

[54] SELF-CONTAINED DOOR SAFETY SWITCH  
WITH MANUALLY DISABLED LATCH

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[58] Field of Search ..... 200/5 R, 39 R, 39 A,  
200/61.62, 61.79, 61.85, 40, 41, 72, 78, 153  
T, 157, 169 PB

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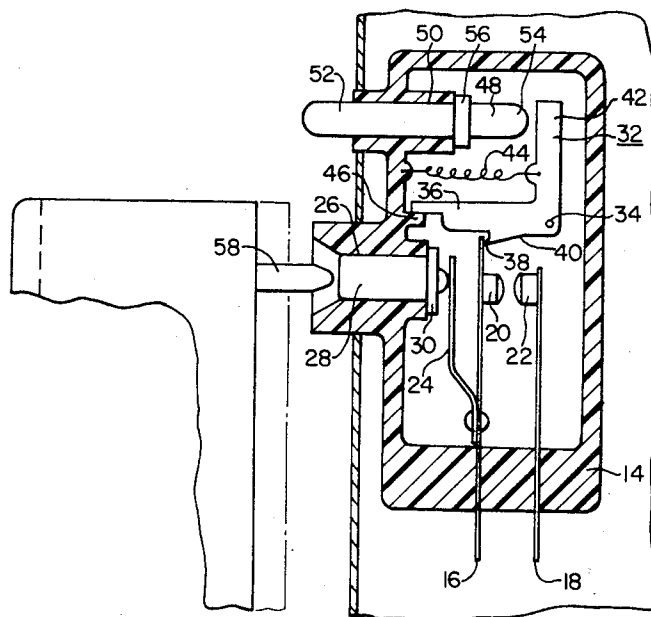
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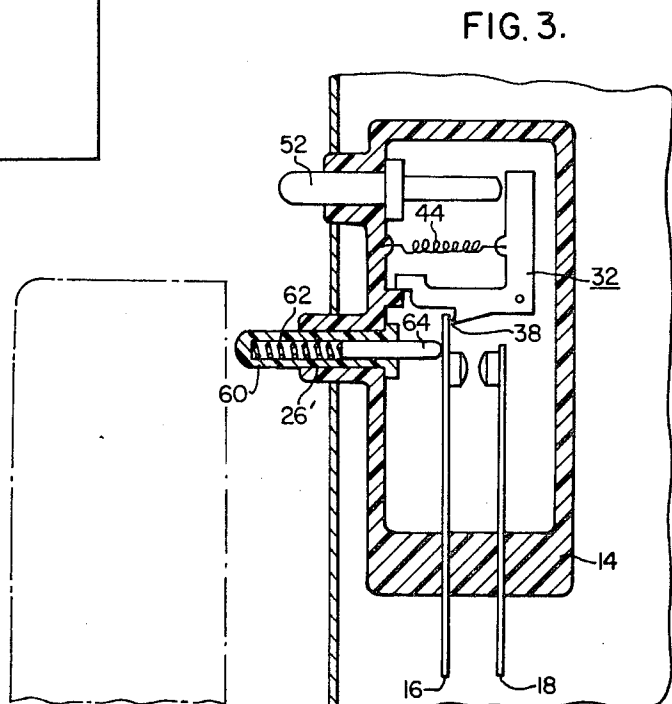
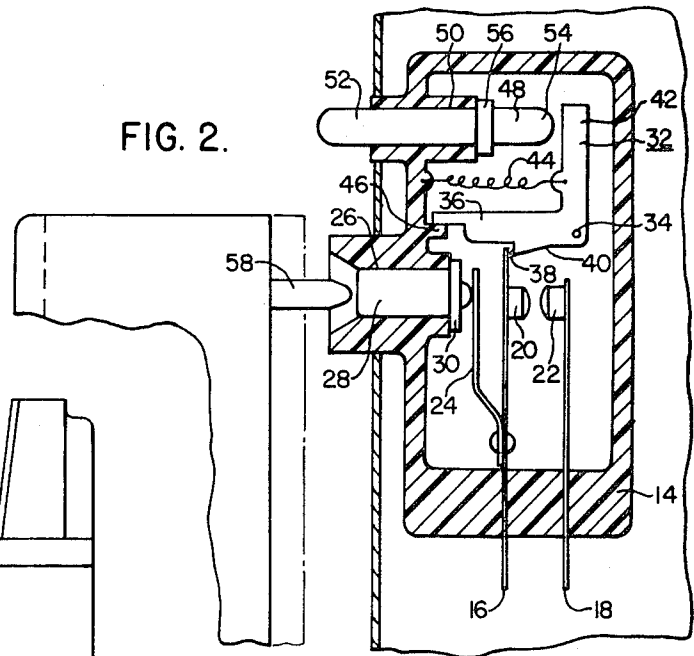
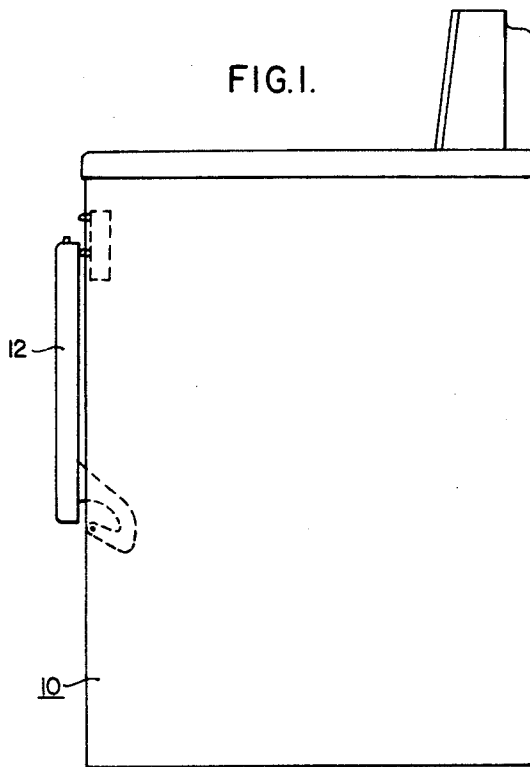
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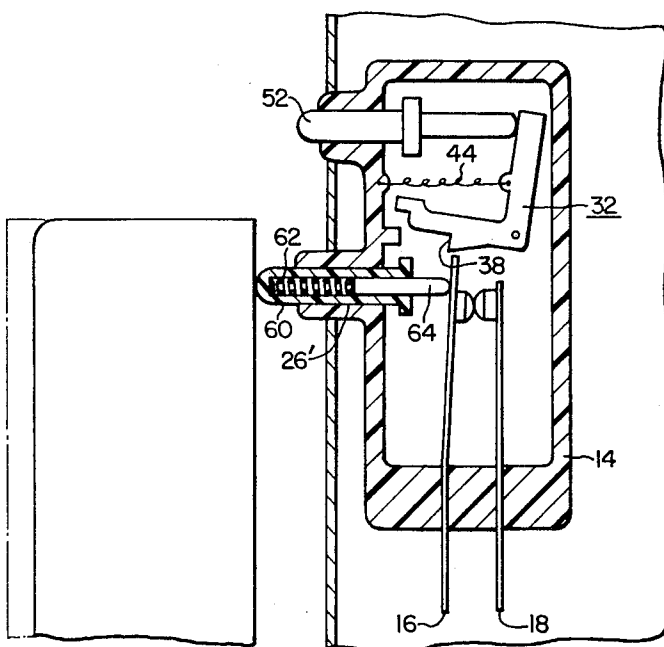
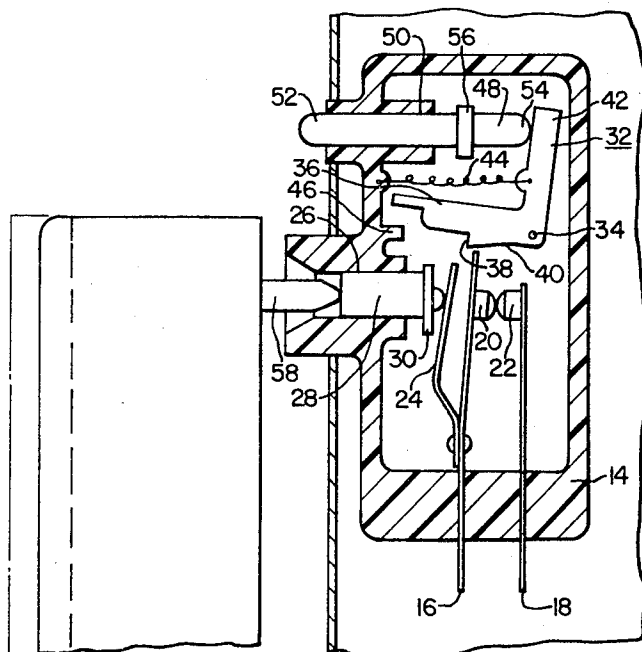
[57] ABSTRACT

The invention discloses a self-contained safety switch for use in conjunction with an electric motor driven appliance, such as laundry apparatus, enclosed by a cabinet having an access door in which proper use of the switch first requires that the door is closed to bias the contacts of the switch in a direction to close them while a blocking member, internal to the switch housing, prevents the contacts from closing until removed through manually pressing a pin extending through the housing. The door, while in a closed position, thereafter maintains the contacts closed; however, whenever the door is open, the contacts return to their initial position requiring a repeat process of closing the door and subsequently depressing the extending pin to again actuate the appliance.

4 Claims, 5 Drawing Figures







# SELF-CONTAINED DOOR SAFETY SWITCH WITH MANUALLY DISABLED LATCH

## BACKGROUND OF THE INVENTION

### 1. Field of The Invention

The present invention relates to a safety switch for an electric motor driven appliance and more specifically to a switch that requires a manual operation subsequent to closing the appliance door to actuate the appliance.

### 2. Description of The Prior Art

Circuits for laundry apparatus such as washers have previously included door operated switches in the circuitry so that the machine would not operate when the door is open; however, upon closing the door the machine would immediately start. A new Underwriters' Laboratory safety requirements specifies that upon closing the door, the appliance must remain inoperative until a second manual operation is performed by the operator. U.S. Pat. No. 3,602,662, having a common assignee as the present application, discloses an appliance door switch mounting arrangement also directed to satisfying the above requirement, and, to the extent that it discloses the schematic diagram of the electrical circuit and the connection of the safety switch within that circuit, is herein incorporated by reference. However, as opposed to the structure shown in the above-identified patent, the switch of the present invention is self-contained and easily adapted to any appliance cabinet having a door hinged thereto.

## SUMMARY OF THE INVENTION

The self-contained safety switch of the present invention is enclosed in a housing adapted to be mounted on the cabinet of the appliance so as to be in the path of the door as the door is closed. The switch includes two plunger pins, one of which is accessible to the door when in a closed position and, in effect, when depressed by the door cocks one of the contact carrying arms to a biased position against a blocking element. Subsequent depression of the second plunger, which is accessible for manual operation, removes the blocking element and allows the contacts to close, completing the electrical circuit to the appliance controls. The inherent resiliency of the biased contact-carrying arm returns the contact to the start position whenever the door is opened, requiring the operation to be repeated each time the door is closed.

## DESCRIPTION OF THE DRAWINGS

FIG. 1 is an elevational schematic view of a laundry appliance showing the relative mounting position of the switch of the present invention;

FIG. 2 is an enlarged elevational cross-sectional view of the switch; FIG. 2A is a view similar to FIG. 2 showing the switch in operative position;

FIG. 3 is a view similar to FIG. 2 of a second embodiment of the switch of the present invention; and FIG. 3A is a view similar to FIG. 3 showing the switch of that embodiment in the operative position.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

The present invention is shown mounted on the housing of an appliance 10 such as a laundry washer or dryer, generally adjacent the access opening to the in-

terior of the appliance so as to be contacted by the door 12 when in the closed position as shown in FIG. 1.

The invention itself is shown in two embodiments (FIG. 2 and FIG. 3) with those structural elements common to both embodiments identified by common reference numerals.

Referring initially to FIG. 2, the invention is seen to comprise a housing 14 enclosing a pair of electrically conducting contact carrying arms 16 and 18 projecting through the housing providing attaching leads for connection into the electrical circuit of the appliance. Each arm carries an electrical contact 20 and 22 in spaced, facing relationship so that any circuit established through the contacts is normally "off". At least arm 16 has an inherent resiliency such that it can be moved sufficiently to place its attached contact 20 against contact 22 in electrically conductive relationship as shown in FIG. 2A.

A leaf spring 24 is mounted in cantilever fashion on the movable arm 16, such as by riveting them together, and extends to a position generally adjacent an aperture 26 defined in the housing 14.

A movable plunger 28 is received in a recessed position within aperture 26 and extends into the interior of the housing 14 so as to abut against the leaf spring 24. The plunger has an annular collar portion 30 interiorly of the housing to prevent the spring 24 from pushing the plunger out.

An "L"-shaped lever 32 is supported for pivotal movement within the housing, as on a pin 34, substantially at the juncture of its two legs 36 and 42. The horizontal leg 36 of the lever 32 defines an abrupt shoulder 38 which extends downwardly to normally rest adjacent an upper extension of movable arm 16. The leg 36 further defines a gradual incline from the tip of the shoulder 38 to the main body of the leg to provide a cam surface 40.

The vertical leg 42 of the lever 32 has a coil spring 44 attached intermediate the pivot pin and the end of the leg with the other end of spring 44 connected to the housing, such that spring 44 is biased to rotate lever 32 in a counterclockwise direction as viewed in FIG. 2. A ledge 46 projects from the housing to adjacent the free end of leg 36 to maintain the lever in proper at rest attitude.

A second plunger pin 48 is slidably disposed within another aperture 50 defined by the housing 14, with one end 62 projecting forwardly of the housing and the opposite end 54 abutting the vertical leg 42 of lever 32. Pin 48 also has an annular collar 56 to prevent it from being forwardly expelled from the aperture 50.

The door 12 of the appliance carries a pin 58 on its inner face which, as the door approaches the closed position, projects into aperture 26 and abuts plunger 28. Thus, moving door 12 to a closed position, where it is maintained by a latch (not shown), causes pin 58 to move the plunger 28 inwardly against the leaf spring 24. This biases the leaf spring to apply a clockwise force against contact carrying arm 16 which in turn is prevented from moving by shoulder 38 abutting the upper end thereof. Therefore, with the door closed, a still further operation is required before the appliance is actuated through contacts 20 and 22.

To start the appliance by completing the electrical circuit once the door is closed, plunger 52 is manually depressed by the operator. This rocks lever 32 about pin 34 releasing arm 16 from shoulder 38 and allowing

contact 20 to close on contact 22 and assume the position shown in FIG. 2A. As long as the door 12 remains closed, contacts 20 and 22 also remain closed. However, should door 12 be opened for any reason, the pressure against the plunger 28 from pin 58 is removed and arm 16, because of its natural resiliency, returns to its at rest position by camming lever 32 out of its way along cam face 40. This permits the arm 16 to again abut shoulder 38 upon reclosing the door 12 which, in turn, again requires manual depression of plunger 52 to actuate the appliance.

The embodiment shown in FIG. 3 operates on the same principle as that just described with the only change being that the door pin 58, plunger 28, and leaf spring 24 of the previously described embodiment are replaced by a forwardly extending pin 60 slidably received in aperture 26' defined in the housing 14. Pin 60 is generally hollow and supports in its interior a coil spring 62 and a telescoping inner pin 64 abutting the spring 62 and extending interiorly to the contact carrying arm 16.

Thus, moving door 12 to its closed position causes pin 16 to slide inwardly and compress spring 62 between the telescoping pins 60 and 64 as pin 64 is prevented from moving by abutting arm 16 which in turn is held against movement by shoulder 38 on lever 32.

Subsequent to the door being closed, pin 52 must be manually depressed to remove the shoulder 38 from a blocking position and allow pin 64 as forced by spring 62 to force the contacts 20 and 22 closed as shown in FIG. 3A.

Again as before, opening the door permits the contact arm 16 to return to its at rest position whereupon pin 52 must be manually depressed, after each instance that a door is open, to actuate the machine.

It is obvious that the requirement to close the door prior to closing contacts 20 and 22 can be circumvented by, in the second embodiment, merely manually depressing pin 60 inwardly prior to pressing pin 52 and then continuing to hold pin 60 in that position, and, in the first embodiment, inserting a proper size article into the aperture 26 to depress plunger 28 prior to pressing pin 52 and also continuing to hold plunger 28 in such position. However, both switches, in their proper use, provide a safety feature in that they require a conscious deliberate act, apart from, and subsequent to, closing the appliance door before the appliance is actuated.

I claim as my invention:

1. A safety switch for an appliance having a cabinet including an access door supported thereon, said safety switch comprising:

a switch housing for mounting on said appliance generally adjacent said door;

first and second contacts mounted in spaced opposing relationship on arms enclosed in said housing and having leads extending exteriorly of the housing, at least one of said arms being movable to a position closing said contacts;

plunger means mounted in said housing and movable from a first position to a second position in response to closure of said door for resiliently urging said movable arm toward the other arm, said plunger means including a pin movably mounted in said housing and a spring member interposed between said pin and said movable arm;

blocking means preventing movement of said movable arm and including a portion extending into the path of said movable arm;

manual means for moving said blocking means to a non-blocking position, said means including a second pin received within said housing and having one end extending therefrom for manual access; and,

spring means for restoring said blocking means to said blocking position.

2. Structure according to claim 1 wherein said portion of said blocking means extending into the path of said movable arm defines an abrupt shoulder adjacent said movable arm when said arms are in opposed spaced relationship and a camming surface adjacent said movable arm when said arms are in a position when said contacts are closed; and,

said movable arm is resilient and assumes said position spaced from said opposing arm when in an unbiased condition;

whereby movement of said plunger means from said second to said first position in response to opening said door restores said arms to said spaced position with said blocking projection cammed from an interfering position by said movable arm contacting said camming surface.

3. Structure according to claim 2 wherein said pin of said plunger means is recessed within said housing and said door includes a projection in alignment with said recessed pin when said door is in a closed position to move said pin to said second position.

4. Structure according to claim 2 wherein said plunger means comprises a generally hollow first pin extending from said housing into the path of said door and said spring member includes an internally extending second pin telescopically received within said first pin and having an end abutting said movable arm and a spring received within said hollow end and abutting said second pin.

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