United States Patent [19]

Peterson

[11] **3,715,537**

[45] **Feb. 6, 1973**

[54] **HINGE MOUNTED MICROSWITCH WITH ADJUSTABLE ACTUATOR PIN MOUNTED ON ADJACENT LEAF**

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[22] Filed: **Aug. 27, 1971**

[21] Appl. No.: **175,594**

[52] **U.S. Cl.**.....**200/61.7,** 200/61.81

[51] **Int. Cl.**.....**H01h 3/16**

[58] **Field of Search**...200/16 A, 61.2, 61.21, 61.62–61.88, 61.7, 61.81

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Primary Examiner—J.R. Scott

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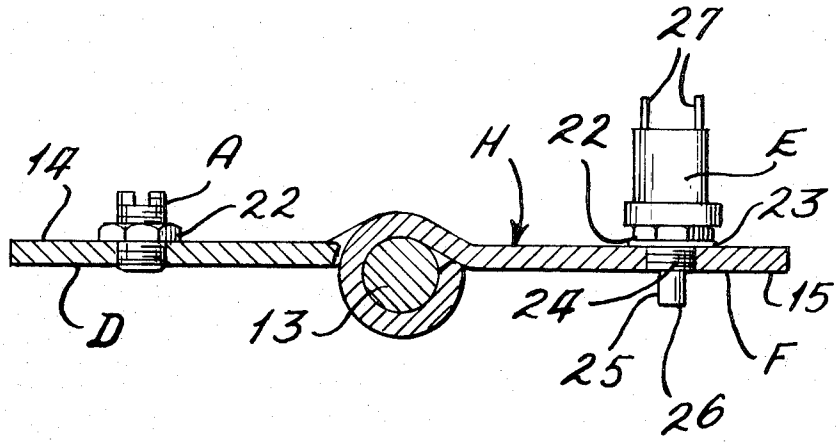
[57] **ABSTRACT**

A hinge wherein the leaves are pivotally secured together on a pin, one of said leaves having an electric switch connected thereto which contacts cooperating means connected to the other leaf for sounding an alarm or activating a signal when the door is not in its closed position or to activate some means when the door is in its closed position.

4 Claims, 4 Drawing Figures



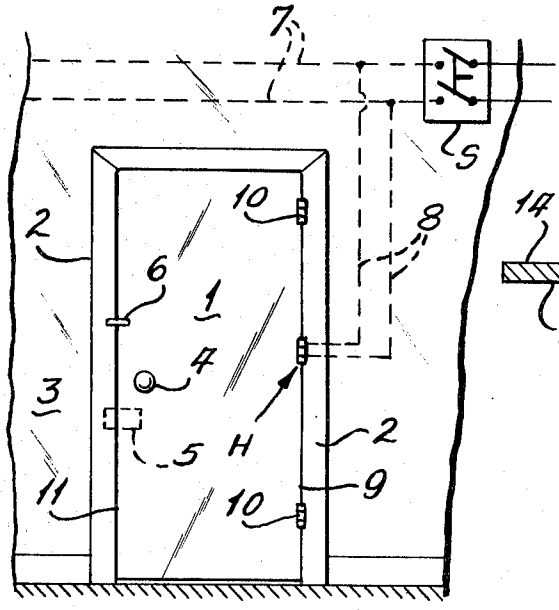


FIG. 1

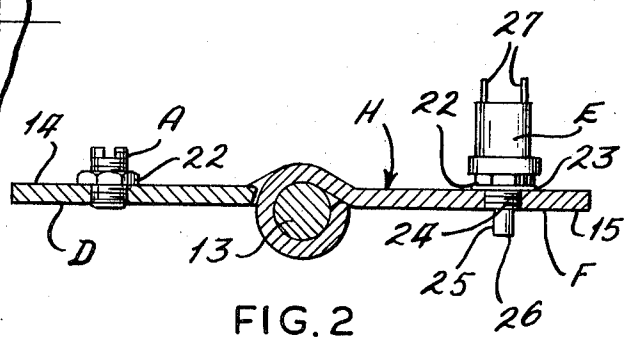


FIG. 2

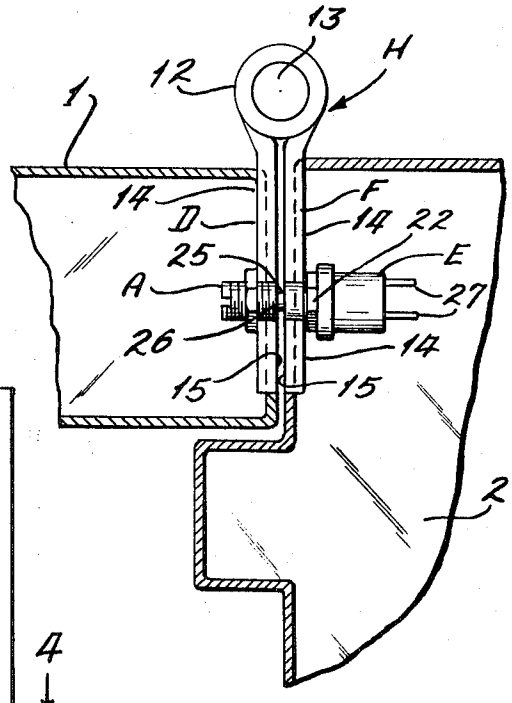


FIG. 4

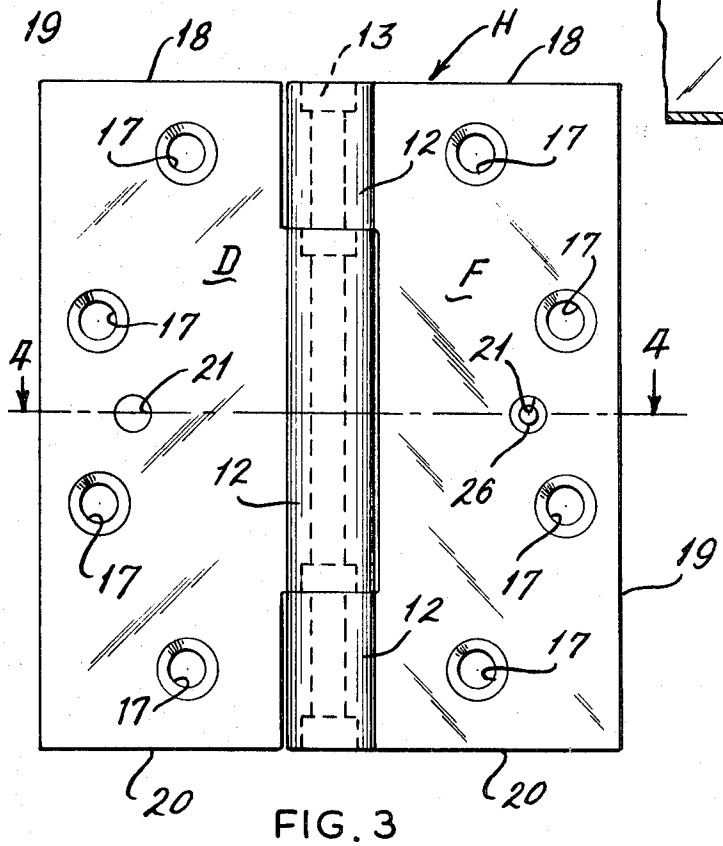


FIG. 3

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HINGE MOUNTED MICROSWITCH WITH ADJUSTABLE ACTUATOR PIN MOUNTED ON ADJACENT LEAF

This invention relates to an improved hinge, and in particular, to a hinge having electrical means on one leaf which cooperates with means on the other leaf thereof when the door is closed. Such a hinge may receive an electrical conduit attached to the wall and/or door frame, either on the outside or inside thereof, and conducts electricity from the door hinge to a switch on one of the two hinge leaves. The other leaf of the hinge contains means which cooperate with the switch. Such a hinge may also be used in burglar alarm systems, or may be used to close (or open) a circuit when the door is closed, or may be wired to a control panel to signal whether a door in the building is opened or closed.

One of the principal objects of the present invention is to provide a hinge having electric switch means thereon connected to electrical conduits thereby permitting an alarm or signal to be activated when the hinge is opened a predetermined amount. Another object is to provide a hinge having two leaves, one of which has electric switch means connected thereto and the other of which has adjustable means for contacting said electric switch means when the door is closed. Another object is to provide an electric switch and cooperating adjustment means, each of which can be applied to either of the two leaves of the hinge. Another object is to provide switch means on a hinge so that the switch may be connected to activate items when the other door is in its open position or in its closed position.

These and other objects and advantages will become apparent hereinafter.

The present invention is embodied in a hinge having leaves pivotally secured together on a pin wherein one leaf has an electric switch connected thereto, said electrical switch being connected to electrical conduits for sounding and alarm or activating a signal when the hinge is opened beyond a predetermined amount. The word door as used herein includes doors of all sorts, panels, cabinet doors, windows and the like, wherein one edge is equipped with hinges.

The invention also consists in the parts and in the arrangements and combinations of parts hereinafter described and claimed. In the accompanying drawings which form part of this specification and wherein like numerals and symbols refer to like parts wherever they occur:

FIG. 1 is a diagrammatic side elevation view of a door provided with a hinge embodying the present invention and showing the environment of the hinge,

FIG. 2 is a top plan view of a hinge embodying the present invention provided with an electric switch, with the leaves in fully open position,

FIG. 3 is a front elevational view of a hinge embodying the present invention with the leaves in open position as shown in FIG. 3, and

FIG. 4 is a horizontal cross-sectional view of the hinge shown in FIG. 3 taken along the line 4—4 thereof, but with the leaves in door-closed position and mounted on a door and on a jamb frame.

Referring now to the drawings in detail, it will be seen that the embodiment of the invention which has been illustrated comprises a hinge H having a leaf D and a leaf F which are adapted to be secured to a door 1 and a frame 2, respectively.

A typical environment for the hinge H is shown in FIG. 1 wherein a door 1 is mounted within a frame 2 with a wall portion 3 therearound. The door 1 has upper, middle, and lower hinges, a door knob 4, and may have electrically operated locking means 5. The door may also be provided with mechanical locking means, such as a bolt or latch 6, in addition to the usually retractable means actuated by rotating the door knob 4. The wall 3 may contain electrical conduits 7 with a switch S therein. The axis of the switch E is perpendicular to the leaf to which it is connected. Electrical conduits 8 extend from the conduits 7 to the hinge side 9 of the door 1. In addition to the hinge H, which contains the present invention, the door 1 may be provided with other conventional hinges 10. The door 1 has an edge 11 opposite to the hinge side 9 of the door 1. If desired, one or more of the doors of a building may be so connected so that the activation of switch S permits the alarm to be sounded or a signal activated when a door 1 with the hinge H thereon is opened more that a predetermined amount. The hinge H and switch S may also be arranged so that it activates a device such as light, when the door 1 is closed, if such is desired.

The hinge H has two leaves D and F, which are provided with cooperating knuckles 12 through which a hinge pin 13 extends. The hinge H may be of any suitable type, may have any number of knuckles 12 as desired, and may be provided with additional features, such as bearings, if so desired. The present invention may be used on any of the hinges wherein two leaves D and F are pivotally mounted on a hinge pin 13 and which leaves are in relatively close substantially parallel position when the door is closed. The leaf F is adapted to be connected to the frame 2 and the leaf D to the door 1, but if desired, the leaf F can be connected to the door 1 and the leaf D to the frame 2.

The leaf F has an outer surface 14 adjacent to the frame 2 and an inner surface 15 which is visible to a viewer when the leaf F is mounted to the frame 2, such as by screws (not shown) which fit through the holes 17. The leaf F has a top edge 18, an outer edge 19 which is usually parallel to the hinged edge and the hinge pin 13, and a lower edge 20. The leaf F is provided with an opening 21 for receiving a switch E. The switch E has a threaded end which threads into the opening 21 and is held in position by a locknut 22 with a washer 23 therebetween. The switch E has a plunger assembly 24 suitable mounted therein and contains a plunger 25 having an end 26. A spring (not shown) is mounted within the switch E so as to bias the plunger 25 forwardly of the inner surface 15 at all times. The locknut 22 is provided on the switch E for adjusting the position of the switch E in the leaf F. The electrical conduit 8 extends from the switch E to the conduits 7. The plunger 25 is mounted on the leaf F in a position so that the plunger end 26 contacts an adjustment screw A on the leaf D when the hinge is in its door-closed position.

The leaf D has an outer surface 14 adjacent to the door 1 and an inner surface 15 which is visible to a viewer when the leaf F is mounted to the door 1, such as by screws (not shown) which fit through the holes 17. The leaf D has a top edge 18, an outer edge 19

which is usually parallel to the hinged edge and the hinge pin **13**, and a lower edge **20**. The leaf D is provided with an opening **21** which has threads for receiving the threaded adjustment screw A, which is held in position by a locknut **22**. The openings **21** in the leaves D and F are of the same size so that the electric switch E or the adjustment screw A may be placed or screwed in either one of the two leaves D and F, as desired. In this way, either the door leaf or the frame leaf may contain the electric switch E or the adjustment screw A. With hollow metal doors, it may be desirable to have the adjustment screw A mounted on the door rather than to the leaf mounted on the frame.

The electric switch E may be any one of several brands presently available, such as one made by the Switchcraft Company. The switch E itself has a plunger **25** which is biased outwardly from one end thereof by a suitable spring and has several terminals **27** at the other end thereof to which the conduits **8** are connected. Usually three or two terminals **27** are provided on the switch E. The switch E may be used to sound a burglar alarm when the door is opened when it should not be, or it may be used to turn on a light either when the door is opened or when the door is closed, or it may be used to activate a camera or a television camera when the door is opened, or it may be connected for other purposes.

This invention is intended to cover all changes and modifications of the example of the invention herein chosen for purposes of the disclosure, which do not constitute departures from the spirit and scope of the invention.

What is claimed is:

1. In a hinge having two leaves pivotally secured together on a pin, each of said leaves having holes therein for receiving means for attaching said leaves to a door and to a frame, the improvement wherein each of said leaves has a separate opening therein of the same size, said openings being in registering relation to each other when said leaves are in their closed position, one of said leaves having electric switch means connected thereto in said opening adapted to cooperate with adjustable switch receiving means connected in said opening on said other leaf, one of said means having a movable portion therein normally biased toward said other means, said electric switch means being capable of being activated depending upon whether said electric switch means is in retracted contacting position with said switch receiving means on said other leaf.

2. The improvement set forth in claim **1**, wherein said electric switch means biased toward said other leaf comprises a plunger mounted in said switch, said plunger normally extending inwardly of the surface adjacent to said plunger in a direction toward said other hinge leaf.

3. The improvement set forth in claim **2** wherein said plunger in said electric switch means contacts said adjustable means on said other leaf when said hinge is closed, but does not contact said means on said adjustable other leaf when said hinge is partially open, thereby establishing contact to activate a device when the hinge is partially open.

4. The improvement set forth in claim **2** wherein said plunger is biased toward said means on said adjustable other hinge leaf by a spring mounted within said electric switch means and wherein said plunger is partially retracted against the compressive force of said spring by said means on said other hinge leaf when said door is in its door-closed position.

* * * * *

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,715,537 Dated February 6, 1973

Inventor(s) Francis C. Peterson

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 4, line 4, "to" should be "with";

Column 4, line 25, after "said" first occurrence, insert "adjustable"; same line, after "said" second occurrence, cancel "adjusta-"; line 26, before "other", cancel "ble";

Column 4, line 30, after "said" first occurrence, insert "adjustable"; same line, after "said" second occurrence, cancel "adjustable".

Signed and sealed this 3rd day of July 1973.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

Rene Tegtmeyer
Acting Commissioner of Patents

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