

[54] **INTRUSION DETECTING ALARM SYSTEM** 3,147,468 9/1964 Daniels 340/274
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 [58] **Field of Search** 340/274, 276, 402,
 340/403; 200/61.7, 61.76, 61.81, 61.82; 315/83

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[57] ABSTRACT

An intrusion alarm including a vibrator, an energizing battery, and a switch controllable by an intrusion detector element to connect the battery to the vibrator, all mounted on a frame to be mounted on a vibratable panel, such as a door or window pane.

14 Claims, 11 Drawing Figures

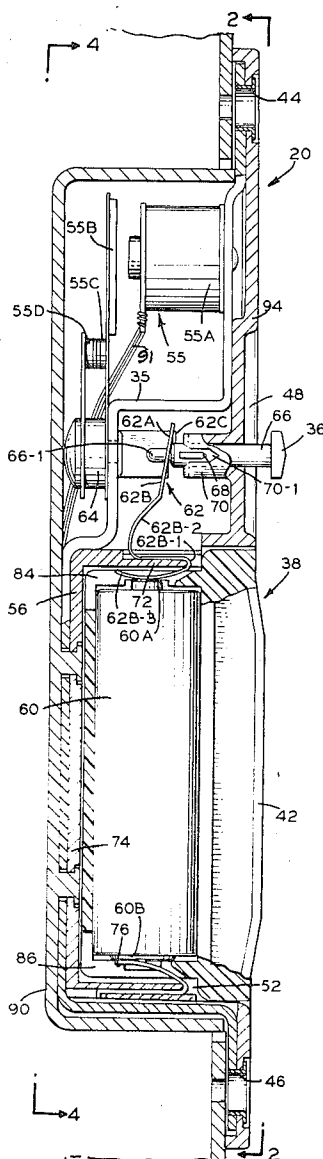


FIG. 1

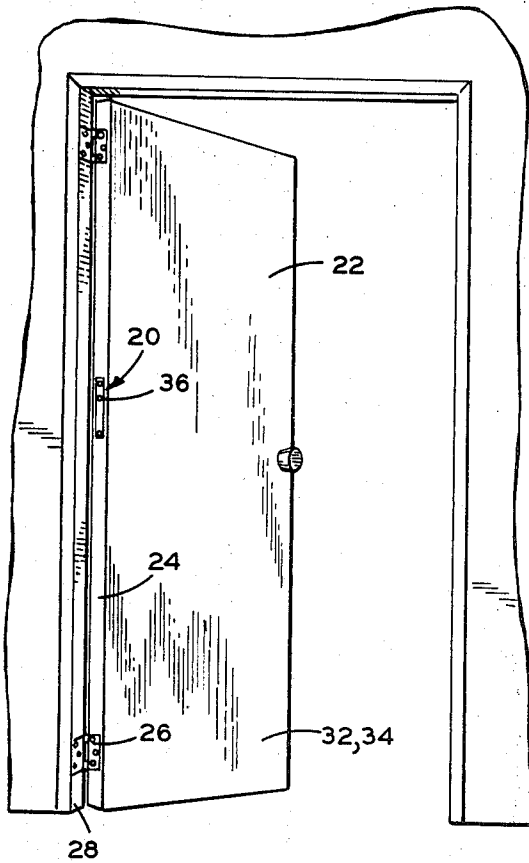
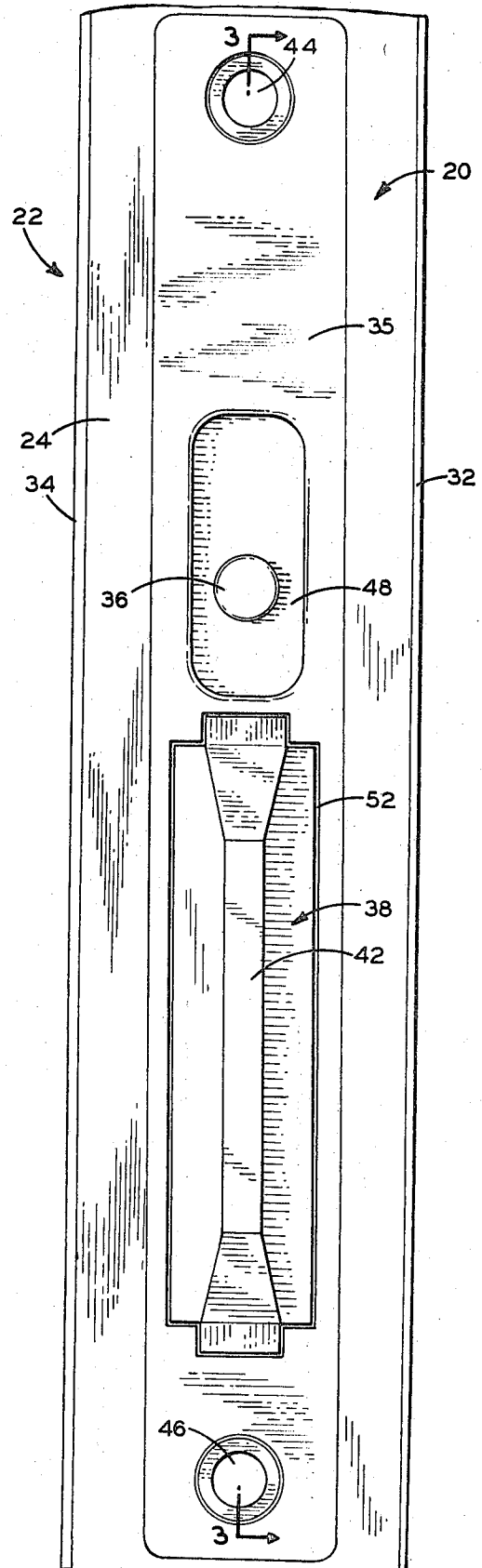
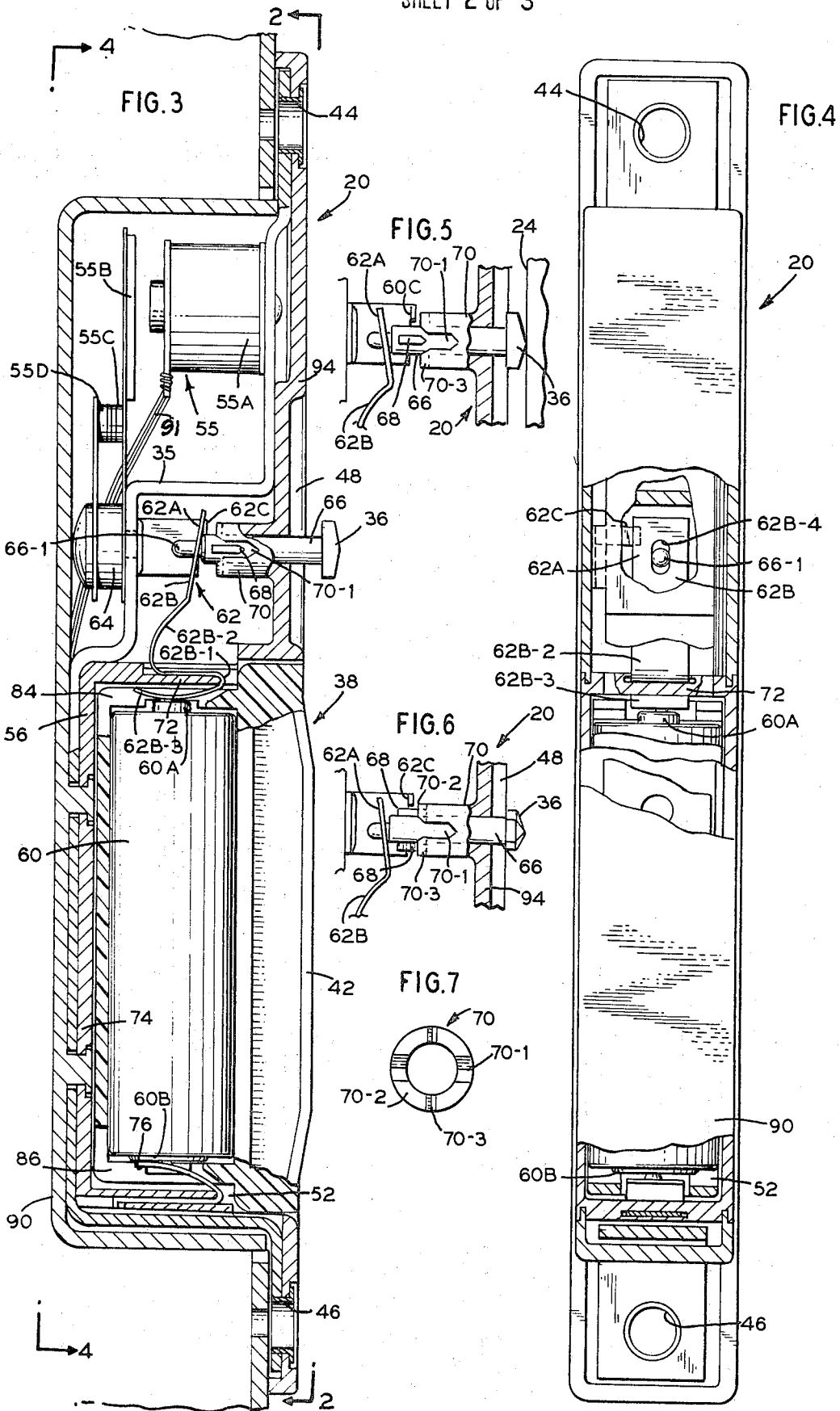
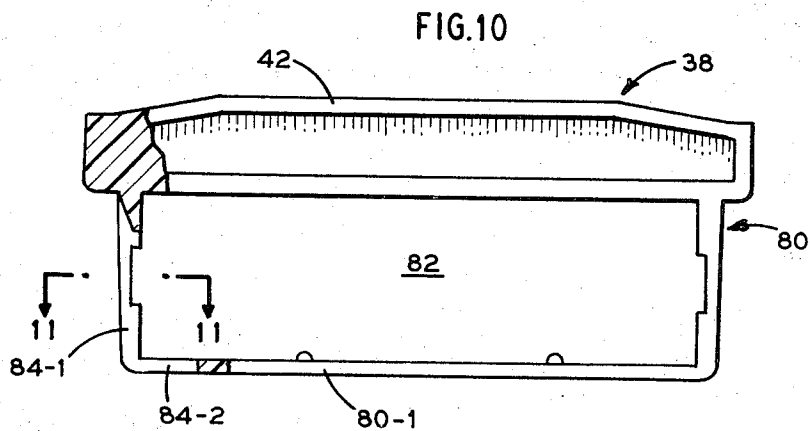
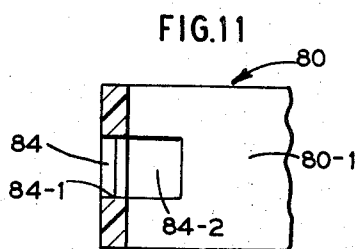
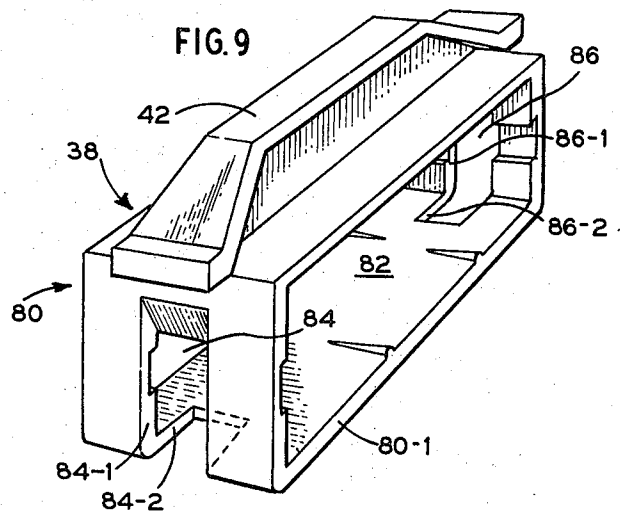
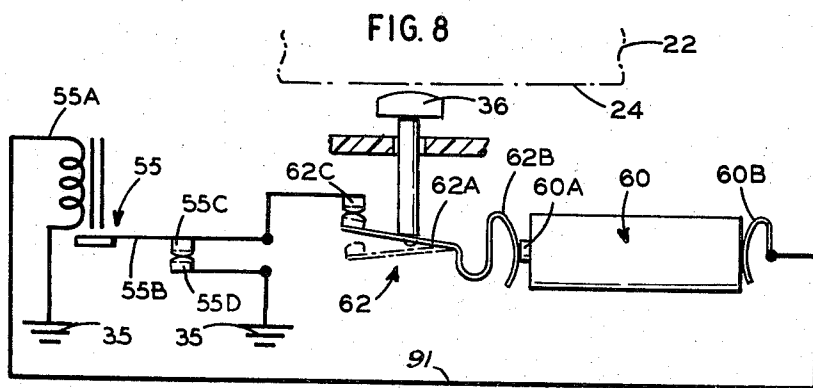


FIG. 2







INTRUSION DETECTING ALARM SYSTEM

This invention relates to signalling systems, and particularly to a signalling system that may be utilized as an intrusion warning.

There are many kinds of intrusion, that involve the opening of a door, or of a window, or similarly the movement of some physical element relating to an area that is to be safeguarded. When an intrusion does occur, it is desirable to provide a signal which may be visible or audible. In order to provide a suitable audible signal, a source of substantial power is generally required. Where access may be had to a conventional light and power circuit, such a source of power is, of course, adequate to operate an audible signalling device of any power capacity generally needed. In some cases, where access to a power circuit is not conveniently available, a battery operated system may be utilized, subject to constraints of the space available, within which the intrusion detector may be disposed, and subject to the availability of a battery whose dimensions will be adequate to operate the sound producing device for the audibility that is to be desired.

In the present case, the object of the present invention is to provide a small self-contained package including a small battery and a relatively small sound-producing device. In order to translate the small signal output of the sound producer, the present invention utilizes the sound magnifying properties of a panel, such as a door, for example, as a sounding board for a directly impressed vibration signal. Similarly, any other form of vibrating panel may be utilized that is mounted in suitable manner to be available as a vibrating surface free of restraints that would limit the normal vibration amplitude which could be generated in the panel in response to an applied force of a suitable frequency.

Thus, it is one object of the invention to provide a power package with a vibrating element, that can be mounted on and within a door frame, where it is not visible, with a suitable limit-type switch that is normally held in open-circuit position when the door is in proper closed position, with the limit-switch arranged to be moved to circuit-closing position when the door is opened through an angle sufficient to release the usual operating pin element of the limit-switch.

The system contemplated within this invention includes an electromagnet with a vibrating armature or clapper, similar in operation to a buzzer, with a self-operated back-contact for opening and closing the circuit of the magnet coil, thereby to cause the armature of the relay to vibrate at some predetermined frequency appropriate to the intended use. The power-pack for the electromagnet includes a small battery to energize the coil of the vibrating electromagnet, and the circuitry between the battery and the electromagnet coil is controlled by the intrusion-detecting limit-switch. When that limit-switch is permitted to close by unauthorized movement of a protected door or window, the electromagnet is energized and the vibration of the armature of the electromagnet is imparted to its supporting frame, which is of suitable energy-transmitting material, and the supporting frame is secured to a door or other similarly vibratable panel, which may include a window pane, for example, which may be vibrated and caused to emit a loud amplified sound signal when vibrated.

The limit-switch, which controls the operation of this audible signalling system, is provided with a control pin which may be selectively manually positioned, and serves to prime the detector switch to operative or to nonoperative position, so the system can be primed for operation, or be disconnected when not desired.

This limit-switch, which is utilized as the intrusion detecting switch, embodies a simple cantilever spring element to provide several features and functions. The spring element serves as a movable switch contact that is operated by a push button controlled by the door movement. When the door is in closed position, the push button holds the movable switch contact in open-circuit position. When the door is moved through a small predetermined angle, toward open position, the spring element as a switch contact, moves to circuit-closing position to energize the signalling system. In addition, the spring element serves to provide a permanent continuous bias against the push button and its operating pin, so the switch can be utilized as a manually-operable disconnect switch to hold the operating circuit open when operation of the system is not desired, irrespective of door operation. Further the leaf spring also serves as an element of a spring contact for engaging one of the terminals of the battery for the package, and the construction of the leaf spring is such as to make it an inexpensive element that may be stamped and formed, and later easily and readily disposed in its operating position by simply sliding it into proper position in its pre-formed plastic supporting frame, without requiring additional anchoring or fastening elements.

An additional important feature of the invention is the provision of a cradle or carriage for supporting the unit battery cell which is employed in this system. The cradle is constructed in such manner as to receive and support the cell, after which the cradle is inserted into a mating receiving recess or cavity of appropriate dimension to receive the cradle in closely slip-fit relationship, that substantially precludes the entrance of moisture into the cavity while the cradle is in place. The receiving cavity for the cell is provided with a resilient leaf spring contact element mounted at each end of the cavity. When the cell cradle is inserted into its recess while supporting a cell, the cell movement is in a path in which the cell terminals slide onto and along the leaf spring contacts with a rubbing action, and in such way as to move them out of their normal unrestrained position, to a tensioned position that causes those contacts to engage the cell terminals with high pressure. If a cell is not present in the cradle when the cradle is inserted into its cavity, the contact springs will remain in normal unrestrained position, which would be such as to make it difficult to remove the cradle. One of the features is in the design of the cradle, and is such as to insure free movement of the cradle into and out of its receiving cavity, irrespective of the presence or absence of the cell in the cradle, when the cradle is moved into operating position in its receiving cavity.

In the present application, the construction of the intrusion detecting switch is such as to provide several features of advantage in order to simplify the construction and assembly of the package, and to permit all of the features to be accomplished within a small volume of space so that the package itself will be not only economical to manufacture, but will be easy to handle and easy to position in its operating environment, with a minimum of effort. Further, the construction will as-

sure a long operating life free of trouble, as a result of which there will be an assurance of proper operation in the device, when an emergency situation develops by reason of an intrusion whose occurrence must be detected and signalled for the safety and protection of the region that is being supervised.

The various features of design and function of the system of this invention are described in more detail in the following specification, taken together with the explanatory drawings, in which

FIG. 1 is a perspective view of a door on which the intrusion detector is mounted, with the door shown in open position in its frame;

FIG. 2 is a front elevational view of the intrusion detector in position in the door;

FIG. 3 is a vertical sectional view of the intrusion detector with parts shown in elevation, to show the form of the supporting frame and the manner in which the vibrating buzzer and the energizing battery and the control switch are all supported on the frame;

FIG. 4 is a rear elevational view of the intrusion detector, with parts broken away and with parts in section, to show certain details of internal construction;

FIG. 5 is a side elevational view of the control switch of the detector when the door is nearly closed;

FIG. 6 is similar to the view of FIG. 5, but with the switch set for nondetecting operation;

FIG. 7 is an elevational face view of the control seat for the switch in FIGS. 5 and 6, for seating the switch control element according to desired detecting or non-detecting operation;

FIG. 8 is a circuit diagram of the detector circuit;

FIG. 9 is a perspective view of the carriage for the cell;

FIG. 10 is an elevational side view of the carriage.

FIG. 11 is a plan view of a back corner of the carriage to illustrate a cut-out to permit free insertion and withdrawal.

As shown generally in the drawings, an intrusion detector of this invention embodies a vibrating device, such as a buzzer, with a unit battery to serve as a source of energy, all mounted on a frame as a single simple assembly unit which may then be mounted on the edge of a stile, or vertical part of a door frame, in such manner that the vibrations of the buzzer will be imparted to the door as a vibrating panel, to produce loud amplified sound from the vibrations of the buzzer on its supporting frame.

The detector, here disclosed, is provided with a simple limit switch that is normally biased to closed position to connect the battery and the buzzer coil so that the buzzer will be energized, when the switch is moved to its closed position by the tension force of an internal spring. The switch is constructed to be moved to its open position by depression of a finger pin when the door, upon which the detector is mounted, is in closed position. When the door is opened, the switch is permitted to move back to that closed position whereupon the buzzer is energized and caused to vibrate, and the vibrations are amplified by the door panel or panels.

Since the detector is to be employed merely to detect intrusion or unauthorized opening of the door, the priming finger pin is provided with means for opening the switch and locking it or holding it in such open position as long as the use of the detector is not wanted. The switch is simple in construction, and utilizes a resilient contact spring for several functions, and thereby

provides several functional features in the simplicity of the switch construction.

As shown in FIGS. 1 and 2, an intrusion detector 20 is made of relatively narrow design to permit it to be mounted on a door 22, preferably on the inner stile 24 which is supported on hinges 26 to seat against a door jamb 28.

The detector 20 is preferably constructed and supported on a frame 35 that will enable the entire detector 20 to be sufficiently narrow to fit on the door stile 24 between the front and rear panels 32 and 34 of the door 22, as shown in FIG. 2. The frame 35 is preferably of metal having a good conductivity to the vibration forces, at the frequency of the buzzer. The detector 20, when mounted on the door stile 24, exposes a limit switch button 36, and a carriage 38 having a manipulating handle 42 for moving the carriage 38 into and out of position on the detector frame 35. The frame 35 is provided with two screw holes 44 and 46, for screws to anchor the detector on the door stile 24.

In order that the door may close normally with the stile engaging the jamb, the detector frame 35 is provided with a depression or cavity 48 that will permit the limit switch button 36 to be depressed inwardly to an extent that will bring the outer contour plane of the button head 36 within the contour planar limit of the outer surface of the door stile 24.

The detector frame 35 is also similarly shaped to provide a pocket 52 that will permit the battery cell carriage to be pressed inward sufficiently to place the carriage handle within the external contour plane of the outer surface of the stile 24.

As shown in the drawings, the detector 20 comprises the metal frame 35, a vibrating device or buzzer 55 supported thereon, with a pocket structure 56 on the frame 35 for supporting a movable carriage 38, which in turn supports a unit battery cell 60, to energize the buzzer, and a switch 62 that is controlled by the limit switch button 36, previously referred to, for controlling the operation of the buzzer.

The buzzer 55 comprises an operating coil 55A, a vibratable armature 55B to support a contact 55C to engage and disengage stationary contact 55D supported on a post 64 supported on the metal frame 35.

The schematic functional diagram of the detector is shown in FIG. 8.

The detector 20 may be pre-set, either to operating position or to nonoperating position. When the door 22 is closed, with the switch set in operating position, the switch 62 will be held open by the limit switch push button 36, and the circuit between the buzzer coil 55A and the battery 60 will be open at the switch, so the buzzer is not energized. If the door is opened when the detector is thus set to operate, the switch 62 will close to complete the circuit between the battery 60 and the buzzer coil 55A when the button is deprived of the back-bucking pressure of the door stile 24 when the door is in closed position.

This operation becomes readily apparent upon considering the diagram of the circuit as shown in FIG. 8. When the door 22 is open, and positioned away from button 36, the button 36 of the switch 62 will be in the outer position shown and will be pressed to such outer position by the cantilever spring element 62A which also supports the movable contact element of the switch 62. In that condition, the circuit proceeds from the terminal 60A of the battery through the spring ele-

ment 62B-62A of switch 62, through the contacts 62C of switch 62 to the contacts 55C of the buzzer 55, to ground, which represents the metal frame 35, thence up through the coil 55A and back to the other terminal 60B of the electric cell 60.

The buzzer will thereupon be energized to operate and vibrate the armature 55B, as a result of which reaction vibration forces will be set up in the frame 35 and imparted to the door to cause the door panels 32 and 34 to vibrate as sounding boards, and to create a loud sound.

When it is desired to lock the switch 62 in non-operating position, as when the supervised area is properly occupied, by the tenants, or other supervisory personnel, the button 36 of control switch 62 is pressed inward to move a pin 66, having a double-wing detent 68, to press the movable switch contact 62A inward to a position where it will be disengaged from the cooperating stationary switch contact 62C. The pin 66, slidably supported in sleeve 70, is then rotated through an angle of 90° by button 36, while pressed inward, and the pressure on button 36 is then relieved, to permit the resilient spring blade 62A to push the pin 66 outward, until the double-wing detent 68 on pin 66 moves into and seats in a groove 70-3 in sleeve 70, in which pin 66 is slidably and rotatably supported. The detent 68, when in groove 70-3 of sleeve 70, holds pin 66 in pressed-in position, to hold the two switch contact elements 62A and 62C separated and out of physical contact, irrespective of the position of the door, as shown in FIGS. 5 and 6.

The switch 62 provides certain advantageous features to the invention. As shown in FIG. 3, the switch embodies the spring blade contact element 62B as the movable contact of the switch 62. That contact element is shaped to form a substantially U-shaped part 62B-1, which serves as an anchoring element for the blade 62B when fitted over an anchoring plate 72 that is part of the insulating plastic structure for the detector. The spring blade 62B also embodies an upper cantilever section 62B-2 and a lower cantilever portion 62B-3.

The spring element 62B has several functions. The upper blade portion 62B-2 serves to engage the stationary contact 62A and to complete the circuit from the battery 60 through the complete spring 62B and through the stationary switch contacts 62A, 62C to the buzzer coil 55A as shown in FIG. 8. The blade 62B-2 also serves mechanically as a resilient spring element for impressing a permanent biasing force against the switch operating pin under the limit switch button 36. The lower blade element 62B-3 serves as a wiping contact to engage one element of the unit battery cell 60 when that cell is in position in its carrier 38 in the assembly.

The carrier or carriage 38 for the cell is arranged to slide fit into the box-like pocket 52 formed within a plastic box 74 whose upper wall constitutes the anchoring plastic section 72, previously referred to, that serves as a receiving and supporting guide and anchor for the switch contact blade 62B. That blade 62B is essentially a floating contact, which can be easily assembled, and which will be held in position by its own reaction force and its own functional operating force against the positioning pin 66 of the switch 62.

The carriage 38 is formed to embody a frame 80 defining a central opening 82 for accommodating a unit

battery 60, and further embodies the handle 42 which serves as a manipulating frame for pressing the carriage into the pocket 52 in the box 74, for receiving the carriage. In order to obtain the benefit of a good electrical contact between the two terminal surfaces of the battery 60 and the upper switch blade 62B and a lower spring terminal 76, those two blades 62B and 76 are respectively disposed to extend into the two paths through which the two end surfaces of the battery will move, in their insertion and withdrawal movements, so that those surfaces will be engaged by the spring blade contacts 62B and 76 with a wiping action.

The two spring blade elements 62B and 76 are resilient, and are supported as cantilevers, and are disposed to point backwardly at their bottom ends, so the spring blades may engage the cell terminal surfaces and press on them axially inward toward the cell, as the cell is moved inward to operating position. In order to accommodate those spring blades 62B and 76, in their adjusting movements, the frame 80 of the carriage 38 is provided with a horizontal slot 84 in its top surface, and a similar slot 86 in its bottom surface, through which the spring blade contacts 62B and 76 may extend to engage the adjacent terminal surface of the battery cell.

The slot 84 has two portions slots 84-1 and 84-2 as an L-shape, down into the back wall 80-1, formed from the top and bottom of the frame 80, so the spring blade elements 62B and 76 will not catch on the back wall, in case the carrier is inserted into its receiving box without a battery cell in place that would serve to press the springblade elements 62B and 76 outward, away from the carriage. In that case, without a cell in place, the spring blade elements 62B and 76 will extend downward into the frame 80, and would engage the back wall 80-1 if the slots 84-1 and 86-1 did not continue backward into the back wall 80-1 to provide the additional slot extensions, to provide open spaces and prevent the back wall 80-1 from catching on those blade elements.

FIGS. 5, 6 and 7 explain the operation of the switch 62 and the setting button 36 for positioning the switch for surveillance or non-surveillance operation.

The push pin 66 serves to control the setting of switch 62 for normal intrusion detecting operation, or to lock the switch out of operation. The pin 66 is supported in the sleeve 70 that is formed as an integral element on the plastic supporting frame 94, the lower part of which contains the pocket or space 52 to receive the carrier or cradle 38 for the battery cell 60. The push pin 66 is freely movable axially in the sleeve 70, within certain limits controlled by the button or head 36 on the outer head of the push pin. The switch blade 62B has an upper portion which serves as a contact 62A, as previously noted, and the upper portion of the blade 62B is provided with a short longitudinal oval slot 62B-4 to receive a small retaining pin 66-1 at the inner end of the push pin 66. The blade 62B is supported as a cantilever and is formed to be prestressed when positioned on pin 66-1, in order to provide and maintain at all times a bracing force at the inner end of the pin 66 that would tend to move the push pin 66 outward in the sleeve 70, and to permit and control the contact 62A, as the upper end of the resilient blade 62B, to serve as a movable contact and to engage the stationary contact 62C previously referred to.

In order to normally control the push pin 66 to maintain a predetermined angular position, to permit free

axial movement, the push pin 66 carries the guide rib 68 previously referred to, which slides freely in a slot 70-1, formed lengthwise in the wall of sleeve 70, to a sufficient depth to be more than adequate to permit the push pin 66 to be moved toward its extreme outer position to enable the switch blade 62A to engage its outer end against the stationary contact 62C. The rib 68 on the push pin 66 thus serves as a guide and control element to prevent the pin 66 from undesirably turning angularly within the sleeve 70. Under these conditions with free axial movement of the push pin 66 permitted to its outermost position in response to the pushing pressure of the switch blade 62B, the pin is free to move axially to such outer position when the door is moved from fully closed position through at least an initial small angle towards open position. Thus when the guide rib 68 is in the slot 70-1, the intrusion detector is activated and ready to operate the intrusion signalling alarm.

When it is desired to de-activate the intrusion device, as when the occupants or supervisors of the protected area are present, and free use of the door is desired without unnecessarily signalling each operation of the door, the switch 62 is moved to open position, and the push pin is there detented to hold switch 62 open. That detenting action is accomplished, as in FIG. 6, by first pressing the push pin 66 inward by means of the push button head 36, to a distance sufficient to enable the back tip end of the guide rib 68 to clear the rear edge surface 70-2 of sleeve 70, after which the button head 36 is rotated through a quarter turn to bring the back tip end of rib 68 in axial alignment with a shallow groove 70-3 into which the rib 68 will then be forced by bias force of the spring blade 62B when pressure on the pin button head 36 is relieved. In that position of the rib 68, in groove 70-3, the push pin 66 is detented, and the switch blade contact 62A is held disengaged from the stationary contact 62C. Thus, the device is de-activated so that it will not be unnecessarily operated when the safeguarded area is otherwise occupied and the intrusion alarm is not needed.

The invention thus discloses a simple combination as an intrusion detector or alarm, which is suitable, in the arrangement disclosed herein, to be mounted on a stile in an ordinary door within the narrow space between the front and back panels of the door, so those panels may be used as resonance or vibrating panels to be vibrated by the forces generated by the buzzer type vibrator, to generate a loud amplified sound sufficiently loud to be audible and to serve as a warning of the intrusion.

The assembly as disclosed herein, with or without modification or rearrangement, may also be mounted on a window frame, in order to cause vibration of the window panel or panels supported in the frame, in order similarly, to generate an amplified warning sound.

Among the various features included in the invention are (1) the switch setting assembly, including the front push button that serves also as a switch positioning device; and (2) the carriage or cradle for the battery cell, which permits the cradle to be inserted into operating position irrespective of the manner in which the cell is fitted into the cradle for insertion into the receiving box on the frame structure. This carriage and cell combination is an important feature in itself, as a simple assembly which may have suitable applications elsewhere for

coupling into a system to be energized by the battery cell. The symmetrical construction of the cradle permits the cell to be inserted without regard to polarity, and the rear wall and top wall cut-outs, as slots, permit the cradle to be inserted and withdrawn without any impedance from the associated contacts positioned to engage the cell when inserted to operating position.

The switch construction provides a simple design in which the upper contact blade 62B may be easily and readily assembled on the supporting insulating frame, with the upper switch blade supported as a cantilever to provide an inherent bias pressure permanently effective in the switch to press against the push pin 66, and to tend to move towards the stationary contact 62C, to complete the switch circuit, without requiring any external springs or anchoring elements beyond the shaped construction of the spring and its bottom anchoring support on the plastic body.

A plastic closure box 90 encloses the several components and is supported on the metal frame 35 to provide a complete assembly unit. An insulated conductor 92 extends from one coil terminal to the bottom cantilever terminal 76 that engages the bottom surface of the cell.

By constructing the two terminals as shown to engage the terminals of the cell, it is immaterial how the cell is positioned.

The invention is not necessarily limited to the arrangement as shown but may be variously modified within the spirit and scope of the invention as defined in the claims.

What is claimed is:

1. A signalling system, suitable for use as an intrusion alarm, comprising:

- a sound producer including a vibrating element;
- a supporting frame structure having a high coefficient of transmission of audible frequencies, and serving to support said vibrating element;
- means for attaching said frame structure to an external panel for amplifying the sound of said vibrating element;
- a battery-operable device for energizing said vibrating element;
- a battery;

a switch operable to connect said battery to said device and to disconnect said battery from said device, said switch including a stationary contact; a movable contact supported on a cantilever spring blade; and means for adjustably positioning said movable contact to selectively control said switch to function or not to function under predetermined conditions, said adjustable positioning means including a push pin supported for and capable of rotation and axially reciprocable movement and mechanically coupled to said movable contact against the resisting spring force of said spring blade, a handle to rotate and axially move said push pin, and a detent to hold said pin in a forward position against the spring action of said spring blade; and means responsive to an intrusion attempt for controlling the switch to connect the battery to the device for energizing said sound producer.

2. A signalling system, as in claim 1, including additionally,

- an elongated metallic supporting frame;
- an electromagnet coil having a core, with its core supported on the upper end of said frame, and posi-

- tioned to point the open end of the core away from said frame;
- an armature cantilever-supported by a reed and disposed to be attracted by said open end of said core; a back contact normally engaged by said armature reed as a switch to establish a circuit to the electromagnet coil, said back contact switch being opened by attracted movement of the armature toward said core to open the coil circuit to cause the armature to function as a vibrating switch;
- and means connecting said battery in a circuit including said vibrating switch and said electromagnet coil.
3. A signalling system, as in claim 2, in which said frame and said reed and armature are of magnetic material to provide a magnetic path of low reluctance for the magnetic flux of the coil.
4. A signalling system, as in claim 3, in which said frame is shaped, in part, to constitute an L, as two contiguous sides of a virtual rectangle, with the armature and said reed disposed to constitute an equivalent opposite long side of said virtual rectangle and said core of the coil disposed with its air gap to said armature to constitute an equivalent opposite short side of said virtual rectangle, whereby said virtual rectangle defines the path of the magnetic flux developed by said electromagnet coil.
5. A signalling system, as in claim 4, in which said elements disposed along said virtual rectangular path are of high permeability to be good magnetic flux conductors.
6. A signalling system, as in claim 2, in which said frame, said core, said cantilever reed, and the air-gap between the core and said armature, define a magnetic path for the magnetic flux of the electromagnet coil.
7. A cell mounting, as a sub-combination of the system in claim 1, comprising:
- a support;
 - a housing, consisting of a hollow box receptacle with back, side and end walls, and open at the front, mounted on said support;
 - an elongated cradle for a battery cell, to fit into said hollow box, and including:
 - a hollow frame structure having elongated forward and back walls, and two top and bottom end walls, with open sides to permit insertion and removal of a battery cell, and having a narrow elongated forwardly disposed handle for said cradle, the width of inner spacing between said front and back walls being such as to permit a snug sliding fit for an intended electric cell; and
 - two resilient leaf spring terminals supported on the receptacle box end walls, to be engaged by the polar terminals of the electric cell in said cradle with a rubbing action, as the cell is inserted or removed.
8. A cell mounting, as in claim 7, in which each of said resilient leaf-spring terminals is supported on one or the other end wall of said hollow box receptacle, and has a resilient spring blade directed inwardly into said hollow box receptacle, and extends downward into the path of an end terminal of a cell to be inserted into said elongated

- cradle;
- and said cradle is shaped with a horizontal slot in each of its top and bottom end walls to provide a free space for each such associated resilient spring blade to extend into and through said horizontal slot and into said path of the related end terminal of a cell being inserted by said elongated cradle into said hollow housing receptacle.
9. A cell mounting, as in claim 8, in which each end wall, top and bottom, is provided with said horizontal slot to permit access movement of each said related spring blade to engage a terminal end of a cell in said cradle, and said forward wall of said cradle is provided at each end, with a vertical slot on said forward wall as a continuation from the inner end of said horizontal slot and extending inwardly in said forward wall to provide an open space for free removal of the cradle past the free end of each cantilevered spring blade, in case the cradle may have been inserted without a cell therein, which condition would have permitted each blade to extend axially into the carriage to block removal of the carriage in the absence of said slot into the forward wall of the carriage.
10. A cradle as an element of the sub-combination in claim 7, comprising
- an elongated rectangular frame including a forward long wall, a rearward long wall, and top and bottom end walls, with the framed space between the long walls fully accessible from either side to press an elongated electric cell into or out of said frame, a front-to-back slot in each top and bottom end wall to provide access space for an external contact to engage an end terminal of either electrode of the cell; and
 - a handle on the rearward long wall for manipulating the cradle.
11. A system, as in claim 1, in which said system is applied to a door leading to an area to be safeguarded, and in which
- said means for adjustably positioning said movable contact may be operated to lock said contact in open switch condition when the intrusion signal is not desired.
12. A system, as in claim 1, in which
- a sleeve element is mounted on said frame as a stationary support and guide for said push pin, and said sleeve element has a deep slot lengthwise in its wall, and a shallow slot in its end edge disposed transversely to said deep slot;
 - and a guide on said pin is movable in said deep slot to permit free movement of said pin to switch-closing position when the system is set to function in response to an intrusion or unauthorized entry.
13. A system, as in claim 12, in which
- said pin is provided with a detent movable to said shallow slot to prevent free movement of said pin to switch-closing position.
14. A system, as in claim 13, in which
- said guide and said detent are combined as a unit element on said pin.

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