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ELECTRIC SWITCH MECHANISM.

APPLICATION FILED NOV. 18, 1918.

1,394,398. Patented Oct. 18, 1921.

Fig. 1.

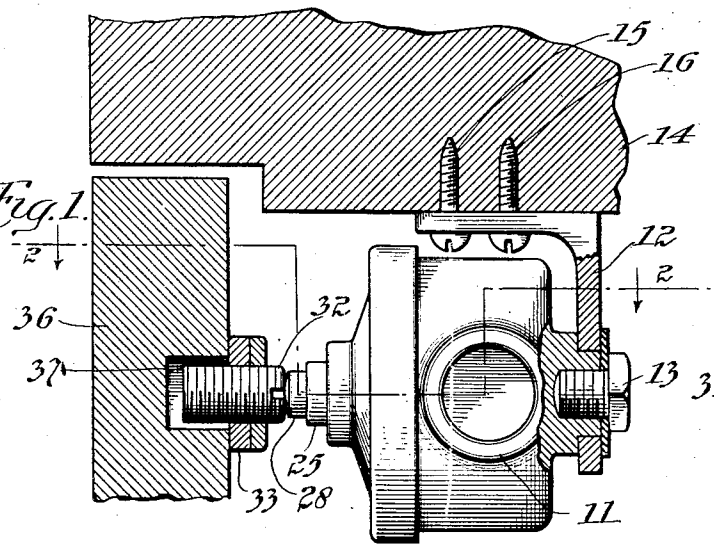


Fig. 3.

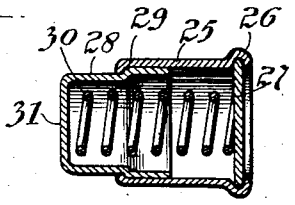


Fig. 2.

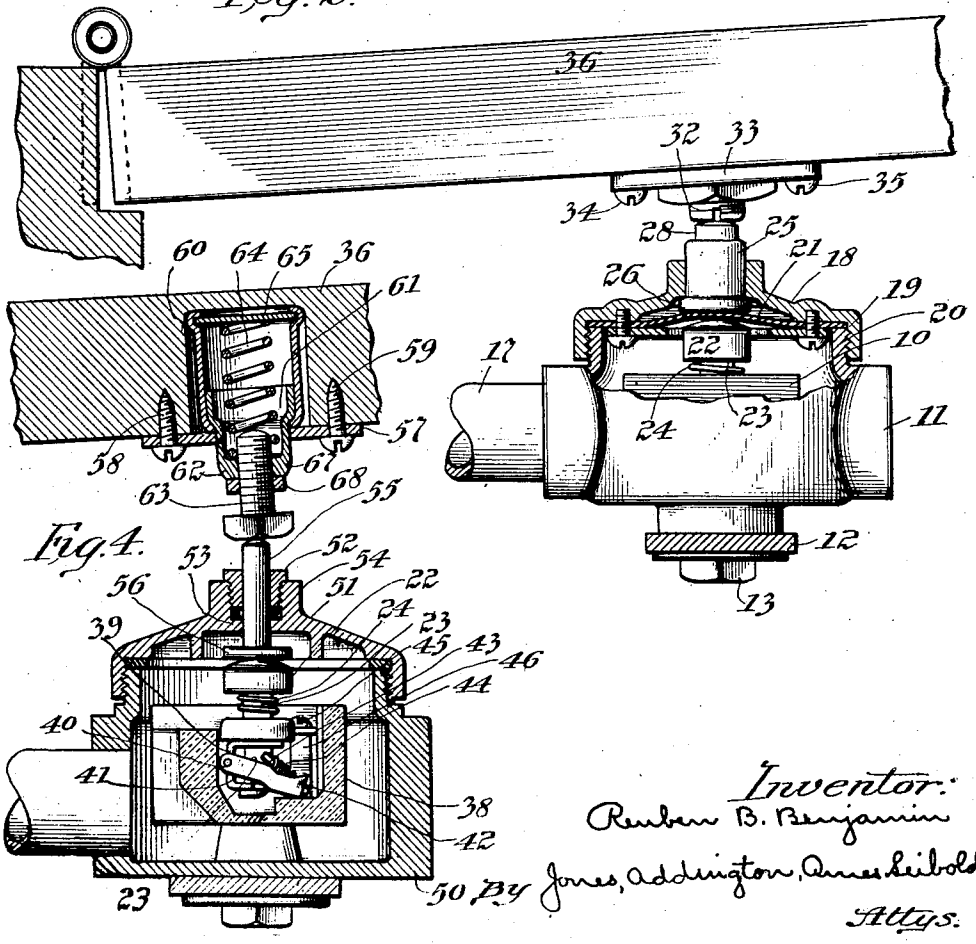


Fig. 4.

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UNITED STATES PATENT OFFICE.

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ELECTRIC-SWITCH MECHANISM.

1,394,398. Specification of Letters Patent. Patented Oct. 18, 1921.

Application filed November 18, 1918. Serial No. 263,074.

To all whom it may concern:

Be it known that I, REUBEN B. BENJAMIN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Electric-Switch Mechanisms, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

This invention relates to an electric switch mechanism, and, more particularly, to an electric switch mechanism which is automatically operated by the action of a door, window, or the like.

The object of this invention is to generally improve the construction of switch-operating mechanisms of this type, and resides essentially in the production of improved means which will prevent injury to the circuit-controlling mechanism due to any improper operation or adjustment of the switch-operating mechanism; and, further, in improved means for adjusting the switch-operating mechanism. Other objects of the invention will become apparent from the following detailed description, the accompanying illustrations, and the appended claims.

For the purpose of illustration, the preferred form of the invention is illustrated in the accompanying drawings, in which—

Figure 1 is a side sectional elevation illustrating the improved switch-operating mechanism in position with respect to the door;

Fig. 2 is a sectional plan view taken on the plane represented by the line 2—2 of Fig. 1 and looking in the direction of the arrow;

Fig. 3 is a detail view of the resilient buffer mechanism; and

Fig. 4 is an illustration of an alternative form in which the adjusting means and the resilient buffer are mounted on the door.

As illustrated in Figs. 1 and 2, the circuit-controlling mechanism or snap-switch 10 is inclosed in a housing 11, the said housing being secured to a bracket 12 by means of a bolt 13. The bracket 12 is rigidly attached to a door-casing or the like 14 by means of screws such as 15 and 16. Fitted in the housing 11 is a conduit 17 through which the circuit-conductors for controlling the circuit are led to the snap-switch 10 inclosed within the housing. Any suitable type of snap-switch may be used, but the preferred form of snap-switch is shown in Fig. 4 and a somewhat detailed description thereof will be given hereinafter.

The switch-inclosing housing 11 is fitted with a cap 18 which is screw-threaded at 19 to the housing 11. Interposed between the housing 11 and the cap 18 and rigidly secured therebetween because of the compressive action between an annular rim 20 on the interior of the housing and the cap 18, is a flexible diaphragm 21 composed of any desired waterproof material, preferably pig skin.

The circuit-controlling switch 10 is provided with an operating button 22 secured to an operating plunger 23, the operating plunger 23 being provided with an operating spiral spring 24. The operating button 22 of the snap-switch 10 is inclosed within the housing 11 beneath the diaphragm 21, and the operating spring 24 of the snap-switch serves to force this button 22 into its normal position, the operating spring 24 being sufficiently strong to distort or extend the diaphragm 21 so that the operating button 22 may assume its normal position notwithstanding the effect of the pressure exerted thereon by the diaphragm 21.

The cap 18 is centrally apertured and in this aperture is slidably fitted a cylindrical switch-operating member 25 which is fitted with a flange 26 at its lower extremity to prevent the cylindrical member from falling out of the cap 18. The flange 26 also serves to hold the base 27 of the cylindrical member in position. The base 27 acts on the button 22 to operate the switch, as hereinafter described.

Inclosed within the cylindrical member 25 is a second cylindrical telescopic member 28 fitted with an annular flange at 29, said flange serving to limit the upward movement of the telescopic member 28. A spiral spring 30 is interposed between the base 27 of the cylindrical member 25 and the upper wall 31 of the telescopic member 28, said spring 30 serving to spread apart to their farthest position the cylindrical member 25 and the telescopic member 28. The upper top wall 31 of the telescopic member 28 coöperates with an adjustable screw 32 to control the operation of the switch-controlling mechanism. The screw 32 is adjustably mounted in a plate 33 secured to the door, window,

or the like by screws such as 34 and 35. This plate is centrally apertured and screw-threaded to permit adjustment of the threaded screw 32, which can consequently be moved back and forth in a direction normal to the vertical plane of the door 36. A section of the door 36 is removed to provide an opening 37 to receive the inner end of the screw 32. In the operation of the apparatus the screw 32 is first adjusted in the plate 33 so as to give the telescopic member 28 the desired movement when the door 36 is closed, to properly operate the switch mechanism inclosed within the housing 11.

The snap-switch as illustrated in Fig. 4 is mounted on an insulating base 38 on which is secured a mounting bracket 39, said bracket being apertured to receive the sliding bar 23. This bar 23 carries at its upper end the operating button 22, and fitted between the operating button 22 and the bracket 39 is the spiral spring 24. This spring 24 is normally under compression and serves to maintain the button 22 in contact with the waterproof diaphragm 21 and, through it, in contact with the cylindrical member 25.

Pivotally secured to pins such as 40 on the vertical member 41 of the bracket 39 is a movable bracket 42 of the switch mechanism. The front arm of the bracket 42 is apertured to receive a pin 43, which is surrounded by a spiral spring 44 normally held in compression between the forward face of the bracket 42 and the rear end of the pin 43, which is pivotally attached to the sliding rod 23. Mounted on the front end of the insulating block 38 are two contact terminals such as 45, to which are secured contact blades such as 46. The bracket 42 is arranged to move up and down under the action of the spring 44 and its associated elements, so that the side arms of the bracket 42 will make contact with the blades 46 and thereby close the circuit.

When the screw 32 has been adjusted to the proper operating position, as hereinbefore described, and the door 36 is moved to its closed position, the head of said screw will contact with the telescopic member 28. Due to this movement of the telescopic member 28, it will be telescoped in the cylindrical member 25 against the action of the spring 30 until the compressive force of the spring is such as to overcome the action of the circuit-controlling apparatus contained within the housing 11. When this degree of compression is acquired by the spring 30, movement will be transferred to the operating button 22 of the snap-switch through the diaphragm 21. This movement will continue until the switch is operated upon the closure of the door 36. The spring 30 is so designed that the compression thereon will continue to the full extent of the telescopic movement of the members 28 and 25 before any force is exerted through the spring to the operating button 22 of the circuit-controlling apparatus or snap-switch which will injure any of the delicate parts of the said switch.

The spring 30 and the associated cylindrival member 25 and the telescopic member 28 consequently act as a resilient buffer between the switch-operating mechanism and the circuit-controlling switch proper, thereby preventing injury to said switch through any slight improper adjustment of the switch-operating mechanism.

The initial adjustment controlling the movement of the switch-operating mechanism is obviously taken care of by adjusting the screw 32 in the plate 33 as hereinbefore described.

In the modified form of mechanism illustrated in Fig. 4, the switch housing 50 is provided with a cap 51 which is centrally apertured, the said aperture being threaded to receive the bushing 52. Between the bushing 52 and the annular flange or seat 53 in said aperture is placed a gasket or packing gland 54 which is apertured to receive the operating pin 55 of the circuit-controlling mechanism or switch, which is loosely fitted in the bushing 52. The gasket 54 renders the housing for the circuit-controlling mechanism or switch waterproof.

Secured to the lower end of the pin 55 is a disk 56 which contacts with the operating button 22 of the snap-switch. Secured to the door 36 is a mechanism utilized to operate the pin 55, said mechanism including a resilient buffer. This mechanism consists of a plate 57 secured to the door by means of screws such as 58 and 59, said plate carrying a cylindrical member 60 which is embedded in the door proper 36 in a suitable aperture provided therefor. Fitted within the cylindrical member 60 is a telescoping member 61, the upper face 62 of which is apertured and threaded to receive a bolt 63. Surrounding that portion of the shank of the bolt 63 which extends into the telescoping member 61 is a spiral spring 64, said spring being held in compression between the face 65 of the cylindrical member 60 and the front face 67 of the telescoping member 61. Due to the threaded connection between the bolt 63 and the telescoping member 61, the bolt is readily movable and adjustable in and out of said telescoping member and when adjusted to the proper position it is locked in this position by the nut 68.

It will be evident from the foregoing description that in the alternate form illustrated in Fig. 4 the resilient buffer does not constitute a part of the switch mechanism and is entirely independent thereof, being associated with the movable door 36 and forming a part of the apparatus used for

making the initial or rough adjustment of the switch-operating mechanism.

In the device illustrated in Fig. 4 the rough adjustment of the mechanism is first made by properly locating the bolt 63 in the telescoping member 61, as hereinbefore described, after which, when the door is closed, the head of the bolt 63 will strike the pin 55 and this will cause the telescoping member 61 to move in the cylindrical member 60 against the compressive force of the spring 64. When the compressive force of the spring 64 is equal to or greater than the force required to operate the circuit-controlling mechanism or snap-switch, the bolt 63 will transmit the forward motion of the door to the pin 55, which will move through the bushing 52 and the gasket 54, the head or disk 56 of said pin acting upon the operating button 22 to operate the switch, as hereinbefore described.

Operating mechanisms constructed in accordance with the invention herein disclosed are useful for many purposes, but are especially useful when it is desired to make the operation of the switch automatic upon the doing of some other act. Thus the particular type of switch herein disclosed may be used in any and all instances when it is desired to automatically open the circuit either to extinguish lights or to discontinue the operation of any electrical apparatus when a door, window, or the like is moved to the open position. Likewise, the switch contacts may be readily changed so as to reverse this operation and close the circuit when the door or window is opened.

Obviously, the invention is not limited to the specific and preferred embodiment thereof herein illustrated and described, but is capable of many variations and other applications which come within the spirit and scope of the invention as set forth in the following claims.

I claim as new and desire to secure by Letters Patent of the United States:

1. In a device of the character described, the combination with a door, of a circuit-controlling switch, means for operating said switch, a primary movable element, and movable means interposed between said element and said first mentioned means, through which said switch may be operated by said primary movable element, and adjustable means mounted on said door operable to determine the amount of movement transferred to said primary element by the movement of said door.

2. In a device of the character described, the combination with a door, of a circuit-controlling switch, a casing inclosing said switch mounted adjacent said door, means protruding through said casing for operating said switch, a shock-absorbing lost-motion transmission means associated with said last-mentioned means, and adjustable means secured to said door operable to determine the amount of movement transmitted to the means protruding through the switch casing by the closing of said door.

In witness whereof I have hereunto subscribed my name.

REUBEN B. BENJAMIN.