

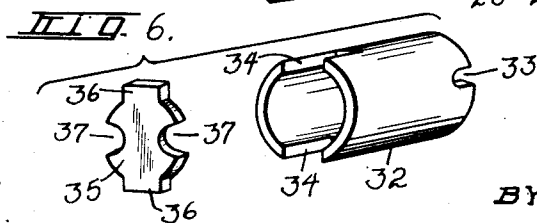
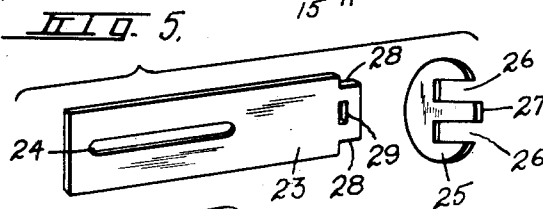
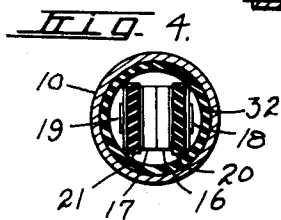
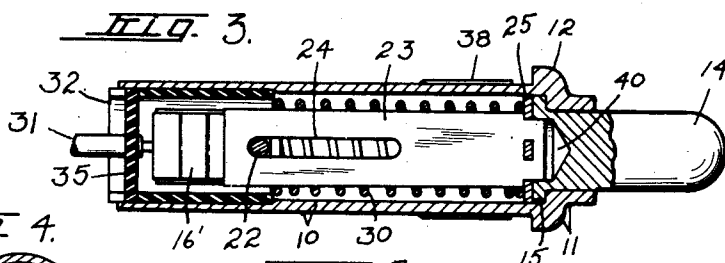
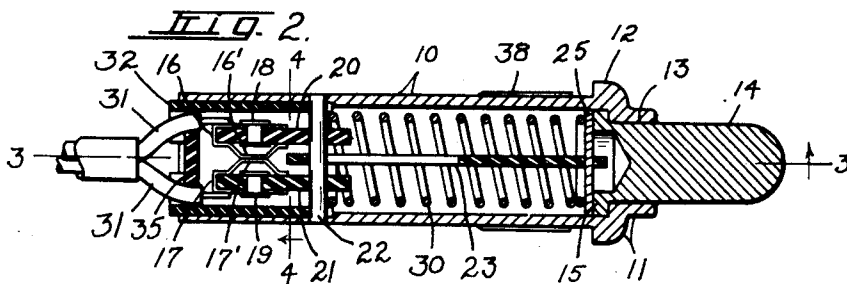
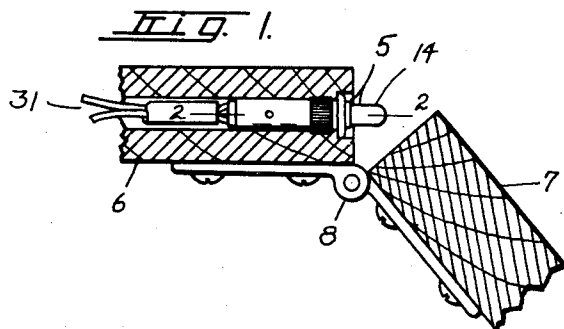
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2,096,503

DOOR PUSHER AND LIGHT SWITCH

Filed June 28, 1934



WITNESS

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DOOR PUSHER AND LIGHT SWITCH

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2 Claims. (Cl. 200—54)

This invention relates to new and useful improvements in electric switches, and particularly, but not exclusively, to switches of the door-operated type.

5 The switch of my invention is particularly useful as a lighting switch, and may be conveniently mounted with respect to the door frame or casing of an enclosure in such manner that opening and closing of the door automatically
10 actuates the switch to control a light within the enclosure. By way of example, the switch may be employed in connection with the lighting of clothes closets, automobile bodies, electric refrigerators, and other small enclosures in which it
15 is desired to light up the interior when the door is opened, and to have the light switched off when the door is closed. Particularly in electric refrigerators, it is desirable to have the door spring open as soon as it is unlatched, and to
20 this end, I have incorporated in the switch-actuating mechanism, a pusher that will accomplish the desired result.

The main object of the invention is to provide an electric switch of the character described that is simple, compact and rugged in construction, and that is easy to assemble and
25 to install, and economical to manufacture.

A further object of this invention is to provide a switch construction in which the switch members are adapted to be actuated by the opening and closing of a door.

A still further object of the invention is to provide a switch, the actuating element of which cooperates with a door so as to facilitate the opening of the door when the same is unlatched.

35 Other objects and advantages relate to details of the switch structure and the arrangement thereof, all as will appear more fully in the following description, taken in connection with the accompanying drawing, in which:—

40 Figure 1 is a view illustrating the switch of my invention in operative relation with respect to a door and door casing.

Figure 2 is a longitudinal sectional view taken
45 along the line 2—2 of Figure 1;

Figure 3 is a longitudinal sectional view taken along line 2—2 of Figure 2;

Figure 4 is a cross sectional view taken along
50 line 4—4 of Figure 2; and

Figures 5 and 6 are perspective views showing further structural details of the switch parts.

In the drawing, like parts are designated by the same characters of reference.

Referring to Figure 1, the numeral 5 generally designates the switch of my invention shown

positioned in a door casing 6. A door 7 is shown hinged to casing 6 and 8.

Switch 5, as more specifically illustrated in Figures 2 and 3, comprises a tubular casing 10 of brass, steel, or other suitable material, and is provided with an end portion 11, in this instance, having an annular outwardly extending flange 12. End portion 11 is provided with a bore 13 of a diameter less than the bore of casing 10, which is preferably coaxial with the bore of tubular casing 10.

Slidably mounted in end portion 11 and projecting through bore 13 is a round nose plunger 14 having a flanged, circular end portion 15 of diameter slightly less than the inner diameter of casing 10 so as to form a free sliding fit with the inner walls of the casing.

Adjacent the open end of the casing 10 and enclosed thereby is provided a pair of U-shaped contacts 16 and 17 riveted or otherwise secured as at 18 and 19 to the adjacent ends of a pair of, in this instance, rectangularly shaped insulating supports 20 and 21. Contacts 16 and 17 may be formed from a strip of flexible conducting material, such as copper or bronze. One leg of U-shaped contacts 16 and 17 is preferably secured to and lies against the outer side of supporting members 20 and 21, whereas the inner legs of the contacts are provided with offset portions as 16' and 17' respectively, which form the switch contact surfaces. The ends of the contacts 16 and 17 adjacent the offset portions are bent backwardly so as to contact the opposing inner surfaces of support members 20 and 21.

The ends of support members 20 and 21 remote from the contacts 16 and 17 are provided with apertures to receive a pin 22 passing diametrically through casing 10 for the purpose of maintaining the contact supports in position. Pin 22 may be frictionally held in place with respect to tubular casing 10, and in addition, may be slightly burred at each end in a well understood manner. Pin 22 is also adapted to pass through a guiding slot 24 extending longitudinally of a blade-like plunger 23.

One end of plunger 23 may be secured to disk 25 in the following manner: Disk 25 is provided with a pair of spaced parallel notches 26 so as to form a diametrically extending tongue 27 of length slightly greater than the radius of disk 25. The end of plunger 23 is notched at 28, and also provided with an aperture 29 having a rectangular configuration adapted to receive tongue

27, thereby joining disk 25 securely to the end of plunger 23.

Disk 25 is adapted to slide within tubular casing 10, and is maintained against flanged portion 15 of plunger 14 by means of coil spring 30, one end of which bears against pin 22, and the other end against disk 25. Plunger 14 is counter-sunk at 40 so as to receive the end of plunger 23 projecting beyond disk 25, thereby permitting disk 25 to bear squarely against flange 15.

Connections to an external circuit may be made to contacts 16 and 17 by means of wires 31 which may be soldered directly to the contact plates or secured in any other well known manner.

In order to insulate the contacts and wire connections from the casing 10, I provide a tubular insulating member 32 of such diameter so as to be frictionally retained within the casing. One end of tubular insulating member 32 is provided with a pair of diametrically opposed notches 33 adapted to register with pin 22. The other end of member 32 is provided with a pair of diametrically opposed notches 34.

A circular-shaped spacing member 35 having diametrically opposed notches 37 is provided for receiving connecting wires 31 and for maintaining them in spaced relation, and is positioned in the end of tubular member 32. Diametrically opposed tabs 36 on spacing member 35 are adapted to register with notches 34, thereby preventing wires 31 from twisting with respect to casing 10.

The entire switch assembly may be mounted in a door casing by providing a tubular opening of diameter slightly larger than the diameter of casing 10 for receiving the assembly. The switch unit may then be driven into the opening thus provided until the flanged portion 12 is firmly seated. In order to secure the switch assembly firmly, I provide an annular fluted portion 38 about the casing which forms a gripping surface to hold the switch assembly in place.

In operation, the switch may be actuated in the manner illustrated in Figure 1. In this instance, the casing 10 of the switch is entirely concealed having only actuating plunger 14 protruding beyond the edge of the door casing 6.

The edge of door 7 is adapted to contact with plunger 14 when the door is closed, and consequently, to force the plunger inwardly in a well understood manner. When the door is open and plunger 14 is in its extended position due to the pressure of spring 30, plunger 23 will be out of contact with switch contacts 16 and 17. As plunger 14 is moved inwardly, against the tension of spring 30, and carrying with it disk 25 and plunger 23, the forward end of the latter will be wedged between the contact surfaces 16' and 17', thereby breaking the circuit. It is apparent that separating the contacts in this manner, while they are carrying current, prevents arcing thereby insuring clean contact surfaces at all times, and longer life. Upon opening the door, plunger 14 is forced outwardly by spring 30 and plunger 23 is withdrawn from between contacts 16 and 17 permitting the contacts to close.

Contact support members 20 and 21 are prevented from spreading since they are encircled substantially throughout their length by tubular insulating member 32 as is clearly illustrated in Figure 4.

Coil spring 30 is preferably made sufficiently stiff so that it will substantially aid in opening the door when the same is unlatched. This feature is of particular importance in the event the switch is employed on refrigerator doors for con-

trolling a light mounted within the refrigerator enclosure. In this instance, plunger 14 would act as a pusher which, upon unlatching the door, would cause the door to spring open. It will, of course, be understood that the door pusher feature is also applicable to appliances and structures other than electric refrigerators which are mentioned by way of example only.

Although I have shown and described a specific switch construction, for the purpose of illustration, I do not wish to be limited to the same, as many changes and modifications may be made by those skilled in the art without departing from the spirit and scope of the appended claims.

I claim:

1. A door operated switch comprising a cylindrical casing, a pair of spaced elongated contact supports extending longitudinally within said casing, a pair of resilient normally closed contacts mounted on said supports adjacent one end of said casing, a pin extending diametrically through said casing and through said supports, a reciprocable plunger extending from the other end of said casing, stop means associated with said casing and said plunger for limiting the outward movement of the latter, a washer adjacent the inner end of said plunger, a switch actuating blade of insulating material secured at one end to said washer, the other end of said blade being disposed between said contact supports in alignment with said contacts, said blade having a longitudinally extending slot therein for receiving said pin, a spring surrounding said blade having one end in contact with said pin and in surrounding relation with the ends of said contact supports and the other end in contact with said washer for maintaining the washer in contact with said plunger and for normally maintaining said plunger in an extended position, and means for moving said plunger inwardly with respect to said casing to wedge said blade between said contacts, said spring being adapted to withdraw said blade from between said contacts for enabling the contacts to close.

2. A door operated switch comprising a cylindrical casing, a pair of contact supports, a pair of resilient normally closed contacts mounted on said supports adjacent one end of said casing, a pin extending diametrically through said casing and through said supports, a reciprocable plunger extending from the other end of said casing, stop means associated with said casing and said plunger for limiting the outward movement of the latter, a switch actuating blade of insulating material operatively connected to said plunger, the other end of said blade being disposed between said contact supports in alignment with said contacts, said blade having a longitudinally extending slot therein for receiving said pin, a spring surrounding said blade having one end in contact with said pin and in surrounding relation with the ends of said contact supports and the other end exerting spring pressure on said plunger for normally maintaining said plunger in an extended position, said casing being mounted in the frame of the refrigerator door in such manner that when the door is closed said plunger is moved inwardly with respect to said casing to wedge said blade between said contacts and said spring being adapted to withdraw said blade from between said contacts for enabling the contacts to close when the door is opened.