

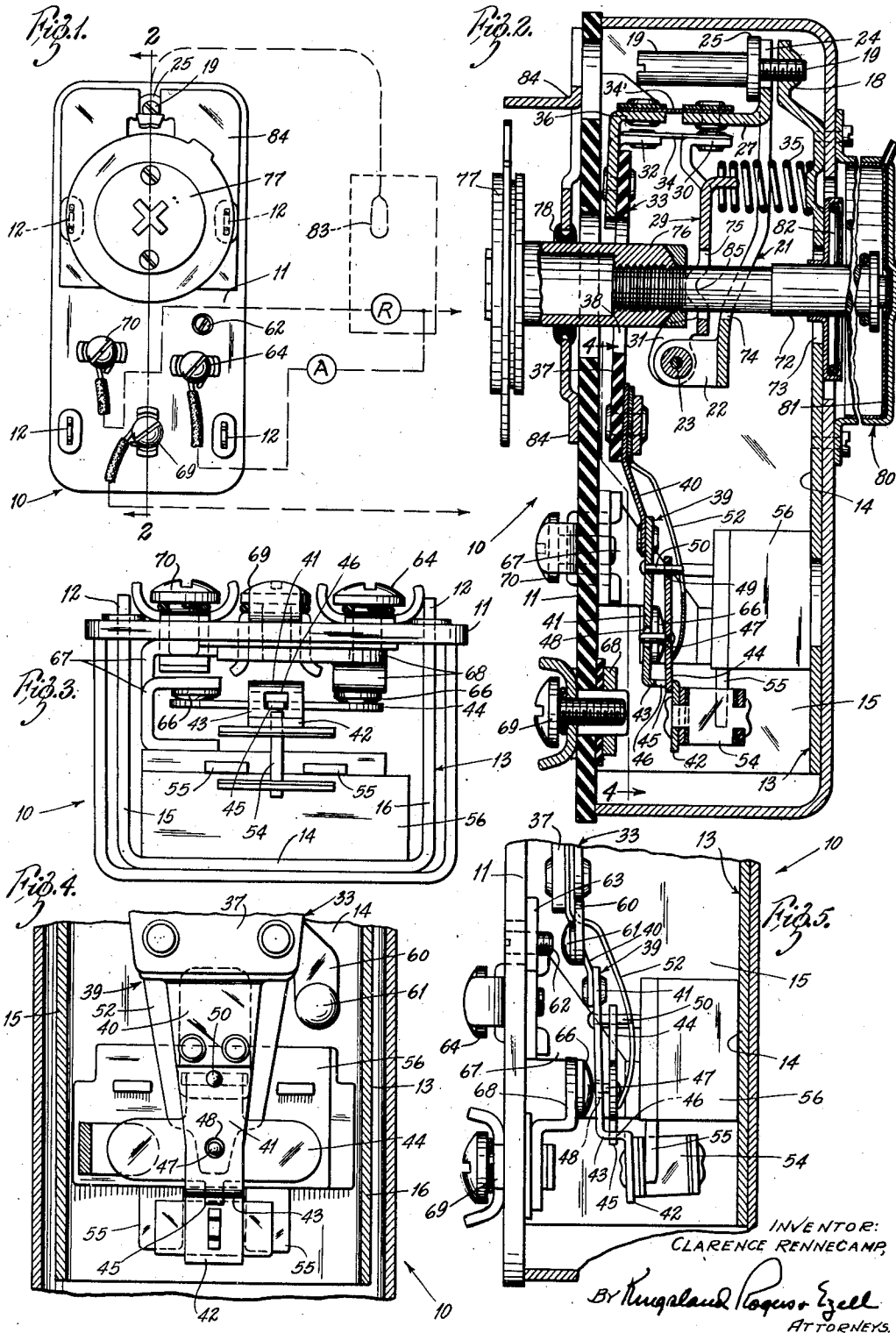
July 4, 1944.

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2,353,075

ACCESSORY CIRCUIT SWITCH

Filed Jan. 1, 1942



UNITED STATES PATENT OFFICE

2,353,075

ACCESSORY CIRCUIT SWITCH

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Application January 1, 1942, Serial No. 425,287

2 Claims. (Cl. 200—83)

The present invention relates generally to switches and more particularly to switches incorporating a novel construction for closing a secondary switch or the like upon overrunning of the switch.

An object of the present invention is to provide a novel switch construction incorporating a construction for closing such secondary switch upon overrunning in the main switch.

Another object is to provide a novel switch construction of the pivoting lever type incorporating means for warning that the lever is unduly flexed.

Another object is to provide a novel safety switch construction.

Other objects are to provide a novel switch construction which is simple in its elements, inexpensive of manufacture, but positive in fulfilling the functions sought therefor.

Other objects and advantages will be apparent from the following description taken in conjunction with the accompanying drawing in which:

Fig. 1 is a plan view of a switch construction incorporating the present invention;

Fig. 2 is a section on the line 2—2 of Fig. 1;

Fig. 3 is an end view of the switch construction shown in Fig. 1;

Fig. 4 is a section on the line 4—4 of Fig. 2; and

Fig. 5 is a side view of a portion of the switch construction shown in Fig. 1, part being in section and parts being broken away for clarity.

Referring to the drawing more particularly by reference numerals, 10 indicates generally a switch construction incorporating the present invention. The switch construction 10 includes a panel 11 of insulating material to which is fixed, by four peened projections 12, a channel-shaped frame 13. The frame 13 includes a bight 14 and legs 15 and 16.

At one end of the bight 14 is an inward projection 18 formed integral therewith, to which a screw 19 is threadedly secured for adjustment. A lever member 21 including opposed ears 22 at one end is pivoted by the ears 22 on a pin 23 supported by the legs 15 and 16 of the frame 13. The other end of the lever member 21 includes a slot 24 disposed about the threaded portion of the screw 19 and between the projection 18 and a shoulder 25 of the screw 19. A right angularly extending portion 27 is struck out of the lever member 21.

A primary lever generally indicated 29 has one section pivoted on the pin 23 through suit-

able ears 31. The opposite end of the lever 29 has spaced ears 30 turned parallel to the upstanding portion 27 on the lever 21, and also aligned with ears 32 on a secondary lever 33. The portions 30 and 32 are connected by a flexible spring hinge member 34 which is of thin spring bronze, or the like, and which in effect provides a pivotal connection between the lever member 29 and the secondary lever 33. A helical spring 35 biases the lever 29 counterclockwise, as shown in Fig. 2.

The secondary lever 33 includes additional overturned ears 36 parallel to the ears 32 spaced upwardly a short distance therefrom, and connected to the portion 27 of the differential lever 21 by spring hinge 34', that may be formed as part of the hinge 34. It also has an intermediate insulative segment 37 having an opening 38 therethrough, and a contact supporting segment 39. The segment 39 includes a yieldable spring bronze element 40 connected directly to the segment 37, an element 41 having a portion 42 stepped off by the portion 43, and a contact bridging element 44 of T configuration having a projection 45 resting in a slot 46 in the portion 43, having a pin 47 extending through an opening 48 in the element 41, and having an aperture 49 surrounding a T-shaped pin 50 fixed to the element 41. A leaf spring 52 secured to the insulative segment 37 has a free end in engagement with the side of the element 44 remote from the element 41 in biasing relation. Portion 42 has secured thereto a magnetic I-member 54 which is in operative association with legs 55 of a magnet mounted in the insulative member 56. The I-member gives magnetic armatures on opposite sides of the magnet, to provide a snap-action in both directions of the switch.

An arm 60 (Figs. 4 and 5) is secured to the insulative segment 37 and carries at its free end a contact 61. The arm 60 is in electrical connection with the switch closing plate 44.

Mounted on the panel 11 in opposed relation to the contact 61 is a conductive member 62 (Fig. 5) which threadedly engages for adjustment a supporting member 63 secured to the panel 11. The member 62 is connected with a terminal 64 that may be connected in circuit with a bell, or the like. The main contacts 66 are secured to supporting members 67 and 68 mounted on the panel 11 and forming parts of the terminals 69 and 70 respectively.

A stud 72 extends through an opening 73 in the bight 14, an opening 74 in the lever member 21, and an opening 75 in the lever member 29

and threadedly engages an adjusting nut 76 attached to an adjustment plate 77, the nut 76 being guided in a suitable washer 78 mounted on an indicating plate 84 for free rotary and axial movement. The end of the nut 76 remote from the adjusting plate 77, through a self-centering washer, engages projections 85 on the primary lever 29. The end of the stud 72 remote from the plate 77 is adapted to be contacted and longitudinally displaced by a suitable solid charge thermal element 80, or other actuator. Details of this switch mechanism are set forth in the application of L. M. Persons, Serial Number 203,020, filed April 20, 1938. For present purposes, it is sufficient to state that the thermal element 80 has a diaphragm 81 moved to the left in Fig. 2 upon rise in temperature, against the pressure of a spring 82. The spring 82 returns the stud to the right upon reflexing of the diaphragm. The thermal bulb 83 is located in the refrigerated area.

Operation

Considering Fig. 2, it is evident that longitudinal movement of the stud 72 and the nut 76 to the right, occasioned by the thermal element 80, will result in a clockwise pivotal movement of the primary lever 29 against the biasing force of the helical spring 35. This pivotal movement of the lever 29 acts through the spring hinge 34 to displace the upper end of the secondary lever 33, which in turn, and through the hinge 34', pivots the differential lever 21 clockwise until the end 24 thereof abuts the portion 18. During this movement the lower end of the secondary lever has not been displaced to shift the switch, as it is held by the snap-action magnet. Additional movement of the stud 72 and the primary lever causes the secondary lever to pivot on the hinge 34'. At first, such additional movement deforms the resilient secondary lever until the force of the magnet is overcome, and then the switch shifts with a snap-action.

Upon reverse movement of the stud 72, a similar action takes place, under influence of the spring 35. The free movement of the upper end of the secondary lever and differential lever until the latter abuts the screw shoulder 25, determines the differential of the switch, which is adjustable.

The switch is shown in connection with a refrigerating unit R (Fig. 1), which is energized when the main switch is closed. It is obvious that the contacts could be put on the opposite side of the secondary lever, this requiring merely a reversal of parts.

Should the movement of the stud 72 and the nut 76 to the left continue beyond a predetermined point, where the switch is shifted to the closed position as shown, the yieldable member 40 will be deformed. This deforming of the section 40 may become of sufficient extent to cause the contact 61, to engage the conductive member

62, which will close a supplemental circuit, such as one through an alarm bell A, or the like, thereby indicating and continuing to indicate to an attendant or other person that there is an excessive heat in the refrigerator, or the like. The point at which the supplemental circuit closes may be selected by adjusting the screw 62.

It is manifest that the present novel switch construction incorporating the described and shown alarm fulfills all the objects and advantages sought therefor. Changes in configuration and materials may be made within the scope of the present invention.

It is to be understood that the foregoing description and the accompanying drawing are given by way of illustration and example and not for purposes of limitation, the invention being defined by the claims which follow.

What is claimed is:

1. In a mechanism of the kind described, a lever, a pivot for the lever, a stop for the end of the lever spaced from the pivot, said stop comprising first switch contact means, the lever having an original shape between the stop and the pivot, but being resilient between said points to be bowed from said shape, power means to displace the lever about the pivot until the other end thereof strikes the stop, and further movement of the power means being adapted to bow the lever against its inherent resiliency between the stop and the pivot, and second switch contact means disposed at the bowed portion of the lever and adapted to be engaged when the power means bows the lever a predetermined amount, said lever being adapted to return to its original shape upon release by the power means, and thereby to disengage the second switch contact means.

2. In a mechanism of the kind described, a lever, a pivot for the lever, a stop for the end of the lever spaced from the pivot, said stop comprising first switch contact means, the lever having an original shape between the stop and the pivot, but being resilient between said points to be bowed from said shape, power means to displace the lever about the pivot until the other end thereof strikes the stop, said power means comprising a heat-responsive mechanism adapted to produce movement in one direction upon increase in temperature and in the opposite direction upon decrease thereof, and further movement of the power means being adapted to bow the lever against its inherent resiliency between the stop and the pivot, and second switch contact means disposed at the bowed portion of the lever and adapted to be engaged when the power means bows the lever a predetermined amount, said lever being adapted to return to its original shape upon release by the power means, and thereby to disengage the second switch contact means.

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