a conspicuous and inaccessible location on the front of the building in which the vault is located. At this conspicuous location there are arranged the batteries for energizing the circuits and the alarm sounding device, which is preferably a motor-driven horn 51. The horn is connected in series with a battery 52 and a normally open relay 53, which is held open by the electromagnet 54 in the closed circuit of the wires 16 and 20. A battery 55 in this circuit furnishes the energy for energizing the electromagnet. The wires 29 and 36 are connected to opposite sides of the battery 52 which is of larger current capacity than the battery 55.

When the system is set to signal an attempt to open the vault door, the circuit 16-20 is closed, the circuit 29-36 is open and switches 40-41-42-43-45 and 46 are

closed and switches 44 and 49 are open. If the hook closing member 5 is moved to release the casing from the vault door, the circuit 16—20 will be opened at contacts 17, 19, thereby deenergizing the relay coil 54, so that its armature falls back and closes the contacts at 53, thus completing the circuit of battery 52 through the horn 51. The same action will occur if an endeavor is made to dismember the casing. As soon as the cover plate 30 is pried loose, pressure on the spring 21 will be relieved and the metal piece 25, which was frictionally held by the pressure of springs 21 and 23, will drop and open the circuit 16—20. If the cover plate is replaced, the springs will remain slightly separated and will not be brought into contact unless the metal piece 25 has been inserted between the springs. Should the casing be tilted to the side, the mercurial switch will close the circuit through the fusible link 47 and the battery 52, thus causing the link to fuse and opening the circuit 16, so that the alarm will be continuously sounded.

The wire 16 is also preferably provided at suitable locations with switches 56 which may be manually opened to sound an alarm when threatening conditions arise.

When it is desired to open the vault, the person in possession of the secret arrangement of the switches on the control board, first closes switch 49 to short circuit the contacts 17 and 19, then opens switches 42 and 46, rendering the devices in the casing inoperative, so that it can be removed from the door without sounding the alarm. When it is desired to close and protect the vault, switch 44 is closed, to pull down the lever 12, and the casing attached to the door, after which switches 42 and 46 are closed and then switches 49 and 44 opened. The system is then in condition to sound an alarm if an attempt is made to open the vault door.

I claim:

1. In a vault protection system, a casing adapted to be attached to the vault door, a cable comprising a plurality of wires connected to the casing and extending across the jamb of the door to an anchorage whereby the door cannot be opened, a signal and means operative by the severing of the cable for operating the signal.

2. In a vault protection system, a casing adapted to be attached to the vault door, a cable comprising a plurality of wires connected to the casing and extending across the jamb of the door to an anchorage whereby the door cannot be opened, a signal and means operative by the detaching of the casing from the door for operating the signal.

3. In a vault protection system, a casing adapted to be attached to the vault door, a

cable comprising a plurality of wires connected to the casing and extending across the jamb of the door to an anchorage whereby the door cannot be opened, a signal and means operative upon the tilting of the casing from its normal position for operating the signal.

4. In a vault protection system, a casing, a hook on said casing adapted to receive the opening handle of the vault door, a hook closing member on said casing, a closed electric circuit connected to said casing adapted upon opening to produce a signal, and means operative by the opening movement of said hook closing member, to open said closed circuit.

5. In a vault protection system, a casing, a hook on said casing, adapted to receive the opening handle of the vault door, a hook closing member on said casing, a cable connected to said casing and extending across the jamb of said door to an anchorage, wires in said cable forming an electric circuit, a signal associated with said circuit and means operative by the opening movement of said hook closing member for actuating said signal.

6. In a vault protection system, a casing adapted to be releasably attached to the vault door, a cable connected to said casing and extending across the jamb of the door to an anchorage, wires in said cable forming a closed electric circuit and an open electric circuit, a signal and means operative by the opening of the first circuit to actuate said signal and means operative by the closing of the second circuit for also actuating said signal.

7. In a vault protection system, a casing adapted to be attached to the vault door, a cable connected to said casing, wires in said cable forming a closed electric circuit and an open electric circuit, a signal arranged to be actuated by the opening of said closed circuit, means in said casing operable by the tilting of the casing to close the open circuit and means actuated by the flow of current in the circuit thus closed for opening the first mentioned closed circuit.

8. In a vault protection system, a casing adapted to be attached to the vault door, a cable connected to the casing and extending across the jamb of the door to an anchorage, wires in said cable forming electric circuits, one of which is closed, means in the casing for controlling said circuits, a plate closing one side of the casing, means operative by the removal of the plate for opening the closed circuit, a signal, and means operative by the opening of said circuit for actuating said signal.

9. In a vault protection system, a casing adapted to be attached to the vault door, a hook on said casing, a hook closing member on said casing, a normally closed elec-

tric circuit connected to said casing, a signal arranged to be operated by the opening of said circuit, a lever in said casing carrying a contact in said circuit and means operative upon movement of said hook closing member to move said lever to open said circuit.

10. In a vault protection system, a casing adapted to be attached to the vault door,
10 an electric circuit connected to said casing,

a lever in said casing normally holding said circuit closed, means for releasing said lever to open said circuit, an electromagnet for restoring said lever to closed circuit position and a controllable circuit for said 15 electromagnet.

In testimony whereof, I have hereunto set my hand.

JOHN J. DUFFIE.