April 30, 1957 A. E. SCHUELER 2,790,881

CONTROL SWITCHES

Filed March 30, 1954

Fig. 1.

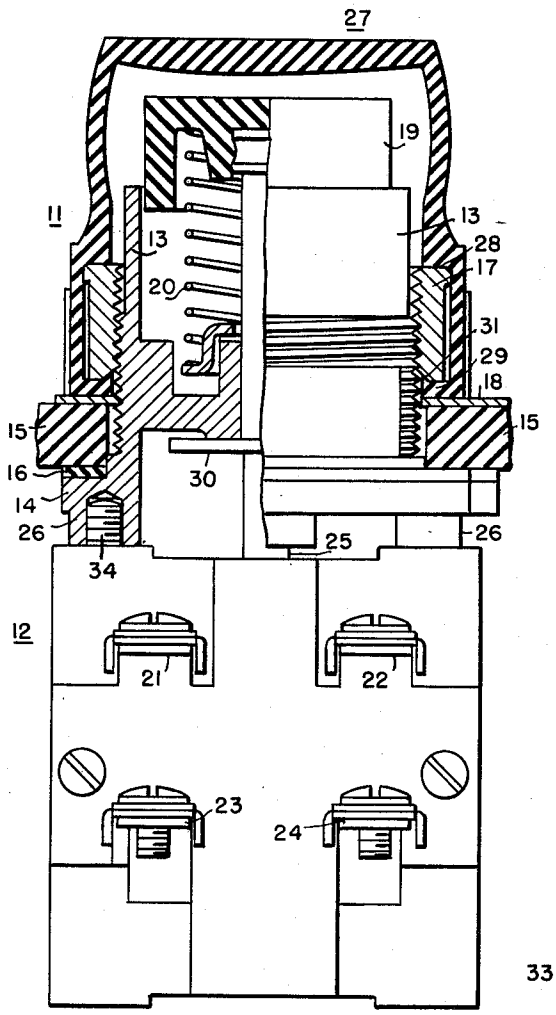


Fig. 2.

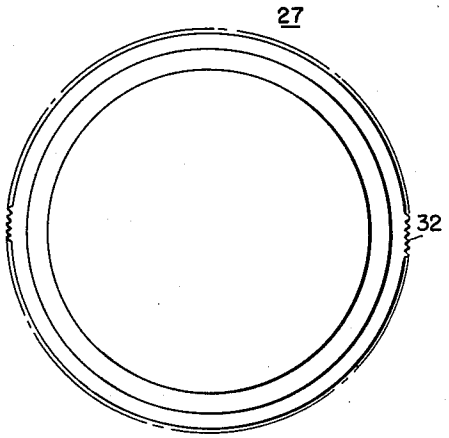


Fig. 3.

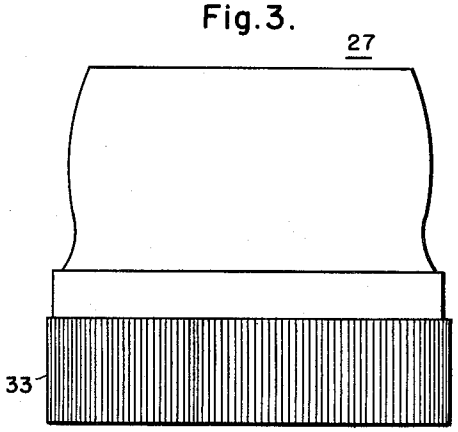
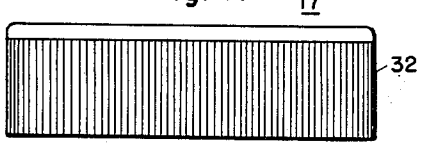


Fig. 4.



INVENTOR

Alfred E. Schueler.

BY

ATTORNEY

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CONTROL SWITCHES

Alfred E. Schueler, Beaver, Pa., assignor to Westinghouse Electric Corporation, East Pittsburgh, Pa., a corporation of Pennsylvania

Application March 30, 1954, Serial No. 419,807

7 Claims. (Cl. 200—168)

My invention relates, generally, to control switches and, more particularly, to switches of the push-button or toggle type.

Such switches are frequently utiliized where dust may enter the switch structure around the actuating member to the extent that proper operation of the switch is prevented. Also, the switches are sometimes utilized at locations and temperatures where ice formations around the actuating member cause a switch to become inoperative.

An object of my invention is to provide a protective cap for the actuating member of a control switch.

Another object of my invention is to provide a protective cap which may be readily attached to a switch of standard construction without any modification of the switch.

A more general object of my invention is to provide a protective cap which shall be simple and efficient in operation and which may be economically manufactured and installed.

Other objects of my invention will be explained fully hereinafter or will be apparent to those skilled in the art.

In accordance with one embodiment of my invention, a protective cap, composed of natural or synthetic rubber or similar flexible material, encloses the actuating member of a push-button or toggle switch. The cap is attached to the switch by means of a clamping ring disposed inside the cap and engaging an internal flange on the cap. The flange is disposed between the bottom of the ring and a panel or wall of a box on which the switch is mounted.

For a better understanding of the nature and objects of my invention, reference may be had to the following detailed description, taken in conjunction with the accompanying drawing, in which:

Figure 1 is a view, partly in section and partly in elevation, of a switch embodying the principal features of my invention;

Fig. 2 is a view, in plan, of a protective cap for the switch;

Fig. 3 is a view, in elevation, of the cap shown in Fig. 2; and

Fig. 4 is a view, in elevation, of a clamping ring utilized to hold the cap in position on the switch.

Referring to the drawing, and particularly to Fig. 1, the switch structure shown therein may be of the type more fully disclosed in Stanley L. Frank's Patent No. 2,669,616, issued February 16, 1954, and comprises an operating unit **11** and a switch unit **12**. The operating unit **11** includes a tubular supporting sleeve **13**, preferably cast from a suitable metal and having a flange **14** at one end thereof adapted to engage the under side of a supporting panel **15**. A sealing washer **16** composed of any desirable sealing material, such as rubber, may be interposed between the flange **14** and the inner surface of the panel **15**.

A portion of the sleeve **13** is threaded for receiving a

metal clamping ring **17** which is adapted to secure the sleeve **13** and the entire operating member to the panel **15** when the clamping ring is drawn up tightly. A metal washer **18** may be provided between the clamping ring **17** and the panel **15**. The washer **18** may carry suitable indicia for proper identification of the switch.

An actuating member or push button **19** is reciprocably disposed in the sleeve **13**. The push button **19** is normally biased to its outermost position by a spring **20** which is disposed inside the sleeve **13**.

The switch unit **12** may be of a type having a bridging contact member (not shown) disposed to engage contact members which are connected to terminal members **21** and **22** when the push button **19** is in its outermost position. When the push button **19** is fully depressed the bridging contact member engages contact members connected to terminal members **23** and **24**.

The bridging contact member is carried by an operating member **25** which is biased upwardly by a spring (not shown) disposed inside the switch unit **12**. The upper end of the operating member **25** is engaged by a disc **30** carried by the push button **19** when the push button is depressed. The switch unit **12** may be attached to bosses **26** on the flange **14** by screws **34** extending through the switch unit **12** into the bosses **26**, or it may be mounted in the enclosure of which plate **15** is the cover.

As explained hereinbefore, difficulty has been encountered with dust entering the operating unit around the push button **19** when the switch is installed in certain locations. This dust, collecting under the head of the button **19** and around the spring **20**, can prevent the button from being depressed enough to properly actuate the switch. Difficulty has also been encountered with ice forming around the actuating member **19** or within the sleeve **13** under certain conditions. In order to overcome these difficulties I have provided a cup-shaped cap **27** for the actuating member. The cap **27** may be composed of natural or synthetic rubber or similar flexible material which is dust proof and moisture proof.

As shown in Fig. 1, the flexible cap **27** encloses the actuating member **19** and the clamping ring **17**. The cap **27** has an internal shoulder **28** which engages the upper end of the cylindrical clamping ring **17**. The cap also has an internal flange **29** which is engaged by the lower end of the cylindrical ring **17**. A generally triangularly-shaped bead **31** is provided on the upper edge of the lower flange **29**, thereby securely retaining the cap **27** in position when the ring **17** is drawn against the flange **29**, which, in turn, is compressed against the washer **18**.

As shown most clearly in Fig. 4, the outer surface of the ring **17** is serrated at **32**. As shown most clearly in Fig. 3, the outer surface of the lower portion of the cap **27** is serrated at **33**. Since the serrated portion **33** of the cap **27** is opposite the serrated portion **32** of the ring **17**, the ring may be tightened by gripping the serrated portion of the cap **27** and compressing the cap against the serrated portion of the ring **17**. The clamping of the lower flange **29** against the panel **15** by the ring **17** provides an effective seal over the entire hole in the panel **15** in which the switch is mounted, and prevents dust or fluid from getting into the enclosure of which the panel **15** is the cover and thus protects the switch unit **12**.

As previously explained, the cap **27** is composed of a flexible material. Therefore, the cap may be depressed to depress the push button **19** and operate the switch unit **12** in the manner hereinbefore explained. While a reciprocating actuating member or push button **19** is illustrated in the accompanying drawing, it will be understood that the flexible cap may be utilized with a toggle switch having a pivoted actuating member. The cap may be

shaped to conform generally with the shape of the actuating member. In view of the flexible nature of the material, the operation of the switch is not impaired by the protective cap.

From the foregoing description, it is apparent that I have provided a protective cap or cover for control switches which effectively excludes dirt and moisture from the operating mechanism of a switch. Furthermore, ice is prevented from forming around the actuating member since moisture is excluded from the actuating member. If ice should form on the outside of the cap, it may be readily broken because of the flexibility of the material of which the cap is composed. The cap may be readily attached to switches of standard construction having a clamping ring for attaching the switch to a panel or supporting wall of an enclosure containing the switch unit.

Since numerous changes may be made in the above-described construction, and different embodiments of the invention may be made without departing from the spirit and scope thereof, it is intended that all matter contained in the foregoing description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

I claim as my invention:

1. In a switch, in combination, an externally threaded supporting sleeve, an internally threaded cylindrical clamping ring threaded onto said sleeve, a switch actuating member disposed in said sleeve, a generally cup-shaped flexible member enclosing said actuating member, and a flange on said flexible member disposed between the sleeve and the ring, said ring compressing said flange to retain the flexible member over the actuating member.

2. In a switch, in combination, a supporting sleeve, a cylindrical clamping ring threaded onto said sleeve, a switch actuating member disposed in said sleeve, and a generally cup-shaped flexible member enclosing said actuating member and said ring, said cup-shaped member having an internal shoulder engaging one end of said ring and an internally flanged rim with a triangular bead on its inside edge, said ring having a bevelled edge engaging said bead to retain the cup-shaped member in position over the actuating member.

3. In a switch, in combination, a supporting sleeve, a cylindrical clamping ring threaded onto said sleeve, a switch actuating member reciprocably disposed in said sleeve, and a generally cup-shaped flexible member enclosing said actuating member and said ring, said cup-shaped member having an internal shoulder engaging one end of said ring and a flanged rim engaged by said ring to retain the cup-shaped member in position over the actuating member, said ring having serrations on its outer surface engaged by said cup-shaped member and said cup-shaped member having serrations on its outer surface opposite the serrations on the ring.

4. Protective means for a switch actuating member, comprising an externally threaded support member for installing around the actuating member, a flexible cap having space inside the cap for the actuating member, an internally threaded clamping ring threaded on said support member, and a flange on said cap disposed between the support member and the ring, said ring compressing said flange to retain the cap over the actuating member.

5. Protective means for a switch actuating member, comprising a generally cylindrical externally threaded support member for installing around the actuating member, a generally cup-shaped flexible member having space inside the cup for the actuating member, an internally threaded clamping ring threaded on said support member, and a flange on said flexible member disposed between the support member and the ring, said ring compressing said flange to retain the flexible member over the actuating member.

6. In combination, supporting means having an opening therein, a sleeve mounted in said opening and having a flange disposed at one side of said means, a cylindrical clamping ring threaded onto said sleeve at the side of said means opposite said flange, a switch actuating member disposed in said sleeve, a generally cup-shaped flexible member enclosing said actuating member and said ring, said cup-shaped member having an internally flanged rim with a raised portion at its inside edge, and one end of said ring engaging said flanged rim between said raised portion and the inside wall of said cup-shaped member and compressing the flanged rim against said supporting means to retain the cup-shaped member in position over the actuating member.

7. Protective means for a switch actuating member, comprising supporting means having an opening therein, an externally threaded support member mounted in said opening to support the actuating member, a flexible cap having space inside the cap for the actuating member, an internally threaded clamping ring threaded on said support member, and a flange on said cap disposed between the supporting means and the ring, said flange being compressed by said ring.

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