Aug. 16, 1955 T. B. TAYLOR 2,715,665

ENCLOSED SWITCH WITH EXTERNAL LIQUID-TIGHT OPERATING MECHANISM

Filed Oct. 28, 1953

FIG. 1

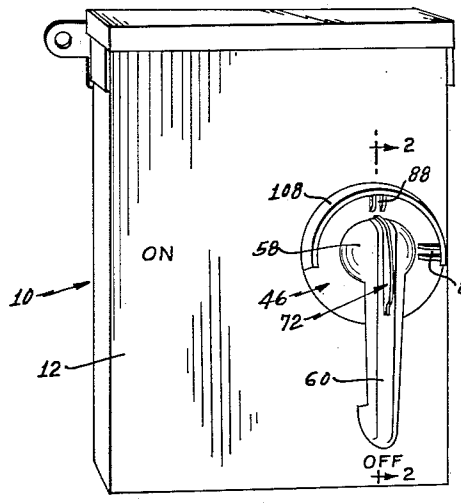


FIG. 7

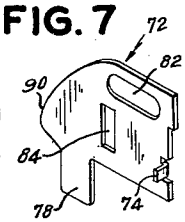


FIG. 2

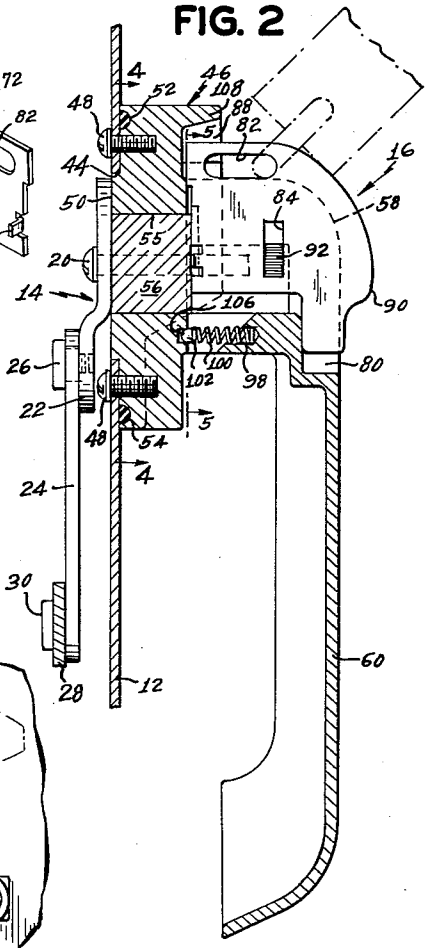


FIG. 3

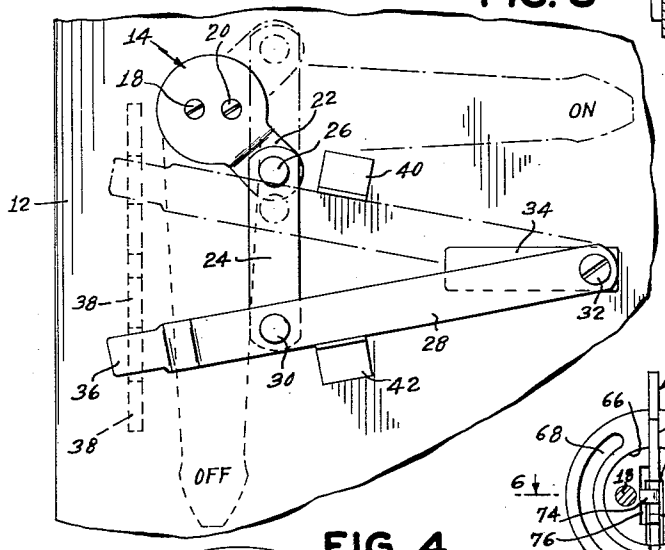


FIG. 4

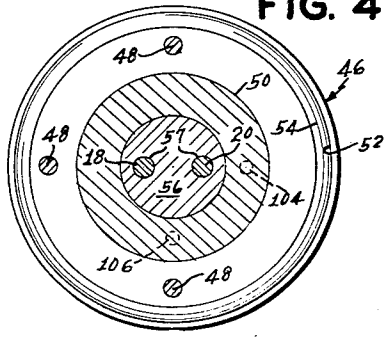


FIG. 5

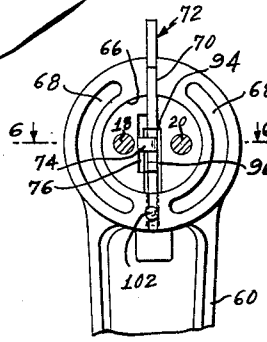
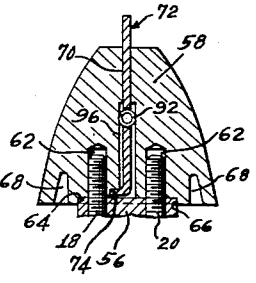


FIG. 6



INVENTOR.
Tracy B. Taylor
BY Edwin Sevison & Harry Cobb
ATTORNEYS

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ENCLOSED SWITCH WITH EXTERNAL LIQUID-TIGHT OPERATING MECHANISM

Tracy B. Taylor, South Orange, N. J., assignor to Federal Electric Products Company, Newark, N. J., a corporation of Delaware

Application October 28, 1953, Serial No. 388,769

2 Claims. (Cl. 200—168)

The present invention relates to enclosed electric switches and more particularly to switches that are provision of an enclosed switch with external liquid-tight of the switch enclosure or casing.

A primary object of the present invention is the provision of an externally actuated switch-operating handle which is so mounted on the enclosure or casing as to prevent the entrance of rain or other liquid or moisture into the casing through said handle mounting structure.

A further object of the present invention is the provision of an enlclosed switch with external liquid-tight operating mechanism which may be locked in either the "On" or "Off" position.

A further object is to provide a strong and durable mounting on the casing for the switch operating means.

The above objects of the invention and objects ancillary thereto will be fully understood from the following description considered in connection with the accompanying illustrative drawings.

In the drawings, which illustrate the best mode presently contemplated by me of carrying out my invention:

Fig. 1 is a front perspective view of an enclosed switch embodying the present invention;

Fig. 2 is a sectional view, on a large scale, on the line 2—2 of Fig. 1 showing the handle in locked condition;

Fig. 3 is a view of the inner side of the cover of the switch casing, showing the switch actuating mechanism;

Fig. 4 is a sectional view on the line 4—4 of Fig. 2;

Fig. 5 is a sectional view on the line 5—5 of Fig. 2;

Fig. 6 is a sectional view on the line 6—6 of Fig. 5; and

Fig. 7 is a perspective view of a locking member removed from the switch operating handle.

Referring now to the drawings in detail, the switch casing **10** comprises a cover **12** which may be swung to open position to permit access to the switch structure mounted within said casing. As here shown, the invention is embodied in a front operated switch and is especially advantageous, at least as to certain of its aspects, in relation to such switches. The switch mechanism, itself, forms no part of the present invention and detailed description thereof is unnecessary. It will be noted, however, that the actuation of said switch is accomplished in substantially the same manner as the switch in the application of Egmont Arens, Serial No. 75,652, filed February 10, 1949, now Patent No. 2,672,746, issued March 23, 1954, and assigned to the assignee of the present invention. Referring to Figs. 2 and 3 of the drawings, a crank member **14** is secured to the handle member generally designated at **16** for rotation therewith by means of screws **18** and **20**. The crank element **14**, as here shown, is in the form of a disk provided with an integral offset ear **22** which is pivotally connected to a link member **24** by a shouldered pivot screw **26**. It will be noted that ear **22** is offset, so as to enable it to clear the heads of the screws **48**. The other extremity of the link member **24** is pivotally attached to an actuating arm **28** as at **30**, said

actuating arm being pivotally secured as shown at **32** to a bracket **34** spot welded or otherwise secured to the inner side of the casing cover. The other end of the actuating arm **28** has formed thereon an offset finger **36** which finger engages switch operating member **38** for actuating the switch as shown and described in said application Egmont Arens. It will be understood that when the external handle **16** is moved clockwise viewing Fig. 1, to its "On" position the actuating arm **28** will be moved to close the switch and when the handle is returned to the "Off" position the actuating arm will be moved to cause the switch to open. Positive stop means **40** and **42** are provided on the interior of the casing cover to limit the movements of the actuating arm **28** in opposite directions thereby also limiting the movement of the external handle **16** to a range of approximately 90 degrees. The stop means **40** and **42** comprise angle members spot welded or otherwise secured to the interior of the casing cover as will be readily apparent from Figure 3.

Turning now to Figures 2 and 4, it will be seen that the cover **12** is provided with a circular aperture **44**. A ring like handle-mounting base member designated generally at **46** is secured to the cover **12** by screws **48** and has an inner peripheral hub-like portion **50** of a depth approximately equal to the thickness of the cover **12** and which fits snugly within the aforementioned aperture **44**. Inwardly spaced from the outer periphery of the element **46** is a continuous peripheral groove **52** adapted to receive therein a rubber gasket or O ring **54** which acts as a fluid sealing member or gasket to prevent water seepage between element **46** and the cover **12**. Preferably, the rubber O ring is of such cross sectional diameter that it is compressed when the element **46** is drawn tightly against the cover **12** by the screws **48**. The handle mounting member **46** is provided with an axial cylindrical bore **55** within which a cylindrical spacer member **56** is mounted for rotation with a close fit in said bore. Spacer member **56** has apertures **57** therein through which screws **18** and **20** extend for securing handle **16** to the crank member **14**. It will be noted that the element **46** provides a relatively long and close fitting bearing surface for member **56** to prevent water seepage at this particular point.

The handle structure and its locking means are generally similar to that employed in the aforementioned application Serial No. 75,652. Certain structural variations are necessitated by the water tight mounting means, however, so a detailed description of said handle and locking structure follows. The handle **16** comprises a hub section **58** and a handle section **60**. As shown more clearly in Fig. 6 the hub section **58** has provided at its inner side internally threaded openings **62** for receiving the screws **18** and **20**. Thus it will be seen that any movement imparted to the handle **16** will result in like movement of the spacer **56** and the crank member. It will be noted that the outer end portion **64** of spacer **56** fits snugly within a circular recess **66** provided in the hub member **58**. Arcuate grooves **68** are provided on the hub member **58** to save metal.

The hub member **58** is provided with a slot **70** adapted to receive the locking element shown generally at **72** in Figure 7. Said locking element **72** is mounted for sliding movement in the slot **70**, it being noted that the locking member has an integrally struck laterally extending lug **74** which cooperates with the slot **76** located adjacent to and in communication with the slot **70**, as shown most clearly in Figs. 2, 5 and 6. It will be obvious that the lug **74** and the slot **76** provide guide means for the sliding movement of the member **72** and that the extremities of the slot **76** will determine the length of the stroke of locking element **72**. The locking element also

has an outwardly extending projection 78 which slidably engages the slot 80 disposed in handle portion 60 to provide additional guiding means for the member 72 as will be seen in Figure 2. Locking element 72 further has an elongated opening 82 and a rectangular opening 84 the functions of which will subsequently be described. The handle mounting base member 46 is provided with two channel-like or grooved portions 86 and 88 extending inwardly from the outer periphery of the member 46 and disposed at approximately 90 degrees from each other as will be seen in Figure 1. These grooved portions are adapted to receive the locking member 72 when said locking member is slid to its projected or locking position, which position is shown in the full lines of Figure 2.

It will be noted that the locking member is provided with an arcuate shoulder portion 90 the purpose of which is to facilitate manipulation of the locking member to projected or locking position by providing a surface readily engageable by the finger of the operator. As will be readily apparent from Fig. 1, when the locking member 72 is slid outwardly so as to extend within the channel 88 the handle 16 will be locked in "Off" position. Likewise when the locking member 72 is slid outwardly so as to extend within the channel 86 the handle will be locked in "On" position. To maintain the locking member 72 in its projected or locking position a padlock or a plurality of the same is inserted through the elongated opening 82 as shown in Fig. 2 and as described in the above mentioned application.

The locking member 72 is normally spring-retracted, being urged to inoperative or non-locking position by means of spring 92, Figures 2 and 6. The spring 92 is mounted within the rectangular opening 84 and cooperates with the shoulders 94 which are provided by virtue of the fact that the slot 70 has an enlarged portion 96. As will be seen from Fig. 6, the outer diameter of spring 92 is of greater dimension than the thickness of the locking member 72 and it is the outwardly extending portions of the spring that engage the shoulders 94 to normally maintain the locking member in retracted position. The handle 16 is additionally provided with a cylindrical bore 98 which houses spring 100 and ball 102. The spring pressed ball 102 cooperates with the circular recesses 104 and 106 in member 46 to provide detent means that function to effectively position the handle in either its "On" or "Off" position.

As shown clearly by Figures 1 and 2, the handle mounting base 46 is provided with an arcuate hood like portion 108, which hood like portion serves as a shield to prevent rain or other liquid from seeping between the handle and its mounting means.

In order to restrain the member 56 from axial movement in an outward direction within the bore 55, the disc portion of the crank element 14 is of a greater diameter than the bore 55 and makes sliding contact with the inner surface of the handle mounting member 46 whenever the handle 16 is operated. Likewise, in order to restrain the member 56 from axial movement inwardly of bore 55, the hub portion 58 of the handle 16

is of a greater diameter than the bore 55 and slidably abuts the outer surface of the handle mounting member 46. The fact that the disk portion of the crank element 14 overlaps the inner surface of the member 46 surrounding bore 55 is additionally advantageous in that it provides an added safeguard against liquid seepage into the casing should any liquid happen to reach the inner end of bore 55.

While I have shown and described the preferred embodiments of my invention, it will be understood that various changes may be made in the present invention without departing from the underlying idea or principles of the invention within the scope of the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent, is:

1. A switch casing and switch actuating mechanism, including a casing wall having an opening formed therein, a bushing having a passage in alignment with said opening, a plurality of arcuately spaced fastening elements extending from inside the casing, through said wall and into said bushing, a gasket tightly held between said bushing and said casing wall, a composite manual operator including a disk bearing against the inside surface of said wall, a handle bearing against the opposite end surface of said bushing, and a bearing portion between said handle and said disk and having bearing contact with said bushing passage, and interengageable releasable detent means having respective portions on said handle and on said bushing effective to arrest said handle in predetermined arcuately spaced positions, said fastening elements being effective to prevent rotation of said bushing.

2. A switch casing and switch actuating mechanism, including a casing wall having an opening formed therein, a bushing having a passage in alignment with said opening, a plurality of arcuately spaced fastening elements extending from inside the casing, through said wall and into said bushing, a gasket tightly held between said bushing and said casing wall, a composite manual operator including a disk bearing against the inside surface of said wall, a handle bearing against the opposite end surface of said bushing, and a bearing portion between said handle and said disk and having bearing contact with said bushing passage, and interengageable releasable detent means having respective portions on said handle and on said bushing effective to arrest said handle in predetermined arcuately spaced positions, said fastening elements being effective to prevent rotation of said bushing, said bushing further embodying an arcuate hood-like portion projecting over the bearing of the handle against said opposite end surface of the bushing, as a shield.

References Cited in the file of this patent

UNITED STATES PATENTS

2,050,854	Olley	Aug. 11, 1936
2,100,722	Paulson et al.	Nov. 30, 1937
2,202,207	Johnson	May 28, 1940
2,216,298	Rowe	Oct. 1, 1940