United States Patent [19]

Williams

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[45] **Dec. 11, 1973**

[54] **DOOR POSITION SIGNALLING SYSTEM**

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[21] Appl. No.: **169,525**

[52] **U.S. Cl.** **340/274,** 200/61.76

[51] **Int. Cl.** **G08b 13/08**

[58] **Field of Search** 340/274, 276, 273; 200/61.79, 61.82, 61.62, 61.81, 61.76

[56] **References Cited**

UNITED STATES PATENTS

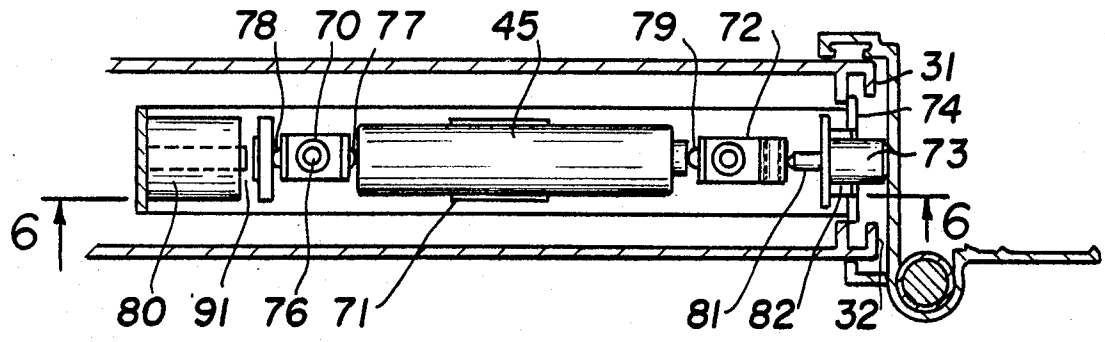
2,437,777	3/1948	Zajc	200/61.82 X
3,641,540	2/1972	Cutler	340/274 X
3,011,163	11/1961	Britt	340/274
3,410,245	11/1968	Kashden et al.	340/274 UX
3,291,928	12/1966	Jones	200/61.79
3,383,674	5/1968	Soltau et al.	340/276
3,147,468	9/1964	Daniels	340/274
2,911,491	11/1959	Rock	200/61.79

Primary Examiner—Thomas B. Habecker
Assistant Examiner—Scott F. Partridge
Attorney—Robert R. Strack et al.

[57] **ABSTRACT**

An audible signal unit powered by dry cells or the like is mounted within the hollow frame members of metallic storm or screen doors. The signal portion of the unit uses the frame as a housing and resonant cavity. The entire unit is mounted over an aperture formed in the hinge edge of the door.

10 Claims, 8 Drawing Figures



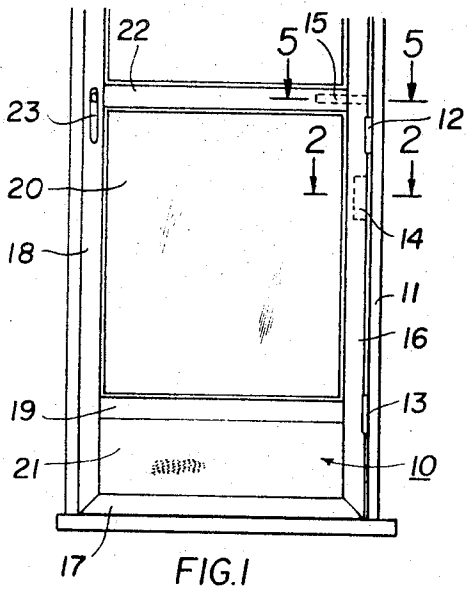


FIG. 1

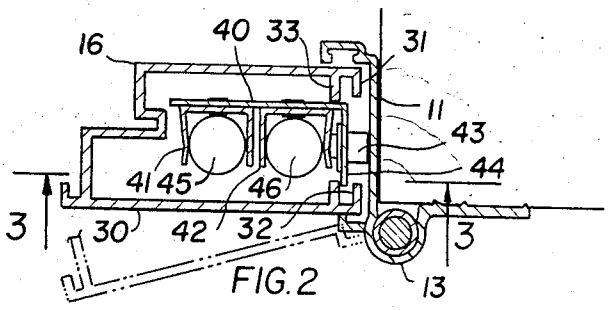


FIG. 2

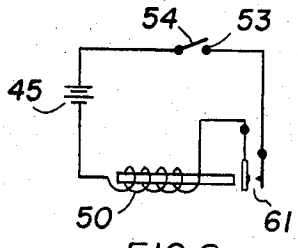


FIG. 8

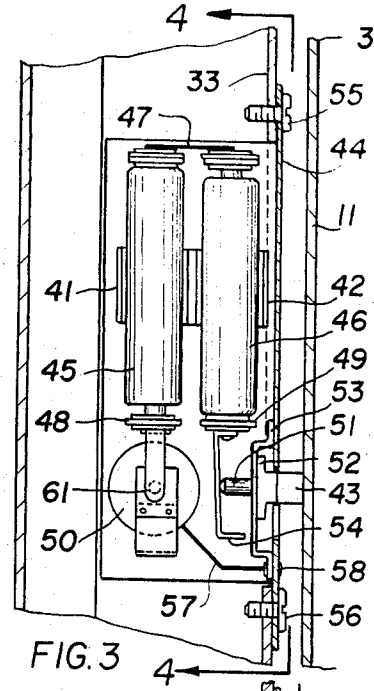


FIG. 3

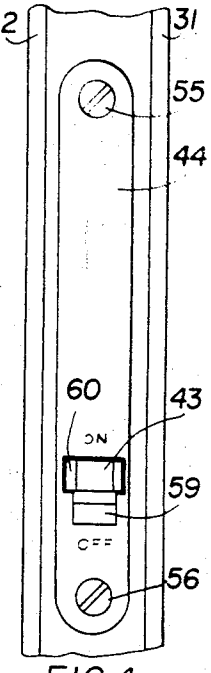


FIG. 4

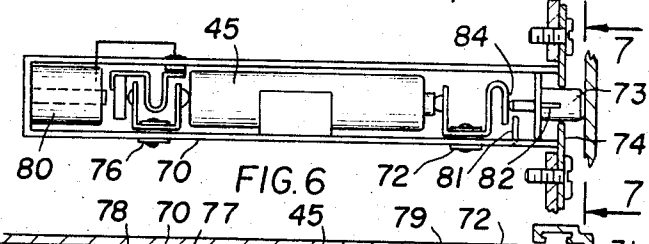


FIG. 6

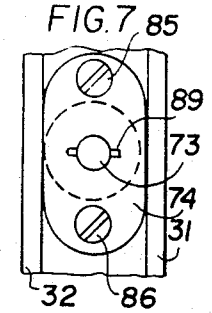


FIG. 7

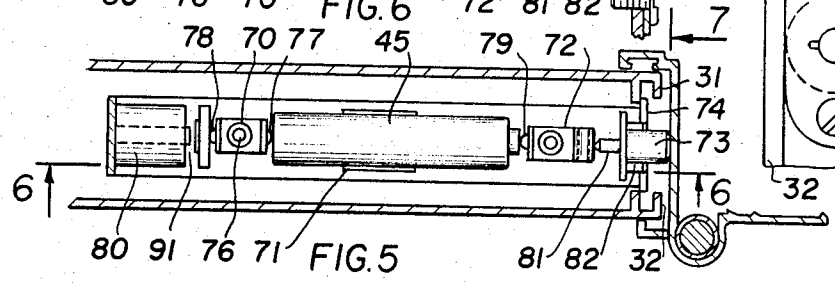


FIG. 5

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DOOR POSITION SIGNALLING SYSTEM

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to automatic alarm systems, more particularly it relates to alarm systems for use in conjunction with doors.

2. Description of the Prior Art

There has long been recognition of the need for signalling use of doors and windows in homes and places of business. Many alarm systems have been developed which detect unauthorized entry and are automatically operated either by damage to the door or window, or merely by the act of opening such a unit. The nature of these alarm devices range from manually tripped bells to very sophisticated electronically actuated audible or radio transmitted signals. Among the principle features of such alarms or indicators, are: ease of installation, reliability, cost of installation and maintenance, and difficulty of bypass by unauthorized parties.

In addition to the use of alarms as indicators of unauthorized entering, they are also frequently of value in small commercial establishments as an indication that a customer has entered the premises. Still further, such devices, if economically feasable and convenient enough to install can be used by private homeowners as a child monitor. In this latter use, an adult is able to detect if and when a child opens the door in order to leave the house or apartment.

Most existing door signaling systems use externally mounted units to contain the signaling components. These units are located either on the door or door jamb, and in some cases on both. When electricity is used, a switch means is positioned to energize the circuit when the door is opened. Door jamb installations have been most common because they facilitate the connection of the necessary electrical wiring and reduce the continuous shocks encountered each time a door is closed. Furthermore, when wood doors are involved installation within the door itself has required weakening the door and excessive carpentry effort.

SUMMARY OF THE INVENTION

The alarm or signalling device of the present invention has been specifically designed for optimum performance in conjunction with storm and screen doors of the metallic type. Such doors are fabricated of thin sheet or extruded metal and have hollow frame members. The hollow metal cavity formed by these metallic door frames produces an excellent resonant chamber for amplifyiing audible sounds generated therein. Furthermore, it has been appreciated that these frame members themselves can be utilized as the protective housing for the sound generator. Because of the effect of the door member, a relatively small power source can be employed for the actuation of the alarm. In fact, a single dry cell battery has been found adequate when properly combined with a suitable signal source such as a low voltage direct current buzzer. A signal system incorporating the novel features of the invention includes a low voltage portable power source, a signal means energized thereby, and switching means for operating the system when the door is opened. These components are assembled in such a manner they cooperate with the door frame members in order to achieve both the protection and resonating characteristics required.

It is an object of the present invention to provide an improved signal system for use in conjunction with doors.

It is another object of the present invention to provide an improved signal system specifically designed for cooperation with metallic doors having hollow frame members.

It is another object of the present invention to provide a self contained electrical signal system automatically actuable upon opening of a door or the like.

It is another object of the present invention to provide an improved electrical signaling system, powered by conventional dry cell batteries and suitable for installation in metallic doors having hollow frame members.

Since there are many screen and storm doors already installed throughout the country, it is important to make installation of the present invention, as simple as possible. Furthermore, since the generally contemplated power source will degenerate with time, the maintenance of the system should be simple. These characteristics of interest are built into the embodiments of this invention.

In general, the invention is embodied in a signalling system having a dry cell battery, a buzzer, and a switch adapted for mounting within the frame of metallic doors and operative upon opening of said door to close a circuit for the energization of the buzzer. Various embodiments of the invention permit the mounting of the signalling system either within the vertical stile of such a door, or protruding into mullion. The particular installation utilized depends upon the desires of the installer.

Additional objects of the invention and particular unique features thereof will become apparent from the following detailed description which is made in conjunction with the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a partial elevational view of a storm door illustrating the position of installation of several embodiments of the invention;

FIG. 2 is a cross-sectional view taken along lines 2—2 in FIG. 1 and providing a transverse view of a first embodiment of the invention;

FIG. 3 is a partial cross-sectional view taken along lines 3—3 of FIG. 2 and illustrates the arrangement of components in the first embodiment of the invention;

FIG. 4 is a cross-sectional view taken along lines 4—4 of FIG. 3 and illustrates the hinge edge surface of a door having the mounting plate which supports the first embodiment of the invention;

FIG. 5 is a cross-sectional view taken along lines 5—5 of FIG. 1 and illustrates a second embodiment of the invention;

FIG. 6 is a cross-sectional view taken along lines 6—6 of FIG. 5 and illustrates a side view of the second embodiment of the invention;

FIG. 7 is a cross-sectional view taken along lines 7—7 of FIG. 6 and illustrates hinge edge of a door and the faceplate supporting the second embodiment of the invention; and

FIG. 8 is a simple circuit schematic showing the electrical interconnection of components utilized in the various embodiments of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention has been specifically developed for use with metallic frame doors of the type shown in FIG. 1. This door 10, is made up of peripheral frame members 16, 17, and 18 which mount panels of glass, screening, or sheet metal 20, 21. Lateral mullions 19 and 22 provide additional support and mounting means. Such doors are rotationally secured to a door jamb 11 by hinges 12 and 13, for example, and they are fastened by a lock means 23.

As distinguished from conventional storm doors and screens of the wood type, the metallic door frame is an extruded piece of aluminum or the like, having the general cross-section illustrated in FIG. 2. These frames are beveled and joined as necessary. The typical frame member 16 includes a face portion 30 and edge portion 33. Both the front and rear faces of the frame member project beyond the edge on the hinge side of the door, in order to provide a channel for the seating of hinge securing screws and the like. In FIG. 2, this channel is generally defined by the edge projections 31 and 32 which also extend inwardly in order to increase the rigidity of the projections.

FIGS. 2, 3, and 4 illustrate the mounting of the first embodiment of the invention within the vertical door frame member 16 on the hinge side of the door. The basic elements of the alarm system include the resonant chamber and outer housing formed by the extruded metallic frame itself, an open support frame 40, 44 for supporting the components of the alarm; battery support clamps 41, 42; a D.C. coil 50 having interuptor contact 61 to create a buzzing effect; switching means 51, 54 for controlling operation of the alarm system; and the necessary structure and wiring for electrical interconnection of the components.

The support frame for the alarm system consists of the two portions 40 and 44, which may be formed of a single sheet of material. The first portion 40 is a substantially flat plate orthogonally projecting from the mounting plate portion 44. Battery clamps 41 and 42 may be riveted to the surface of base 40 and the buzzer coil 50 may be similarly mounted. Terminal connections 47, 48, and 49 are suitably disposed on the opposing ends of the battery support clamps in order to establish contact with dry cell batteries 45, 46, which will furnish the necessary electric power. The particular battery support means and contacts employed are conventional in the art. A metallic spring member 54 extends from battery terminal 49 and forms a portion of the switching means of this embodiment. This conductive spring member 54 is engaged by an elongated pin 51 of the insulated switch. Opposite from pin 51, is the button or actuation portion 43 of the switch, which projects beyond mounting plate 44 into contact with the door jamb 11. Thus, when the door is closed the alarm assembly is in the condition illustrated in FIG. 3. In this condition, spring member 54 is held above contact member 53 and there is no complete electric circuit for actuation of the buzzer. On the other hand, when the door is opened button 43 is urged toward the right, until shoulder 52 rests upon the inner surface of mounting plate 44. In this position, contact is established between spring member 54 and contact member 53, and the switch is closed to energize the system.

Referring to FIG. 8, it will be seen that from an electric standpoint, the signalling system is extremely simple. FIG. 8 illustrates the electric circuit wherein a dry cell battery 45 is serially connected through switch contacts 54, 53 and interruptor 61, to buzzer coil 50. Specific structural details for effecting the electrical interconnection of various components is well within the skill of those in the art.

Special attention may be given to the manner in which the switching means can be deactivated in the event that it is desired to prevent operation of the signalling system even if the door is opened. This is made possible by providing the actuation member 43 with lateral shoulders 60 which are higher than the longitudinal shoulders 52. As seen in FIG. 4, the mounting plate 44 is provided with a T-shaped slot 59. The dimensions of this T-shaped slot are such that the projecting portion of actuating member 43 may be moved vertically therein. In the "on" position shown in FIG. 4, the vertical shoulders 52 bear against the inner face of mounting plate 44 when the door is opened. Under these conditions, switch contact 53, 54 are closed and the circuit will be energized. On the other hand, when the projecting portion 43 is moved downward, the higher lateral shoulders 60 engage the rear surface of mounting plate 44 and under these conditions, the contacts 53, 54 remain open even when the door is opened.

In order to install the embodiment shown in FIG. 4, it is merely necessary to cut an aperture in the edge of the frame 16 and provide screw holes for engaging mounting screws 55 and 56. The mounting plate 44 is made narrower than the space between door projections 31 and 32 and consequently is nested therein. These projections also assure that the door is spaced from door jamp 11 by an appropriate amount to permit the projection of the actuating button 43 and the necessary mounting screws.

A further embodiment of the invention is illustrated in FIGS. 5 through 7. This embodiment would be mounted as shown by dotted lines 15 in FIG. 1, within a mullion or crossrail of a typical screen or storm door. Once again, it will be noted that the unit uses the door frame cavity as both a resonating chamber and a protective housing. As with the first embodiment, it will also be noted that the edge projections 31, 32 provide a "nest" for the switch button 73 and front mounting plate 74.

The second embodiment is characterized by the alignment of the buzzer coil 80, dry cell 45, and switching means 73, all along a single axis. This alignment makes it possible to install the unit by merely boring a hole through the hinge edge of the door. FIGS. 5 through 7 show the use of screws 85, 86 to hold the mounting plate in position, but spring clips, and the like, may also be used to avoid the need for screws.

The push button of the FIGS. 5 through 7 embodiment differs from that of the first embodiment, in that it permits the user to deactivate the system by rotation. The illustrated position of button 73 is the activated position wherein flanges 82 slide within apertures 89 of the mounting plate. To prevent operation, push button 73 is depressed and rotated. This causes flanges 82 to bear upon the inner face of the mounting plate and will insure that contacts 84, 81 will not close.

While several illustrative embodiments of the invention have been shown and described, it will be appreci-

ated that modifications can be made. All modifications which come within the spirit and teachings of this invention, are intended to be embraced within the scope of the following claims.

What is claimed is:

1. A self-contained alarm system, comprising in combination, a metallic door having a hollow frame and an audible electric alarm, said frame including a member with edge projections extending laterally from the front and rear faces of the door, an aperture in the edge of the door between said edge projections providing access to the cavity within said frame member; said alarm having an integral unit including a support plate and mounting plate, means for mounting a source of electric power and electrically energized signalling means to said support plate, normally closed switch means mounted on said support plate and having an actuating member projecting beyond said mounting plate and operative to open when said actuating member is depressed towards the face of said mounting plate, circuit means interconnecting the signalling means and electric power source via said switch means; and means for securing said mounting plate to the edge of a hollow metallic door between said edge projections with said support plate extending into said aperture, whereby said door functions as a resonant chamber for said audible alarm when energized by closure of said switch means.

2. The combination defined in claim **1,** wherein said alarm lies solely within the vertical frame member of the door adapted to be hinged from a door jamb.

3. The combination defined in claim **1,** wherein said alarm projects into a mullion on said door.

4. A self-contained alarm system comprising in combination: a metallic door having a hollow frame, an aperture in said door yielding access to the cavity therein; a mounting element secured over said aperture and extending beyond the cross-sectional dimensions of said aperture; an open frame forming an integral part of said mounting element and projecting into said aperture; a self-contained source of electricity, electrically energized audible alarm means, and normally closed switch means secured to said open frame within said cavity and interconnected in series; said switch means having an actuating element projecting through said mounting element and operative to open said switch when depressed toward the face of said mounting element; whereby the cavity of said frame acts as a resonant chamber for said audible alarm means when energized by closure of said switch means.

5. The combination defined in claim **4,** wherein said alarm lies solely within the vertical frame member of the door adapted to be hinged from a door jamb.

6. The combination defined in claim **4,** wherein said alarm projects into a mullion on said door.

7. A self-contained alarm system as defined in claim **4,** wherein said source of electricity comprises at least one dry cell battery that is removably mounted on said frame.

8. A self-contained alarm system as defined in claim **4,** wherein said hollow door includes cavities with extended longitudinal axes, said aperture yields access to said cavities from one longitudinal edge of said door, and said open frame has a longitudinal axis positioned parallel to said extended longitudinal axes when said mounting element is secured.

9. A self-contained alarm system as defined in claim **8,** wherein said source of electricity, said alarm means, and said switch means are aligned along the longitudinal axis of said open frame.

10. A self-contained alarm system as defined in claim **4,** wherein said actuating member is biased outwardly from the mounting element, and includes manually selectable means for preventing its movement to a normally closed position.

* * * * *