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3,263,040

PRESSURE OPERATED CIRCUIT CONTROLLING DEVICES OPERABLE ON
RELATIVE MOVEMENT BETWEEN TWO ELEMENTS

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2 Sheets-Sheet 1

Fig. 1.

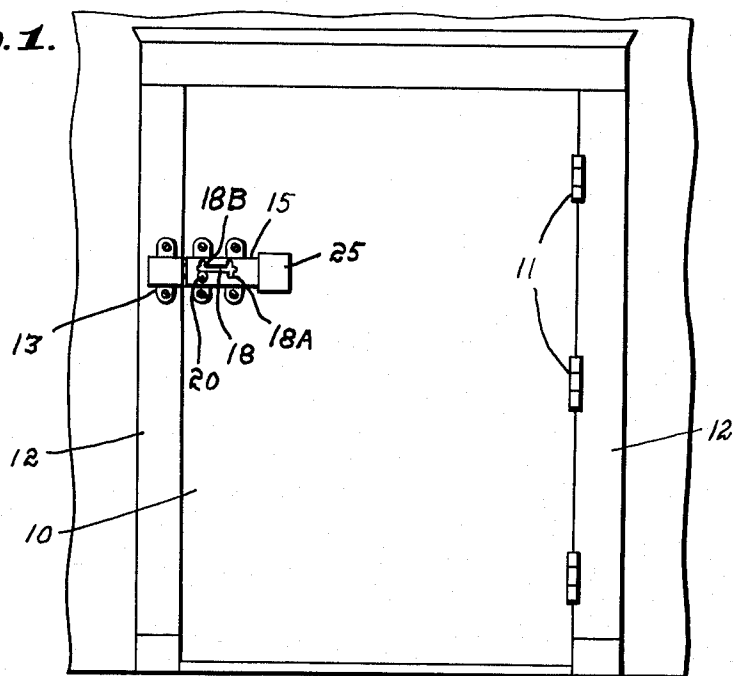
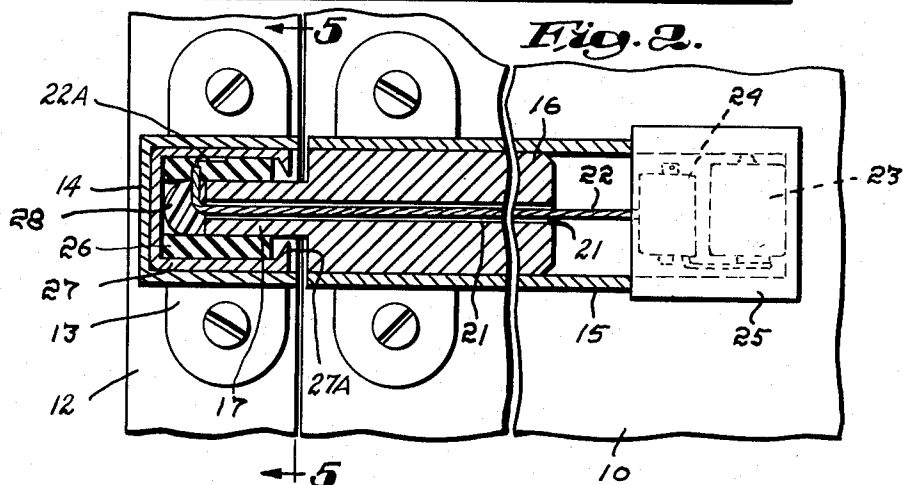


Fig. 2.



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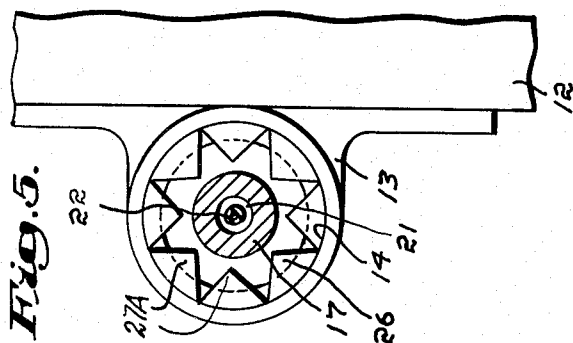
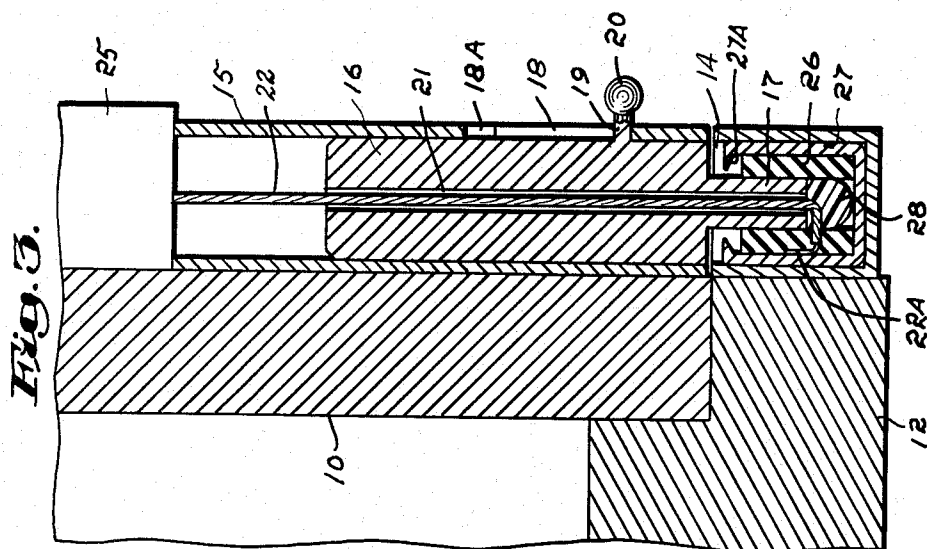
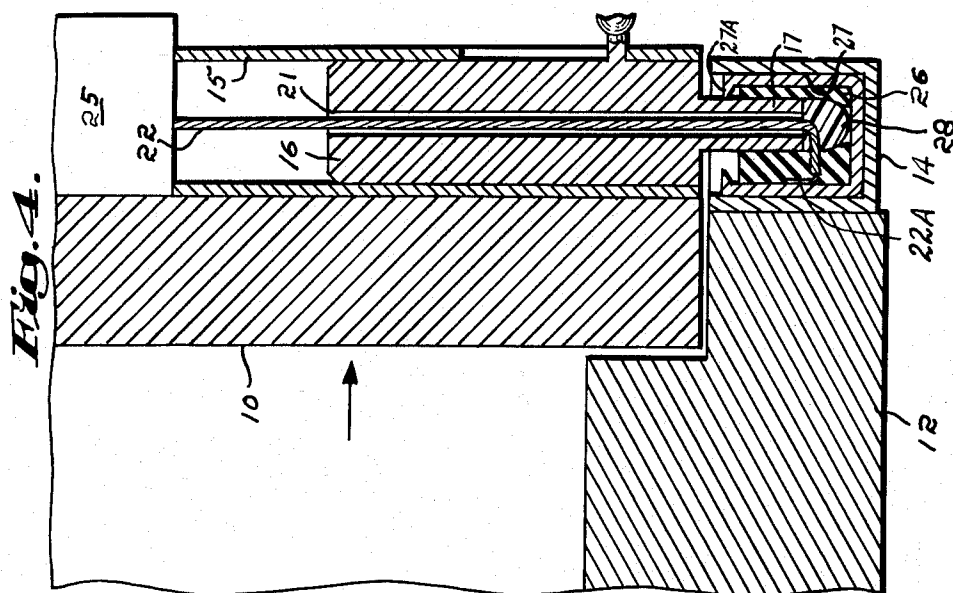
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PRESSURE OPERATED CIRCUIT CONTROLLING DEVICES OPERABLE ON RELATIVE MOVEMENT BETWEEN TWO ELEMENTS

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8 Claims. (Cl. 200—61.64)

The present invention relates to pressure operated, circuit controlling devices, each responsive to relative movement between two elements.

While devices in accordance with the invention are adapted to a wide range of security and safety uses where detection of movement of a predetermined magnitude between two elements is required, the invention is herein discussed primarily in connection with security uses, typically where any undue pressure on a barrier, a door or window for example, is to be detected to trigger an alarm.

The principal objective of the invention is to provide a device to meet such generally indicated requirements and, in accordance with the invention, this objective is attained by providing one element that is movable relative to another element with a first member movable into and out of an operative position relative to a second member with which the second member is provided, the second member having a holding portion by which a connecting portion of the first member is held in the operative position thereof. One of the portions has means yieldably opposing movement between the elements when the above referred to portions are in engagement. A switch having open and closed positions and located where the portions engage, is held in one position by the yieldable means until pressure on one of the elements results in the yielding of the yieldable means, the other switch position then resulting.

A particular objective of the invention is to have the connecting portion of the first member include a sleeve as one contact of the switch, the sleeve being electrically insulated from the first member by the yieldable means and the first member constituting the other contact of the switch.

An additional particular objective of the invention is to have the sleeve in the form of a cup whose closed end is engaged by an inwardly tapering tip at the end of but insulated from the connecting portion of the first member, the tip facilitating the relative pivoting movement between the connecting portion and the cup-shaped sleeve on movement of the first element relative to the second element.

In the accompanying drawings, there is shown an illustrative embodiment of the invention from which these and other of its objectives, novel features, and advantages will be apparent.

In the drawings:

FIGURE 1 is a view of a door as seen from the bolt-carrying side thereof,

FIGURE 2 is a fragmentary, sectional view of the bolt on an increased scale, the section being taken lengthwise and vertically of the bolt,

FIGURE 3 is a fragmentary, sectional view of the door and the bolt on the scale of FIGURE 2, the section being transverse and lengthwise of the bolt and door, the door being closed and the bolt being within its keeper.

FIGURE 4 is a view similar to FIGURE 3 but with pressure so applied against the door as to move the bolt relative to its keeper, and

FIGURE 5 is a section taken approximately along the indicated lines 5—5 of FIGURE 2.

In the drawings, a door 10 is connected by hinges 11

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to one side of a casing 12 whose other side is provided with keeper 13 having a socket 14.

A receiver 15, attached to one side of the door 10, slidably contains a bolt 16 having a connecting portion 17 of reduced diameter. The receiver 15 has a lengthwise slot 18 accommodating the neck 19 of a bolt handle 20 by which the bolt 16 may be withdrawn into a retracted position and its neck 19 seated in a holding pocket 18A or advanced into its holding position in which its neck may be seated in a holding pocket 18B with the connecting portion 17 entrant of the socket 14, if the door 10 is closed.

The bolt 16 has an axial passage 21 extending from end-to-end thereof. A lead 22 extends through the bolt from a battery 23 and a buzzer 24, both within a housing 25 secured to the door 10. In the connecting portion 17, the lead 22 extends through a yieldable sleeve 26 of non-conductive stock with a bare end 22A in electrical contact with a metal cup 27, dimensioned to fit freely within the socket 14. The open end of the cup 27 has a series of inwardly disposed projections 27A held from contact with the connecting portion 17 by the sleeve 26. At the extremity of the bolt portion 16A, there is a tip 28 seated against the closed end of the cup 27, the tip 28 being of material that is a non-conductor of electricity.

With a device such as described, the door 10 is securely but releasably locked and small movements between the door 10 and its casing 11 are possible, even when thus locked, because the sleeve 26 is yieldable. When it yields to a predetermined extent, some of the projections 27A engage the bolt closing the circuit so that the buzzer 24, or other alarm, is energized. The sleeve 26 as shown is of a resiliently yieldable material but it may be frangible thus affording physical evidence of the application of a pressure of a predetermined value against the door. In either event, the sleeve is responsive to force of a predetermined magnitude which may be slight or substantial, as required to meet the needs of any particular installation. While the bolt and its receiver are shown as carried by the door and the keeper secured to the casing, this arrangement may be reversed. The battery powered buzzer 24 is, of course, but one of many alarm systems that may be employed.

I claim:

1. A pressure operated, circuit controlling device to respond to movement between two elements, said device including a first member in the form of a bolt attachable to one element for sliding movement relative thereto into and out of an operative position relative to the other element and a second member attachable to said other element and including a keeper portion, one portion being entered within the other portion in said operative position, a yieldable sleeve carried by one member portion and yieldably opposing movement between said elements in said operative position, and a switch having open and closed positions, one contact of said switch being a part of the sleeve carrying portion and the other contact being held to establish one switch position by said sleeve until pressure on one of said elements results in the yielding of said sleeve, the other switch position then resulting.

2. The device of claim 1 in which the sleeve carrying portion is part of the bolt portion.

3. The device of claim 1 in which the sleeve carrying portion is part of the keeper portion.

4. The device of claim 1 in which one switch contact surrounds the other.

5. A pressure operated, circuit controlling device to respond to movement between two elements, said device including a first member in the form of a bolt attachable to one element for sliding movement relative thereto into and out of an operative position relative to the other element and a second member attachable to said other

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element and including a keeper portion, a portion of said bolt being entered within said keeper portion in said operative position, a yieldable sleeve carried by one member portion and yieldably opposing movement between said elements in said operative position, and a switch having open and closed positions, one contact of said switch being a part of the sleeve carrying portion and the other contact being in the form of a sleeve including a flange at the end of said yieldable sleeve proximate to the first member disposed towards the first named contact in the direction of movement between the elements and held to establish one switch position by said sleeve until pressure on one of said elements results in the yielding of said sleeve, the other switch position then resulting.

6. A pressure operated, circuit controlling device to respond to movement between two elements, said device including a first member in the form of a bolt attachable to one element for sliding movement relative thereto into and out of an operative position relative to the other element, said bolt being a conductor of electricity and a second member attachable to said other element and including a keeper, a portion of said bolt being entered within said keeper portion in said operative position, a sleeve carried by said bolt portion, said sleeve including a yieldable inner part yieldably opposing movement between said elements in said operative position, said inner part being of stock that is a non-conductor of electricity,

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said sleeve also including an outer part that is a conductor of electricity and that is held from contact with said bolt by said inner part, and a switch having open and closed positions, one contact of said switch being the bolt and the other contact being the outer part of said sleeve, said contacts being held apart by said inner sleeve portion until pressure on one of said elements results in the yielding of said sleeve.

7. The device of claim 6 in which the bolt has a passage extending from end-to-end thereof and an insulated conductor extends therefrom and is connected to the outer part of the sleeve.

8. The device of claim 6 in which the keeper portion is a socket and the bolt has a rounded end cap engaging the bottom of the socket in the operative bolt position.

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