340-566 SR
XR 3,340,522

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ENTRY ALARM DEVICE

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Fig. 1

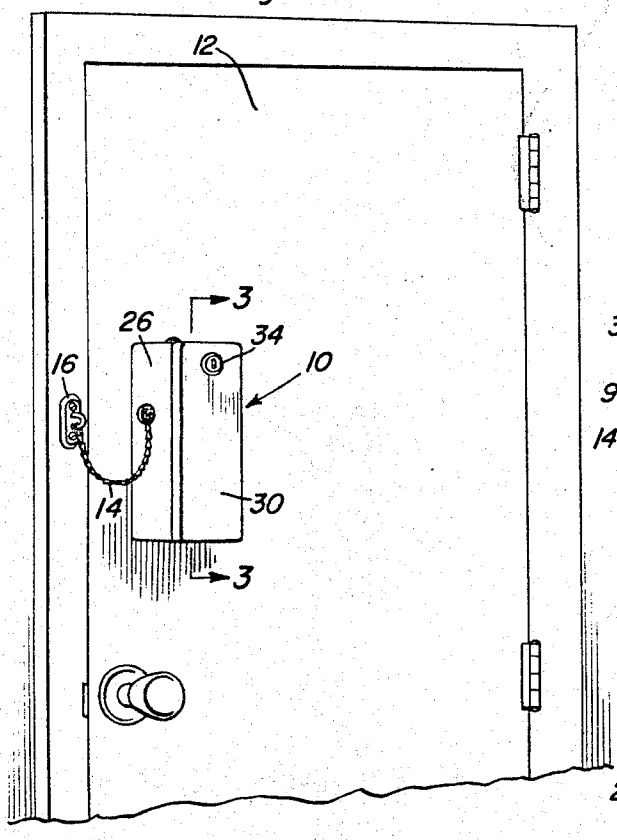


Fig. 2

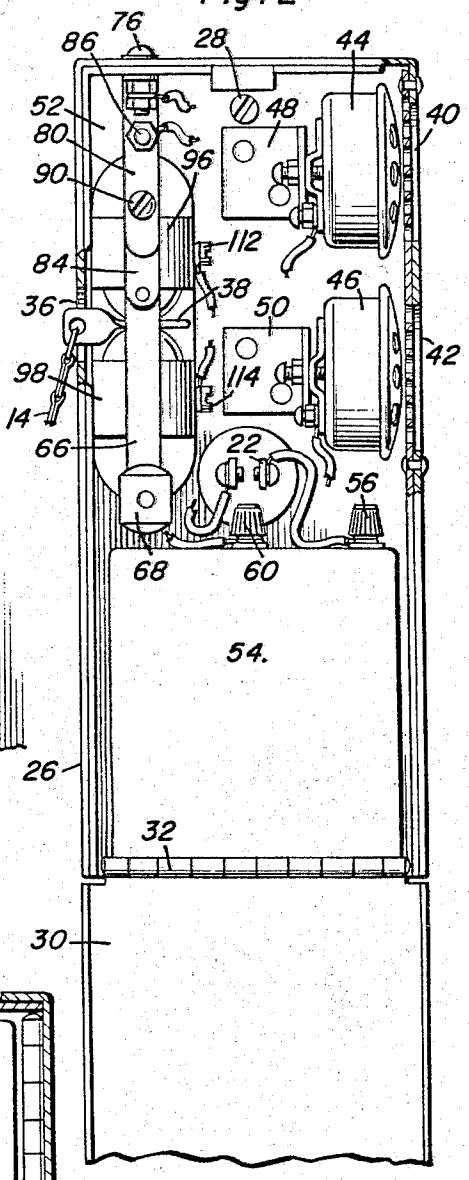
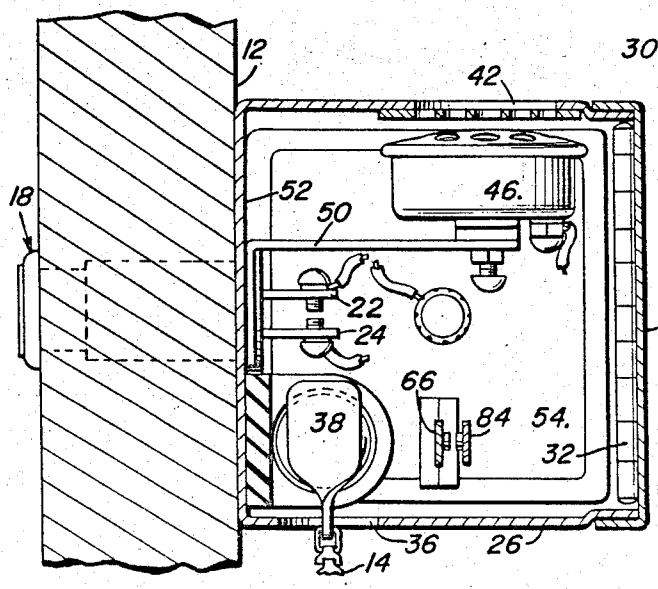


Fig. 4



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ENTRY ALARM DEVICE

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Fig. 3

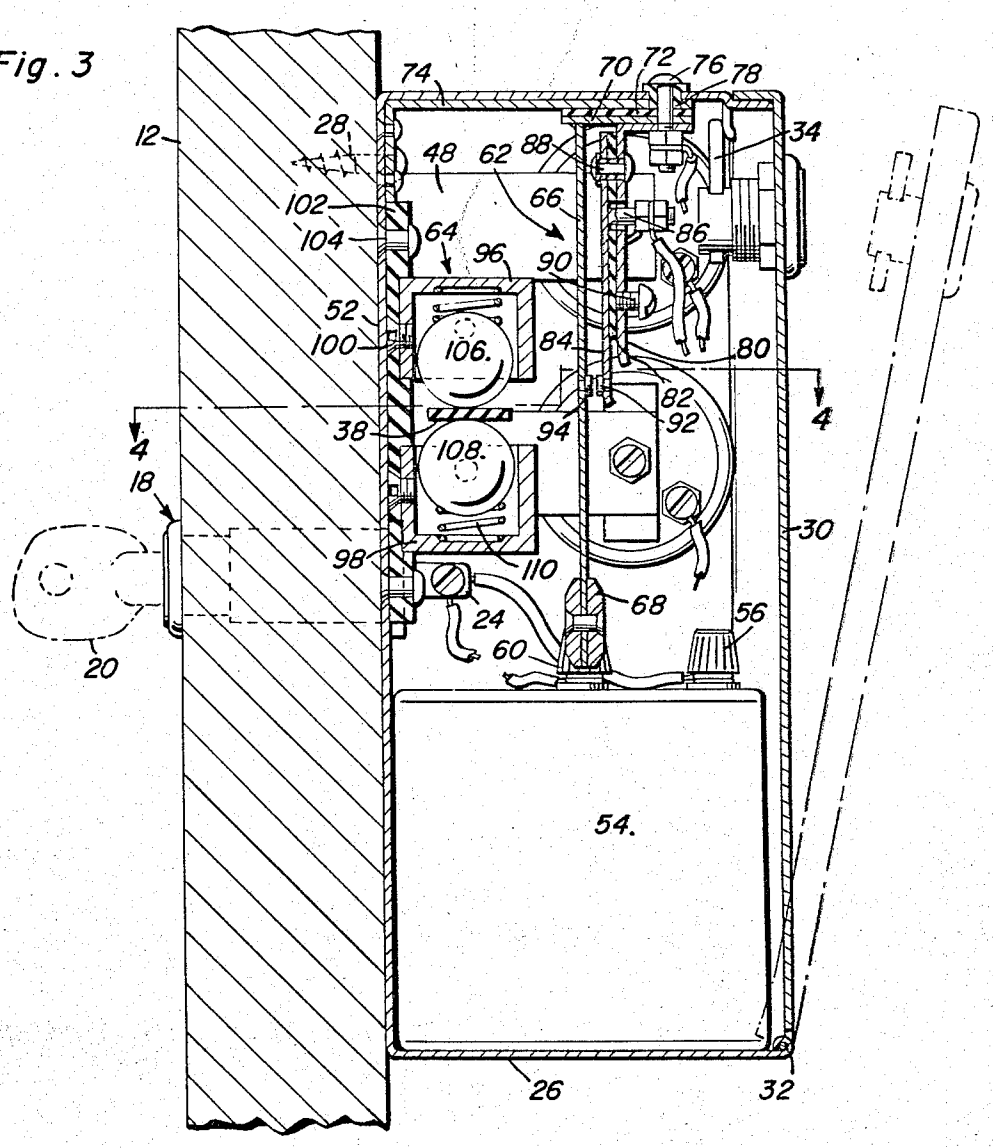
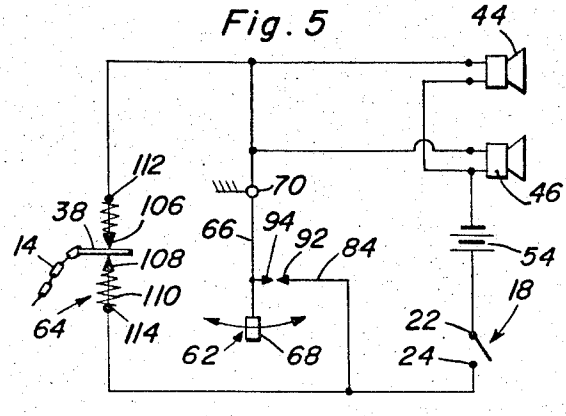


Fig. 5



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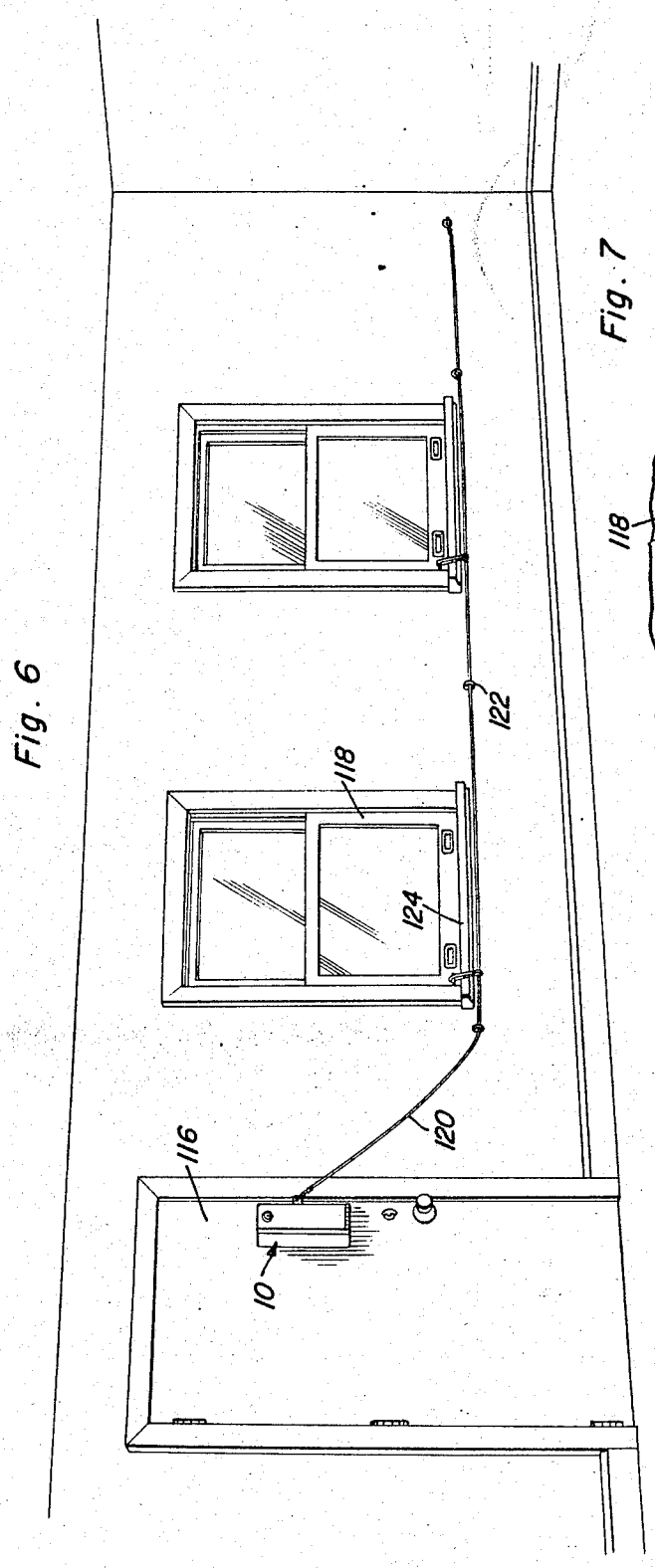


Fig. 6

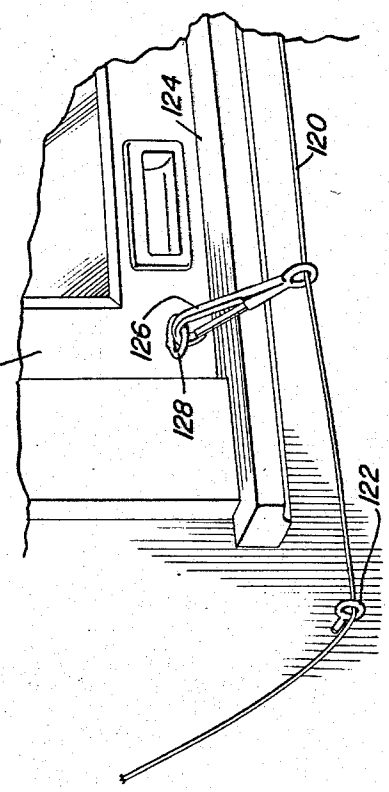


Fig. 7

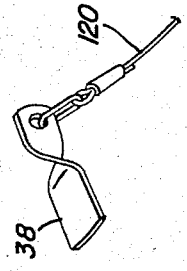


Fig. 8

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ENTRY ALARM DEVICE

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Filed Sept. 15, 1964, Ser. No. 396,598

5 Claims. (Cl. 340—274)

This invention relates to a new and useful device for protecting building enclosures against unlawful or unauthorized entry.

The present invention relates to an alarm device capable of being manufactured and installed in an economical fashion, yet providing building enclosures with reliable protection against unauthorized entry by the sounding of an alarm. A primary object of the present invention, therefore, is to provide a compact alarm device capable of being mounted on a door without any structural modification thereof and cooperating with the door lock so as to be conditioned for operation after the door is latched.

Another object of the present invention is to provide a door-mounted alarm device, operative to sound an intermittent alarm upon opening movement of the door in an unauthorized fashion, the intermittent alarm changing to a continuous alarm when the door has been opened by a predetermined amount. Accordingly, the alarm device of the present invention is capable of appropriately responding to different degrees of entry.

A further object of the present invention is to provide an alarm device less apt to be disabled in an unauthorized fashion.

A still further object of the present invention is to provide an alarm device and associated installational features which render it flexible in use and in accordance with different building enclosure requirements.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a perspective view of the alarm device in one particular installational environment.

FIGURE 2 is a front elevational view of the alarm device with the cover lid opened.

FIGURE 3 is a longitudinal sectional view through the alarm device taken substantially through a plane indicated by section line 3—3 in FIGURE 1.

FIGURE 4 is a transverse sectional view taken substantially through a plane indicated by section line 4—4 in FIGURE 3.

FIGURE 5 is an electrical circuit diagram corresponding to the alarm device of the present invention.

FIGURE 6 is a perspective view showing installation of the alarm device in connection with another form of protective arrangement.

FIGURE 7 is a partial enlarged perspective view of a portion of the arrangement shown in FIGURE 6.

FIGURE 8 is a partial perspective view of the contact spacing element.

Referring now to the drawings in detail, and initially to FIGURE 1, it will be observed that the alarm device, generally referred to by reference numeral 10, is fixedly mounted on the inside of a door 12, which is adapted to be locked from the outside thereof when leaving the building premise. Prior to locking the door, a flexible pulling element 14 may be releasably anchored or hooked to a fixedly mounted anchoring member 16, secured for example to the door jamb framing the access opening

closed by the door 12. The alarm device is therefore mounted on the inside of the door aligned with the door lock 18 which is of a type provided with a circuit disabling switch adapted to be closed when the lock latches the door. In this manner, the alarm device is conditioned for operation when the door is latched by turning of the key 20 within the lock mechanism 18. Accordingly, a pair of electrical terminal elements 22 and 24 project from the lock-actuated switch device into a metallic housing 26 as shown in FIGURES 3 and 4, enclosing the components of the alarm device and fixedly mounted in any suitable fashion on the door 12 as by fasteners 28.

Referring now to FIGURES 2, 3 and 4, it will be observed that the housing 26 is provided on one side thereof with a cover lid 30, hingedly connected at its lower end to the housing by the hinge 32. The cover lid is maintained locked in place, closing the housing by means of a key operated lock device 34. On one lateral side of the housing 26, an opening 36 is formed through which a spacer element 38 is adapted to be withdrawn by a flexible member or chain 14 to which it is connected. The spacer element 38 is made of a non-conductive material for purposes to be hereafter explained. Also formed on the side of the housing 26, opposite the side within which the opening 36 is formed, are a pair of sound-emitting openings 40 and 42 through which sound is emitted by horns 44 and 46 when the alarm device is triggered into operation.

The horn devices are fixedly mounted in alignment with the openings 40 and 42 by means of bracket members 48 and 50 disposed in vertically-spaced relation on the mounting wall 52 of the housing. Also, mounted within the housing and resting on the bottom wall thereof, is a battery source of electrical energy, such as a 6 volt lantern battery 54. One terminal 56 of the battery is therefore adapted to be electrically connected to the terminal post element 22 which projects from the lock-actuated switch mechanism. The other terminal 60 of the battery 54 is electrically connected to one terminal of the horn device 46, while the other terminal post element 24 of the door lock actuated switch is electrically connected to a motion or vibration sensing pendulum device 62 and a contact device generally referred to by reference numeral 64.

The vibration sensing device 62 includes metallic spring suspension strip 66, connected at its lower end to a weight or inertia mass 68 to form a pendulum suspended from a conductive plate element 70 to which the suspension strip 66 is connected at its upper end. The plate element 70 is therefore non-conductively spaced by the spacer 72 from a reinforcing mounting member 74 riveted to the housing and through which a terminal screw element 76 extends surrounded by a non-conductive bushing sleeve 78. Also secured to the terminal screw element 76 is an adjustment bracket 80, non-conductively spaced by the spacer 82 from a fixed contact member 84. The contact member 84 is therefore connected to a terminal post 86 which extends through an opening in the adjustment bracket 80, to which the contact member is secured by a non-conductively sleeved rivet 88. The fixed contact member 84 may be adjustably positioned in spaced relation to the suspension strip 66 by means of an adjustment screw 90 so as to normally hold the contacts open for any rest position assumed by the strip 66 and to vary the sensitivity of the vibration sensing device. The screw 90 is threadedly mounted by the adjustment bracket member 80 in spaced relation to the rivet 88 and abuts the non-conductive spacer 82 for adjustable displacement of the contact member 84. A contact element 92 is therefore mounted on the lower end of the contact member 84 in close spaced relation to a contact element 94 secured

to the suspension strip **66** intermediate the opposite ends thereof. It will therefore be apparent, that upon movement of the housing **26** or the door on which it is mounted, vibration will be imparted to the mass **68** so that intermittent contact will be established between the contact elements **92** and **94** in order to intermittently complete an energizing circuit for both sound emitting horn devices **44** and **46**, the circuits being established through the terminal posts **76** and **86** associated with the vibration sensing device **62**.

While the horn devices may be intermittently energized under control of the vibration sensing device **62** so as to emit one type of alarm when initial movement of the door is sensed, the horn devices are continuously energized to emit another type of alarm under control of the contact device **64** when the door **12** is opened beyond a predetermined amount, withdrawing the spacer element **38** from the housing **26** through the opening **36** therein. The contact device includes therefore a pair of conductive cup members **96** and **98** which are mounted by fasteners **100** on the non-conductive spacer **102**, secured as by rivets **104** to the rear mounting wall **52** of the housing. The cup members **96** and **98** open toward each other and retain therebetween a pair of conductive ball elements **106** and **108**, separated by the non-conductive spacer element **38**. Springs **110**, seated in the cup members **96** and **98**, urge the conductive ball elements toward each other so that when the spacer element **38** is withdrawn therebetween, electrical contact may be established to form an electrical connection between the terminal elements **112** and **114** secured to the cup members **96** and **98**, respectively, as more clearly seen in FIGURE 2.

Referring now to FIGURE 5, operation of the alarm device may be reviewed. It will therefore be apparent that when the lock mechanism **18** is closed to hold the door stationary in its closed position an energizing circuit may be established for the horn devices either momentarily through the contacts **92** and **94** of the vibration sensing device **62** or continuously through the contacts **106** and **108** of the contact device **64**. In the illustrated position, both parallel energizing circuits for the sound emitting horns are open and may be conditioned for operation by latching of the door through the lock device **18** thereby electrically connecting the battery in parallel to both the vibration sensing device **62** and the contact device **64**. Should an attempt be made to open the door in an unauthorized manner, so as to fail to open the switch associated with lock mechanism **18**, vibration of the door **12** would be sensed by the vibration sensing device **62** so as to intermittently energize the sound emitting horns, thereby sounding one type of alarm tending to discourage any further attempt at entry. Should this alarm fail to discourage unauthorized entry; when the door is opened by a predetermined amount, the flexible chain **14** will withdraw the spacer **38** from between the contact elements **106** and **108** so as to render the contact device **64** operative to continuously energize the horns. The horns will then remain energized until the alarm is reset.

Referring now to FIGURES 6 through 8, it will be observed that the alarm device **10** mounted on a door **116** provides the protection aforementioned in connection with opening of door **12** in FIGURE 1, except that a continuous alarm is sounded only if one of the window sashes **118** is opened. Accordingly, the spacer element **38** is connected to a flexible cable **120**, which extends through guide elements **122** such as threaded eye members disposed along a line just below the window sills **124**. The cable **120** therefore carries releasable hook devices **126** releasably engaged with anchoring eye elements **128** secured to the window sashes. It will therefore be apparent that when any of the windows are opened after the alarm device has been conditioned for operation as aforementioned, the cable **120** will be drawn upwardly therewith, so that the tension imposed thereon will withdraw the spacer element **38** from the alarm device in order to sound a continuous alarm. Thus, the arrangement illustrated in FIGURES 6 and 7 will not only provide protection against opening of the access opening closed by the door **116**, but will also provide protection against entry through the access openings closed by the windows. It should also be appreciated that similar arrangements could be utilized in connection with the alarm device such as the interconnection of alarm devices on several doors either electrically or through the flexible members to which the spacers are connected for sounding the continuous alarm when a spacer is withdrawn from the alarm device housing.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. In combination with an enclosure having an access opening adapted to be closed by a door having a lock on one side thereof, an alarm device mounted on the other side of the door within the enclosure, said alarm device comprising, a housing secured to the door, sound emitting means mounted within the housing, vibration sensing means operatively connected to the sound emitting means for intermittent energization thereof in response to vibration of the door prior to entry through said opening, contact means mounted by the housing and connected to the sound emitting means for continuous energization thereof, spacing means mounted by the housing and operative in response to withdrawal thereof for rendering the contact means effective to maintain the sound emitting means energized, means connected to the spacing means for withdrawal thereof from the housing, and lock actuated switch means for disabling of the sound emitting means in response to authorized opening of the door lock, said means for withdrawing the spacing means comprising, an elongated flexible element anchored at one end to the enclosure and at the other end to the spacing means to withdraw the spacing means from the housing when the door is opened by a predetermined amount permitting entry through said opening.

2. In combination with an enclosure having an access opening adapted to be closed by a door having a lock on one side thereof, an alarm device mounted on the other side of the door within the enclosure, said alarm device comprising, a housing secured to the door, sound emitting means mounted within the housing, vibration sensing means operatively connected to the sound emitting means for intermittent energization thereof in response to vibration of the door prior to entry through said opening, contact means mounted by the housing and connected to the sound emitting means for continuous energization thereof, spacing means mounted by the housing and operative in response to withdrawal thereof for rendering the contact means effective to maintain the sound emitting means energized, means connected to the spacing means for withdrawal thereof from the housing, and lock actuated switch means for disabling of the sound emitting means in response to authorized opening of the door lock, said enclosure having at least one window, said means for withdrawing the spacing means comprising, an elongated flexible element connected at one end to the spacing means, guide means mounted on the enclosure through which the flexible element extends, and releasable anchoring means connecting the other end of the flexible element to the window for withdrawing the spacing means upon opening the window by an amount permitting entry into the enclosure.

3. In combination with an enclosure having an access opening adapted to be closed by a door, an alarm device

mounted on one side of the door within the enclosure and aligned with a door lock closed from the other side of the door, said alarm device comprising, a housing secured to the door, a horn mounted within the housing, a battery connected to the horn, circuit completing switch means actuated by the door lock to establish an energizing circuit for the horn, pendulum means mounted in the housing for vibration when sensing movement of the door prior to entry into the enclosure, normally open contact means mounted by the pendulum means and electrically connected in series with the horn for intermittently energizing the horn upon said vibration of the pendulum means, a pair of spring-biased contact elements mounted by the housing and connected in shunt relation to the normally open contact means for continuously energizing the horn, a non-conductive spacer separating said contact elements, and an elongated flexible member connected to said spacer for withdrawal thereof from the housing through an opening to permit closing of the contact elements and maintain said horn energized.

4. The combination of claim 3 including means for releasably anchoring said flexible member to the enclosure.

5. The combination of claim 3 including means for releasably anchoring said flexible member to a window mounted by the enclosure.

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