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UNITIZED COMBINATION BURGLAR-FIRE ALARM DEVICE

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Fig. 1.

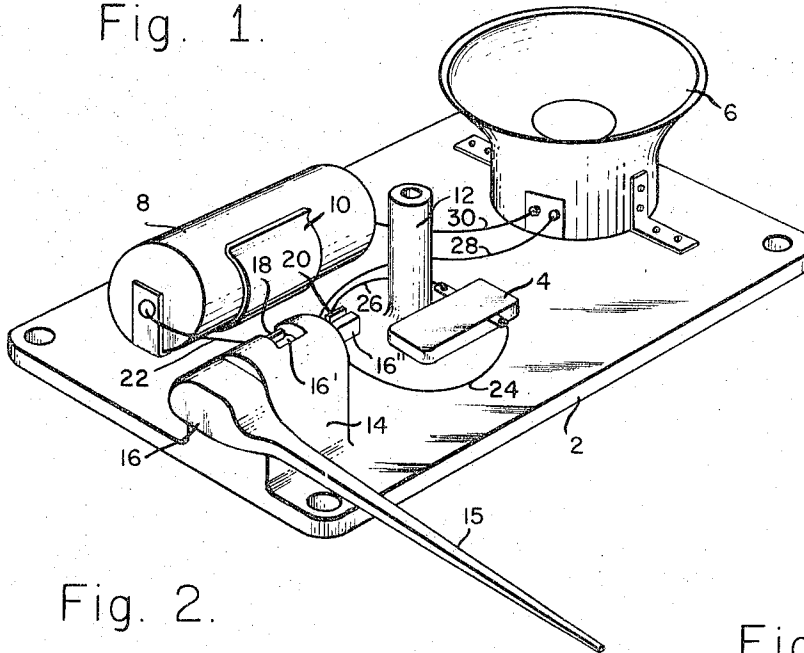


Fig. 2.

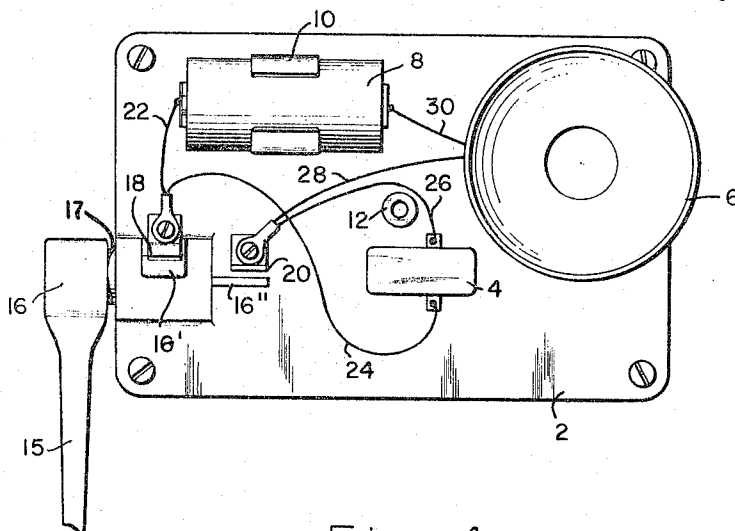


Fig. 3.

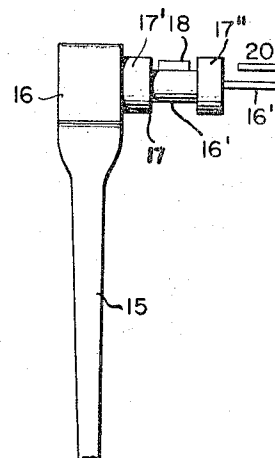
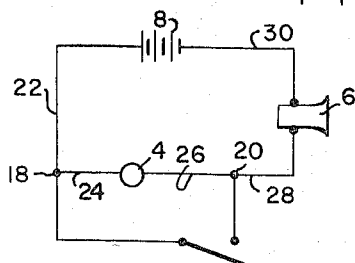


Fig. 4.



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UNITIZED COMBINATION BURGLAR-FIRE ALARM DEVICE

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This invention relates to warning signal devices, particularly of the type which provides an audible signal in the event of fire or burglary. The combination burglar and fire alarm of the invention is compact, relatively simple in construction, and highly sensitive yet is inexpensive and readily movable from one location to another.

My combination burglar and fire alarm is a completely integral unit and needs no wires or the like. While primarily useful in the home, it is not necessarily limited for use thereto. It is also readily and easily installed and because of this and its inexpensiveness, it is feasible to install the unitized burglar-fire alarm device of the invention in every room of the house or upon every window, for example. My burglar-fire alarm device is adapted to be mounted on or adjacent to doors or windows so that the slightest opening movement thereof is sufficient to actuate the signalling mechanism. One of the important aspects of my burglar-fire alarm device is the ease by which the burglar alarm mechanism may be readily disabled, as during the day, to permit normal use of a door or window without impairing the fire-detecting portion of the alarm device.

I am aware the door or window operated combination burglar and fire alarm devices have been proposed by others and perhaps typical of these proposals is U.S. Patent 3,004,248 to A. L. Appel who discloses therein such a device having a spring-loaded and inertia-operative arm which, when caused to move a predetermined distance by the opening of a door, eventually closes a switch in an audible signal-producing circuit. While Appel's alarm device is satisfactory for many purposes, it is not a positively actuated device. Appel's device is subject to an appreciable "dead" time before actuation because of the spring-operative nature of his switch arm. Appel's device depends solely upon an inertial reaction in response to movement of the door for actuation. Actuation of Appel's alarm device does not depend upon movement of the door relative to its casing or some other fixed structure adjacent thereto. It is also noteworthy that during the day or at other times when the door may be subject to normal traffic, Appel must remove his alarm device, it being suggested that it may be hung on another structure during such periods so that its fire-alarming function may not be lost. In contrast, my combination burglar-fire alarm device has no such limitations. Because Appel's alarm device depends upon an inertia-sensitive spring-operative switch arm, there must of necessity be some minimum movement of the door below which the switch arm will not be actuated. Thus, his alarm device can be rendered inoperative if some care or means are taken or provided to maintain the spring-arm switch at rest. It is possible that such a continued "at rest" condition can be achieved by a continuously opening movement of the door so that the switch arm cannot be displaced until movement of the door stops or its direction reversed by which time the door may have been opened sufficiently to permit an arm to be inserted to disabled the alarm device. It is also possible that the switch-arm may be held in its "rest" position by means of a powerful magnetic field applied thereto through the door unless one resorts to more expensive, choice-limiting nonferrous materials for construction of the alarm device. Furthermore, movement of the alarm device during the day for disabling purposes may still provide a series of horn blasts

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which would disturb other occupants of the home or office, for example.

It is, therefore, an object of my invention to provide an improved, completely unitized burglar-fire alarm device which operates instantly and positively in response to the slightest relative movement between the movable and non-movable structure of a door or window.

Another object of the invention is to provide an improved, completely unitized burglar-fire alarm device which may be readily disabled as desired without necessitating removal thereof or impairment of its fire-alarming function.

Another object of the invention is to provide an improved, completely unitized burglar-fire alarm device which is compact, rugged, and inexpensive.

Yet another object of the invention is to provide an improved, completely unitized and foolproof burglar-fire alarm device.

These and other objects and advantages of the invention are realized by providing an electrically-operable audible signal device in a circuit with a lever-operable switch which may be closed by movement of a lever-arm which is positioned against a door or the like to provide an audible signal. A thermal switch member is also connected in the circuit parallel-wise with respect to the lever-operable switch so that upon either an elevation in temperature or partial rotation of the lever arm by movement of the door, an audible signal is produced. During the day, for example, the lever arm may be quickly rotated to a position where it does not contact the door and cannot be rotated to a circuit-closing position by movement of the door.

The invention will be described in greater detail by reference to the drawings in which:

FIGURE 1 is a perspective view of the combination burglar-fire alarm device of the invention;

FIG. 2 is a plan view of the combination burglar-fire alarm device of the invention;

FIG. 3 is a plan view of a detail of lever-arm switch of the combination burglar-fire alarm device of the invention; and

FIG. 4 is a schematic diagram of the electrical circuit which may be utilized in the combination burglar-fire alarm device of the invention.

Referring now to the drawings, a base plate support member 2 is provided on which the combination burglar-fire alarm device of the invention is mounted and by which the device may be secured to the door or window structure as will be more fully described hereinafter. The operative components of the burglar-fire alarm device of the invention comprise a thermal switch member 4, an electrically-operable audible signal device or air horn 6, an electrical power supply or battery member 8, and a mechanically movable electrical switch member including a lever arm 15 mounted on a shaft 16 which will be described in greater detail hereinafter with special reference to FIG. 3. The base plate 2 is also provided with a post member 12 having an internally threaded bore therein which is adapted to receive a screw or bolt by which a cover member may be secured to the base plate, the cover member not being shown in the drawings for facility of illustration. Also integral with the base plate 2 is an inverted U-shaped boss member 14 having an internal bore adapted to receive a shaft. The U-shaped boss member 14 is also provided with a slot-like opening in one side thereof which extends from the base plate 2 to the top of the boss member and across a portion thereof as best shown in FIG. 2. The base plate 2, the mounting post 12, and the lever arm support boss 14 may be die cast, if desired. Alternatively the base plate 2 may be of relatively thin plate metal with the boss portion 14 being a stamped-out and turned portion thereof.

The audible-signal device 6 may be of any suitable type of buzzer or horn capable of operating on battery voltages. Preferably the signal-generator device 6 is an air horn which is operated by a 1½-volt flashlight battery type power supply so as to provide a suitably loud and arresting audible signal with minimum sized components. The signal-generator device 6 may be affixed to the base plate by means of brackets or the like.

The power supply 8 may be a conventional 1½-volt flashlight battery held in place by a clamp member 10 which is affixed to the base plate 2. It will be understood that the battery holder or clamp 10 is adapted to permit ready removal and insertion of batteries as needed.

The thermally responsive switch member 4 is of the type which is normally open but which closes upon an elevation in temperature so as to complete the circuit path between its terminals. A number of suitable thermally responsive switches are readily available on the market for use in the alarm device of the invention and may utilize either a bi-metallic contact spring or a low melting point material such as Wood's metal which upon melting permits a spring-actuated switch to snap closed.

The mechanically operable electrical switch comprises an elongated lever arm 15, 16 mounted on a shaft 17 so as to extend in a direction at right angles with respect to the shaft 17 and the plane surface of the base support plate 2. The shaft 17 is electrically conductive and includes a smaller diameter portion 16' positioned between larger diameter shoulder portions 17' and 17''. The end of the shaft 17 opposite to the end on which the lever arm 15 is mounted terminates in a flattened portion 16'' whose plane is at right angles to the direction of the lever arm 15. The shaft 17 is inserted into the bore formed by and in the boss member 14 so that the lever arm 15 extends beyond the support plate 2 and may be freely rotated from the end thereof. Mounted closely adjacent to the boss member 14 and to the slot provided therein is a vertically extending contact arm 18 which may be of tempered metal. This contact arm 18 extends up through the vertical slot in the boss member 14 and into snug contact with the small diameter portion 16' of the shaft member. It will now be apparent why the shaft is provided with this small diameter portion 16' disposed between the larger diameter shoulder portions 17', 17''. In mounting the shaft member 17 into the boss member 14, the spring-like contact arm 18 is pulled back to allow the shoulder portion 17'' to pass through the boss member and the slot therein. The spring-like contact arm 18 is then released so as to bear firmly against the small diameter portion 16' and between the larger diameter shoulder portions 17', 17'' so as to hold the lever arm-contact shaft assembly in place and thus prevent its removal.

A second contact arm 20 is mounted in the base plate 2 so as to rise vertically therefrom with its flat surface parallel to and closely adjacent to the flattened portion 16'' of the shaft assembly. Hence, a very slight movement of the lever arm 15 will rotate the shaft and quickly bring the narrow edge of the flattened shaft portion 16'' into electrical contact with the contact arm 20.

With special reference to the schematic circuit shown in FIG. 4, the burglar alarm portion of my combination burglar-fire alarm is connected by a wire 22 from one terminal of the battery 8 to the contact arm 18 which contacts the shaft at the portion 16' thereof. The contact arm 20 is connected to the air horn or other electrically operable audible signal generator 6 by a wire 28, the air horn in turn being connected to the other terminal of the battery 8. It will thus be understood that this circuit is normally "open" since no electrical contact is provided between the shaft portion 16'' and the contact arm 20.

The fire alarm portion of the invention is connected in parallel to the burglar alarm portion of the circuit just described by a wire 24 from the contact arm 18 to one terminal of the thermal switch device 4, the other terminal of this device being connected to the contact arm 20 and

thence to the air horn 6 by the wire 28. It will thus be understood that this circuit is also normally "open" due to the absence of a continuous circuit path through the thermal switch device 4.

To operate my combination burglar-fire alarm, the assembly as just described is mounted adjacent to or on a door or window the undesired opening of which is to be signalled. It will be understood that the location of my alarm device either on the door itself or on the adjacent casing thereof is a readily available choice and my alarm device will operate with equal facility and effectiveness at either location. This is in marked contrast to the aforementioned Appel device which must be located only on the moving structure itself. My alarm device is mounted by screwing the base plate 2 onto the door or on the casing adjacent thereto. When mounted on the door casing and above the door, for example, the lever arm 15 is turned downward so as to rest against the door. When the door is moved, as in opening, in a direction toward the lever arm 15, the lever arm 15 will move therewith, rotating the shaft 17 and the flattened shaft portion 16'' so as to bring the edge of this shaft portion 16'' into contact with contact arm 20, thus connecting the signalling device 6 in circuit with the power supply 8 and producing an audible signal. During the day, when it is desired to permit opening and shutting of the door, the lever arm 15 may be rotated 180°, for example, so that lever arm 15 will not be contacted and moved by the door. When in this position, the burglar alarm circuit is open because the flat portion 16'' of the shaft is still parallel to and hence spaced from the contact arm 20. Thus, the burglar alarm portion of my device may be disabled as desired by a quick and simple movement of the lever arm 15. On the other hand, the fire alarm portion of the device is not at all impaired because its operation is independent of the position of the lever arm 15. Thus, at any time when there is an elevation in temperature as from a fire, the thermal switch device 4 can close and connect the audible signal generator in circuit with the power supply 8.

It will be understood that my combination burglar-fire alarm device will operate equally well to signal the undesired opening of windows. For windows which open by sliding up or down or sideways, the lever arm 15 and the flattened shaft portion 16'' will be arranged with respect to each other so that the lever arm 15 will extend against the window and be moved by the window sash, for example.

It will also be appreciated that the burglar-fire alarm device of the invention is extremely rugged and compact and may be assembled with relatively inexpensive components into a completely self-contained unit independent of external power supplies and the like. Likewise, when provided with a cover which fits snugly into place on the base plate 2 around the component parts of my alarm device, tampering with or disabling the alarm device is almost impossible.

Another advantage of the alarm device of the invention is the fact that it may be tested for operability every time it is set in the alarm position against the door or window. Hence, the chances of power supply becoming depleted without being noted are minimal. It is also possible to remove the lever arm-shaft assembly, if desired, and use the device solely as a fire alarm device in any part of a room. Of course, the burglar-fire alarm device may always be used for this purpose even without removal of the lever arm-shaft assembly. However, when it is desired to utilize the alarm device solely for fire alarming purposes, it may be preferable to remove the lever arm-shaft assembly to prevent tampering with the device.

There thus has been described an inexpensive, fool-proof, compact burglar-fire alarm device.

What is claimed is:

1. A burglar-fire device comprising in combination:
 - (1) a base plate support member;

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- (2) an electrically-operable audible signal generating device mounted on said base plate member;
 - (3) an electrical power supply for said audible signal generating device mounted on said base plate;
 - (4) a normally open thermal switch device connected in series with said power supply and said audible signal generating device;
 - (5) a mechanically operable, normally open switch member connected in parallel with said thermal switch device and including:
 - (a) a stationary contact member mounted on said base plate member and having a flat surface connected to said audible signal generating device;
 - (b) an electrically conductive rotatable shaft member mounted on said base plate member and having a first portion electrically connected to said power supply and a flat surface portion disposed adjacent said stationary contact member with said flat surfaces being parallel to and spaced from each other;
 - (c) and a movable lever arm affixed to an end of said shaft member whereby movement of said lever arm rotates said shaft member to bring an edge of said second portion thereof into electrical contact with said flat surface of said stationary contact member to thereby connect said power supply to said audible signal generating device.
2. A burglar-fire device comprising in combination:
- (1) a base plate support member;
 - (2) an electrically-operable audible signal generating device mounted on said base plate member;
 - (3) an electrical power supply for said audible signal generating device mounted on said base plate;
 - (4) a normally open thermal switch device connected in series with said power supply and said audible signal generating device;
 - (5) a mechanically operable, normally open switch member connected in parallel with said thermal switch device and including:
 - (a) a stationary contact member mounted on said base plate member and connected to said audible signal generating device;
 - (b) an electrically conductive rotatable shaft member mounted on said base plate member and having a first portion electrically connected to said power supply and a second flattened portion disposed adjacent said stationary contact member;
 - (c) and a movable lever arm affixed to an end of said shaft member whereby movement of said lever arm rotates said shaft member to bring an edge of said flattened portion thereof into electrical contact with said stationary contact member to thereby connect said power supply to said audible signal generating device.

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3. A burglar-fire device comprising in combination:
- (1) a base plate support member;
 - (2) an electrically-operable audible signal generating device mounted on said base plate member;
 - (3) an electrical power supply for said audible signal generating device mounted on said base plate;
 - (4) a normally open thermal switch device connected in series with said power supply and said audible signal generating device;
 - (5) a mechanically operable, normally open switch member connected in parallel with said thermal switch device and including:
 - (a) a first stationary contact member mounted on said base plate member and connected to said power supply;
 - (b) a second stationary contact member mounted on said base plate member and connected to said audible signal generating device;
 - (c) a support member mounted on said base plate member and having an aperture therein facing said first stationary contact member;
 - (d) an electrically conductive rotatable shaft member mounted in said apertured support member and having a first portion disposed between larger shoulder portions thereof and a second flattened portion disposed adjacent said second stationary contact member, said first portion of said shaft member being disposed adjacent said aperture in said support member whereby said first stationary contact member contacts said first portion between said larger shoulder portions through said aperture in said support member and holds said shaft member in place in said support member;
 - (e) and a movable lever arm affixed to an end of said shaft member whereby movement of said lever arm rotates said shaft member to bring an edge of said flattened portion thereof into electrical contact with said second stationary contact member to thereby connect said power supply to said audible signal generating device.

References Cited by the Examiner

UNITED STATES PATENTS

1,123,393	1/1915	Schmiedeberg	340—283
1,632,893	6/1927	Glaus	340—385
2,724,823	11/1955	Toepfer	340—261 X
2,833,872	5/1958	Oberholzer	200—6
2,922,150	1/1960	Jezl	
3,011,163	11/1961	Britt	340—274

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