

FIG. 5.

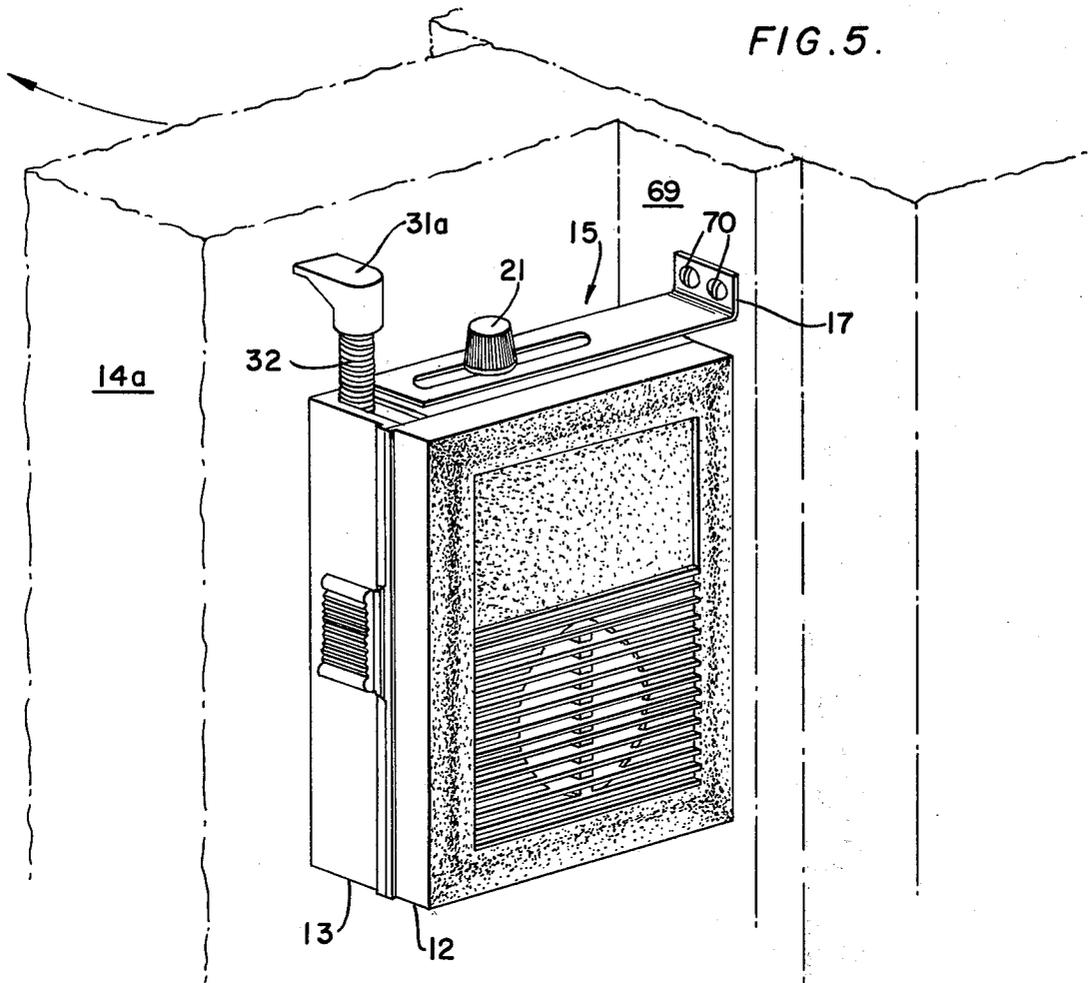
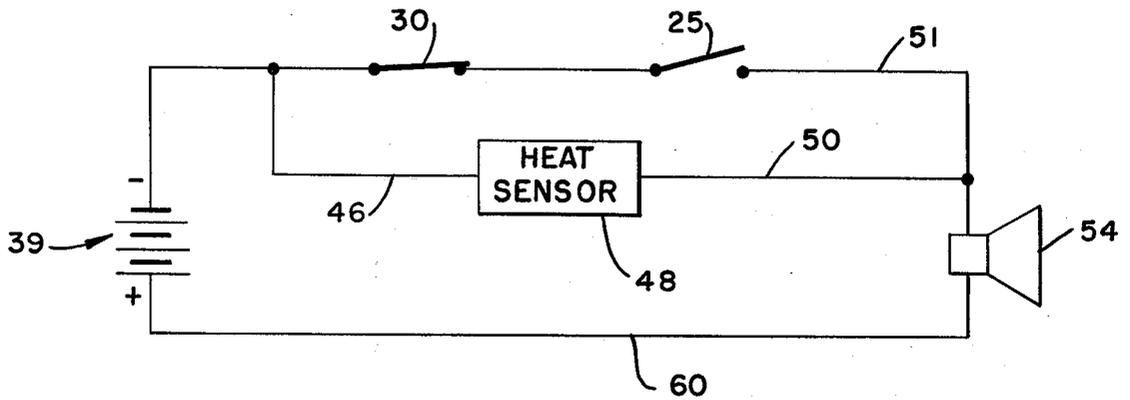


FIG. 6.



PORTABLE ALARM DEVICE USABLE ON INWARDLY OR OUTWARDLY OPENING DOORS

BACKGROUND OF THE INVENTION

This invention relates to a permanent or portable alarm device having mounting means adaptable for securing the device relative to inwardly opening or outwardly opening doors. More particularly, this invention relates to an alarm device which may be mounted on either inwardly opening or outwardly opening doors and includes an electrical circuit capable of being actuated by a coil spring arm extending from the housing. Still more particularly, this invention relates to improved mounting means for securing the device described to either inwardly opening or outwardly opening doors.

The broad field of this invention relates to means for mounting an alarm device of the type which comprises a housing member containing an alarm circuit capable of emitting a signal when an elongated coiled spring actuating member is displaced in response to an unauthorized opening of a door on which the device is mounted. The mounting means are adapted for easily mounting the device on either inwardly opening or outwardly opening doors of any material on a permanent or portable basis.

A number of devices are known to the prior art for providing a warning signal upon the intrusion of an occupied space. Quite often, such devices are part of a permanent relatively expensive, security and monitoring system designed to protect the building and premises. Aside from the cost of permanent installations, it is a general desire in the art to provide for the consumer market a relatively inexpensive, portable, and easy-to-install alarm device.

The prior art has produced a number of portable devices which are relatively easy to install, but which are not readily movable from one location to another. Accordingly, it is an overall aim of this invention to provide such an alarm device to protect dwellings and occupants of dwellings and, in particular, to protect pre-selected areas in those dwellings. Such devices also have the significant advantage of being portable so that an individual can install the device in situ on location for protection when traveling and the like.

One of the deficiencies of some prior art relatively portable devices exists because such devices are principally intended for wooden or composition doors. An example of such a device is shown in the British Design Registration No. 943,777, which pictures an intrusion alarm of the type which comprises a housing, a master switch extending from the housing for actuating the alarm from the interior occupied dwelling, and an actuating member of the type which comprises a coiled spring arm having an activating tip. The mounting bracket for such a device comprises an elongated L-shaped member having gripping and piercing points extending downwardly from one leg of the member to grip the upper surface of the door on which it is mounted. While this device has significant advantages in the art, it is not readily adaptable for use with metal doors because the gripping points do not readily pierce the metal of the door, nor is the device capable of simple installation on inwardly opening doors since the device is principally intended for outwardly opening doors. Accordingly, it is another principal aim of this invention to provide a device of the general type shown

in the British registration which is capable of being readily mounted on both inwardly opening and outwardly opening doors as well as on doors of various materials, including those made of metal.

It is still another object of this invention to provide a device of the general type shown which further includes a heat sensor arranged in series circuit with the alarm circuit to actuate the alarm when the temperature of a space reaches a predetermined limit. Thus, in the event of a fire, or excessive heat, such as around a furnace or the like, the device provides an ample and early warning of such an adverse condition.

Still another example of the general type of alarm to which this invention is related is shown in the U.S. Pat. to Kardel, No. 3,261,010, which discloses a portable door alarm capable of being secured to the top of the door by a slideable clamp. Such a device is principally intended for inwardly opening doors and is not capable of being used with outwardly opening doors without significant modification of the mounting structure. Moreover, the mounting bracket of the aforementioned patent has spaced teeth which cooperate with a fixed bracket to permit adjustment of the mounting bracket so that such device does not possess the versatile mounting characteristic of the device of this invention. It is another significant advantage of the device of this invention that it is capable of being secured to inwardly opening doors of any conventional width.

These and other advantages of the invention will become apparent from the accompanying written description, taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE INVENTION

Directed to achieving the aims of the invention and overcoming the deficiencies of the prior art in order to provide a permanent or portable alarm device capable of being mounted on either inwardly opening or outwardly opening doors on either a permanent or portable basis, the invention comprises the combination of a housing and improved mounting means for mounting the housing.

The alarm device comprises the housing which is preferably of a two-piece construction having a base member and a removable cover member to provide ready access to the interior of the device for replacement of batteries and access to the alarm circuit. Preferably, the device is made of plastic having a decorative front surface, but other materials may be used. The housing is preferably rectangular, but other geometric shapes may be used which define a convenient flush mounting surface adjacent to the door.

The housing contains an alarm means which comprises a series circuit which includes a source of electrical energy, such as replaceable penlight batteries; a master power switch having an actuating member on the outside of the housing; a signaling member, such as a buzzer, for emitting an audible warning signal; and an alarm actuating member secured to the interior of the housing and extending from a surface thereof. The alarm actuating member is of the type which comprises a coil spring body extending from the housing and having an electrically conductive portion in contact with a conductive member within the housing to form the part of the alarm circuit within the housing. A cap member is secured to the coil spring arm and includes an actuating tip which extends beyond the plane of the mounting

surface of the housing so that when the housing is mounted relative to the door surface, and the door is in its closed position, the actuating tip is caused to be displaced slightly to an extent sufficient to free the coil arm contacting portion from electrical contact with the conductor within the housing the opening the series circuit and deactuating the signaling member. When the door is opened, the alarm switch is returned to its normally closed position, thus closing the series circuit within the housing and actuating the signaling member.

The device is constructed so that only a slight movement of the door ajar, on the order of 150 or ¼ inch, will actuate the alarm. Such a construction has distinct advantages over those devices requiring relatively complete opening of a door before the alarm sounds.

Improved mounting means are provide for mounting the housing relative to either inwardly opening or outwardly opening doors and on either a permanent or portable basis. The mounting means are comprised generally of an elongated L-shaped bracket member defining a body portion and a relatively transversely extending lip portion. When mounted on inwardly opening doors, the downwardly extending lip portion of the bracket member and the bracket member body portion envelop the door relatively transversely to the housing mounting surface to secure the housing thereon. The body portion of the bracket member defines an elongated slot therein which cooperates with a releasable tightening member secured to the body of the housing of the device to accommodate doors of varying thicknesses. The downwardly extending lip portion of the bracket member includes openings therein for receiving securing members, such as wood or metal screws, if it is desired to secure the device permanently to an inwardly opening door.

For installation on outwardly opening doors, the bracket member is preferably reversed so that the lip portion extends upwardly. The lip portion is secured to the frame of the door in such a manner that the rear surface of the housing is flush with the surface of the door in its normally closed position. The bracket member extends from the housing relatively parallel to the mounting surface of the housing. In this manner, when the door is slightly ajar, the actuating tip is released to permit the coil spring arm to close the series circuit within the alarm and actuate the device. The construction of the device permits its ready removal, particularly from inwardly opening doors, where no fastening members need be used, so it may be carried and installed readily when traveling to protect the traveler when using hotel and motel installations. The ready portability of the device is an advantage of protecting particular areas within an overall structure, such as a particular office in a building. It is another significant advantage of the invention that it may be used with doors which are either metal or wood. Moreover, once positioned, the device is not apparent or detected from the outside of the protected space.

The device also may include a heat sensor provided in series circuit with the source of power in the alarm device to provide an early warning of an excessive heat build up depending upon the temperature setting of the heat sensor, the example, about 135°F. The operation of the heat sensor is independent of the master power switch.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is a front perspective view of the intrusion and heat alarm according to the invention mounted on an inwardly opening door wherein the door is slightly ajar to actuate the alarm device;

FIG. 2 is a side cross sectional view of FIG. 1 showing in phantom the extended and retracted positions of the arm;

FIG. 3 is a front plan view of the components of the device shown with the front cover removed;

FIG. 4 is a bottom view of the device showing the heat sensor;

FIG. 5 is a front perspective view of the device mounted upon a portion of a door frame to operate in connection with outwardly opening doors showing the reversal and mounting of the bracket member; and

FIG. 6 is a schematic view of the electrical circuit utilized in the device according to the invention.

Detailed Description of the Preferred Embodiments

In FIG. 1, the intrusion and heat alarm device is designated generally by the reference numeral 10. The device 10 comprises a housing designated generally by the reference numeral 11, which is preferably made of plastic. The housing comprises a front cover 12 removably secured to a rear housing member 13 so that the front cover member may be easily removed to replace the batteries within the housing. Preferably, the housing is rectangular, but any geometrical shape may be used which provides a convenient relatively flush mounting surface for reasons which will become apparent.

The device 10 is secured to an inwardly opening door 14 by mounting means designated generally by the reference numeral 15. The means 15 includes a bracket 16 having a downwardly and transversely extending lip portion 17 and an elongated body portion 17a which defines an elongated slot 18. The lip portion 17 includes a pair of openings 19 to receive fastening means, such as wood or metal screws, if desired.

The bracket 15 is secured to the housing 11 by a tightening member designated generally by the reference numeral 20. The tightening member 20 includes a knurled tip 21, a threaded member 22 (best seen in FIG. 3) and a nut 23 non-rotatably secured within a pair of downwardly extending L-shaped lip members 24 integrally formed with the upper surface of the rear cover 13. Because the nut member 23 is non-rotatably secured within the lip members 24 in the interior of the housing 11, the rotation of the knurled tip 21 can cause the tightening or loosening of the bracket 15 relative to the housing 11. Thus, the bracket 15 may be adjusted to extend to any desired lateral extent within the limit of the length of the elongated slot 18 to accommodate mounting the device on variable width doors.

As seen in FIG. 1, in order to mount the device on inwardly opening doors, the device 10 is mounted on the interior surface of the door so that the master power switch 25 having an actuating member 26 is accessible to the occupant of the space and the device 10 is unseen by potential intruders. Preferably, the device is mounted by extending the bracket 15 to an extent sufficient to accommodate the thickness of the door 14 and the rear mounting surface of the housing member 13 is mounted flush with the door, for example, at or near

the edge of the door remote from its hinges. However, any convenient mounting position along the top of the door may be used. Thereafter, the knurled tip 21 is tightened to rigidly secure the device 10 flush with the door 14.

The main actuating member of the device is designated generally by the reference numeral 30. The actuating member 30 comprises a tip member 31 fixedly secured to a coil arm 32 which is in turn secured at its distal end thereof to an electrically conductive securing member 33 having an upturned leg 34 which lies along the inner surface of the housing 13. Preferably, the coil arm is made from a continuous length of wound metal which is biased into the position shown in FIG. 1 so that the coil arm 32 is in contact with the conductor 35 on the inner surface of the rear of the housing 13 to actuate an electrical circuit when the switch 26 is in the "on" position. Thus, at least that portion of the coil arm 32 which extends between the conductive member 33 and the conductive member 35 is conductive to complete a series circuit to actuate the alarm, as will be discussed hereinafter.

The tip member 31 has a relatively flat upper surface 31a terminating in an actuating tip 37 having a forward end 38 which normally lies at a position slightly forward of the plane of the rear surface of the cover 13 (see FIG. 2). Thus, with the device 10 mounted as shown in Fig. 1, when the door 14 is in its completely closed position, the forward end 38 of the actuating tip member 31 contacts the lintel portion of the door frame 36 to cause a flexing of the coil arm 32 so that the actuating member 30 assumes the flexed, non-contacting position shown in phantom outline in FIG. 2. In this position, the contacting portion 39 of the coil arm 32 is free from contact with the conductive member 35 so that even if the switch 25 is in the on position, the alarm is silent. Upon a slight opening of the door, for example, $\frac{1}{8}$ inch or so, the coil arm 32 assumes the position shown in solid outline in FIG. 2 and as shown in FIG. 1, so that the contacting portion 39 of the coil arm 32 contacts the conductor 35 to actuate the alarm.

Thus, it is a significant advantage of the device that only a slight movement of the door is necessary to actuate the alarm. Thus, the device provides a high measure of safety to protect person and property when unobtrusively mounted on an inwardly opening door as shown in FIG. 1.

Because of the relatively small size of the device, and the ease with which it may be mounted on doors, it is another significant advantage of the invention that the device is portable so that it may be readily carried by a person in his travels and secured as shown in FIG. 1 to the doors of hotels, motels, and the like. Still another significant advantage of the invention, which is due to its portable nature, is that it may be utilized in selected areas in large offices during selected times of the day. For example, a business office may be protected by the use of the device with an additional degree of protection when occupied against unwarranted intrusion by simply installing and activating the device 10.

FIGS. 2 and 3 show the basic interior components of the device. A source of power for the device is provided by a pair of penlight batteries, for example, size AA $1\frac{1}{2}$ volt penlight batteries secured in series fashion in a battery holder designated generally by the reference numeral 40. The positive terminal of the battery 39a is in contact with an upwardly extending conduc-

tive portion 41 of a conductive member 42 which has a second upwardly extending portion 43 which is in contact with a negative terminal of the battery 39b. The negative terminal of the battery 39a is in contact with an upwardly extending conductive leg 44 on its irregularly shaped member 45, one leg of which comprises a conductive member 34 which includes the conductive member 35 which contacts the contacting portion 39 of the coil arm 32.

An electrical lead 46 is in electrical contact with the upwardly extending member 44 and is connected to one terminal 47 of the heat sensor 48 which is rigidly secured in an opening in the bottom wall of the rear cover member 13. The second terminal 49 of the heat sensor 48 has connected to it a lead 50 which is secured to a conducting member 51 having an upwardly extending conductive portion 52 secured to the inner wall of the side of the rear cover 13 adjacent to the power switch. The conductive strip 51 is also electrically connected to a terminal of the warning means 54 (not shown).

The actuating portion 26 of the switch 25 is slideable to a limited extent along the side of the rear cover 13 and has a knurled upper surface 55 for easy actuation by the thumb of the user. A member 56 is secured to the switch 26 and is also rigidly secured to a conductive switch member 57 which has outwardly extending U-shaped portions 58 and 59 at the distal ends thereof. In its "off" position, the conductive member 57 is positioned so that the upper U-shaped portion 59 is free from contact with an upwardly extending electrically conductive leg 34 of the conductive member 33 to which one end of the coil arm 32 is conductively secured. Thus, the switch 26 serves as a master switch for activation of the device. When the switch 26 is remotely positioned in its upward position, the upward U-shaped member 59 contacts the upwardly extending leg 34 of the conductive member 33 at the same time that the lowermost U-shaped member 58 remains in contact with the leg 52 of the conductive member 51.

As seen from the wiring diagram of FIG. 6 which is related by the use of appropriate reference numerals to the component diagram of FIGS. 2 and 3, the circuit forms two separate series circuit with the batteries. The first comprises the batteries 40, the heat sensor switch 48, and the alarm 54. The heat sensor 48 works in a conventional manner as a normally open switch which closes when the temperature reaches a predetermined level, for example 135°F. When such a case occurs, the heat sensor closes and the alarm is actuated. The second series circuit comprises the batteries 40, the master switch 25, the coil arm switch 30, and the alarm 54. In such a case, the master switch 25 must be closed before the coil arm switch is effective. In operation, it is preferable to mount the alarm and then close the door to cause the coil arm switch to be deactivated so that the alarm does not cause a signal when the switch 25 is turned on. Thereafter, the alarm device 10 is armed so that when the door is slightly opened, the coil arm switch will close, as previously described, and the alarm will be actuated.

FIG. 5 demonstrates the application of the device to an outwardly opening door 14a. In this instance, the bracket 15 is reversed by removing the threaded member 22 from the nut 23 by rotating the knurled tip 21, reversing the bracket 15 so that the leg 17 extends upwardly and replacing the threaded member 22 in the

nut 23. Thereafter, with the door 14a in a closed position, the rear surface of the alarm device 10 is mounted flush with the door, but preferably in the upper right-hand portion of the door on the hinge side. The bracket is secured to the door frame 69 by the use of fastening screws 70 and the operation of the device proceeds as before.

From the description of the installations in FIGS. 1 and 5, it will be seen that the device has another significant advantage in that it may be used with either metal or wood doors. The installation of FIG. 1 requires no fastening members, except at the option of the user, whereas the installation of FIG. 5 utilizes wood screws or metal screws depending upon the material of the door frame.

The facility with which the coil arm actuates the device is also an advantage in testing or demonstrating that the batteries are sufficiently charged to actuate the alarm. In this case, the tip of the coil arm may be flipped away from the contact to simulate the case in which the door is closed, the switch set in the on position, and the arm release causing it to spring against the contact to simulate the opening of the door. In this manner, a demonstration of the battery charge may be effected.

The invention may be embodied in other specific forms without departing from its spirit or essential characteristics. The present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the claims rather than by the foregoing description, and all changes which come within the meaning and range of the equivalents of the claims are therefore intended to be embraced therein.

What is claimed is:

1. In a portable, easily securable alarm device adapted to be mounted relative to a door-like surface to provide an indication that said surface has been laterally moved a predetermined distance, said device being of the type which comprises a housing, alarm means secured with said housing, said alarm means comprising a source of electrical energy, a master power switch having an actuating member accessible from outside said housing, a signaling member for emitting a warning signal when actuated, and an alarm actuating member comprising a coiled spring body portion secured at about one end thereof, and acting as an spring-like switch contact in an electrical circuit in said housing which includes said source, said power switch, and said signaling member to actuate said signaling

member when said spring body portion is in a first electrical position and said master switch is in a first position for actuating said circuit, said actuating member further including a cap member fixedly secured to the end of said coil arm opposite said end, said cap member having an actuating surface which extends beyond the plane of a mounting surface of said housing to an extent sufficient to disengage said coil arm from a fixed switch contact cooperating with said spring-like contact when said door-like surface is in a closed position, said mounting surface abutting said door-like surface, the improvement comprising means for mounting said housing relative to said door-like surface, said mounting means including a positionable, elongated bracket member having a body portion which includes an elongated slot and a lip portion which extends transversely of said body portion, said mounting means further including means cooperating with said slotted body portion for adjustably securing said bracket member to said housing at any position along said elongated slot so that said lip portion is positioned the desired distance from said mounting surface of said housing.

2. The improvement as set forth in claim 1 wherein said bracket is generally L-shaped so that said lip portion is adapted to contact one side of a door.

3. The apparatus as set forth in claim 2 wherein said lip portion further includes openings therein for receiving fastening members.

4. The combination as set forth in claim 1 in further combination with an inwardly-opening door wherein said device is mounted to said door so that said lip portion contacts a first surface of said door and said mounting surface of said device contacts a second surface of said door in such a manner that said actuating surface contacts a fixed portion above the door to free said actuating member from contact with said fixed contact.

5. The combination as set forth in claim 1 in further combination with an outwardly-opening door wherein the body portion of said bracket member engages the top of said door and the lip portion of said bracket member engages the surface of said door opposite said device.

6. The combination as set forth in claim 5 wherein said bracket member is secured to said housing in such a manner that said lip portion extends upwardly and said bracket member extends relatively parallel to the mounting surface of said device so that said mounting member may be fixedly secured to a door frame.

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