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SWITCH BOX

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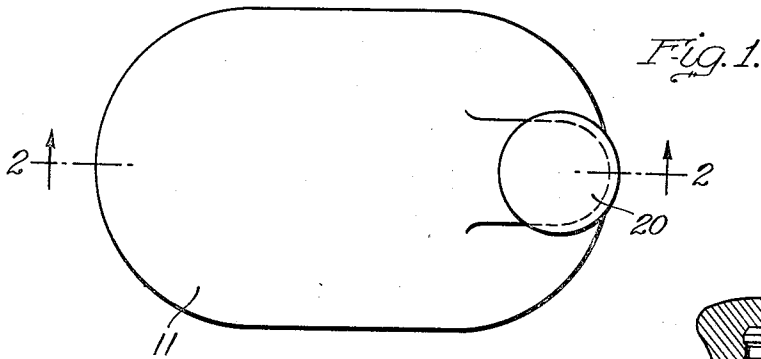


Fig. 1.

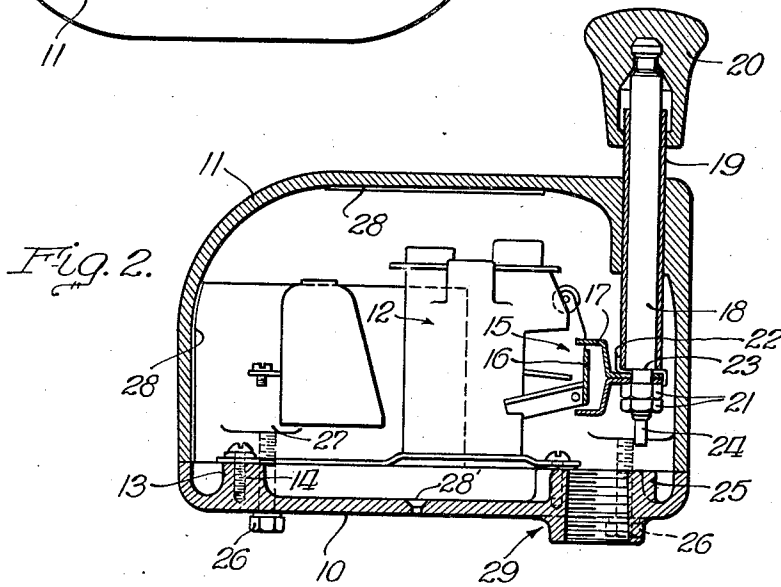


Fig. 2.

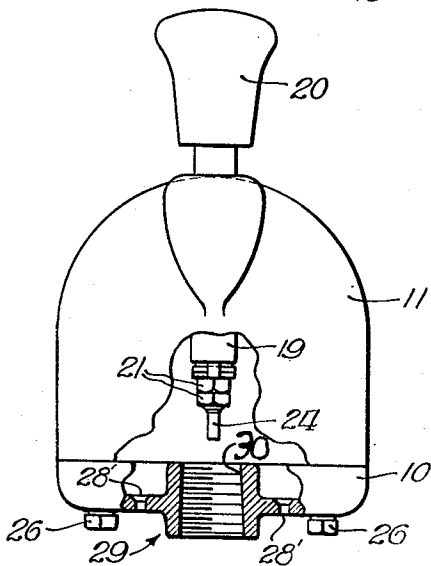


Fig. 3.

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SWITCH BOX

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4 Claims. (Cl. 200—168)

1

This invention relates to a housing or switch box for an electrical switch. More particularly, this invention relates to the aspects of a housing for an electrical switch which adapt it particularly well for use under adverse conditions of moisture and condensed water vapor or like liquids as commonly found in food processing plants such as dairy products processing plants, etc.

Under normal working conditions in food processing plants such, for example, as milk bottling plants, it has been found desirable to use relatively sturdy mechanical devices which are capable of withstanding appreciable abuse. In the instance of electrical switches for apparatus such as milk bottle fillers and cappers, it has been found desirable to use a switch which is relatively easy to switch off and on but which nonetheless is not sensitive to relatively slight and sometimes accidental contacts. Such a switch must also be capable of satisfactory operation under adverse conditions of moisture and condensed water vapor.

In many types of switch housings appropriate provisions have not been made for sealing the housing against inward seepage of condensed water vapor or other liquids or the circulation of water vapor through the interior of the housing. In certain instances a portion of the circulating vapor may condense onto the electrical switch elements and produce defects in the electrical circuits. In certain designs of housings for electrical switches satisfactory arrangements have not been made to drain condensed water vapor or other liquids from the interior of the switch housing, with the result that in some instances such liquids may find their way into the electric cable conduits connected to the switch housing. Leakage of electric current or short circuiting of the electrical system usually results.

In certain instances switch housings are also constructed in such a manner that the electrical switch elements on the interior of the switch housing are not readily accessible for repair or inspection.

It is therefore the primary object of this invention to provide a housing for an electrical switch; which may be readily opened to gain free access to the electrical switch elements contained in the housing, which is provided with means to permit

2

the ready drainage of liquids from the interior of the housing, which is sealed against the circulation of water vapor or the like through the interior of the switch housing, which is provided with electric cable conduit connections through which condensed water vapor or the like which may have gained access into the interior of the switch housing may not enter the electric cable conduit, which is provided with an outwardly extending switch actuating plunger movably sealed to the switch housing and which is relatively easy to operate and which plunger by its position indicates the relative relationship of the electrical contact elements on the interior of the switch, and which is provided with switch support elements on the interior of the housing so arranged as to support the switch mechanism within the housing in such a manner as to prevent possible contact of the switch elements with condensed water vapor or the like which may have formed in or found its way into the interior of the switch housing by supporting the switch upon the base element above the line of juncture between the base element and the cover element of the housing and above the opening into the drain passages.

Other objects and advantages of the present invention may appear more obvious from a consideration of the following description when read in connection with the accompanying drawings in which:

Figure 1 is a plan view of the improved housing for an electrical switch;

Figure 2 is a vertical sectional view of the improved switch housing; and

Figure 3 is a front end elevational view partially in broken away section of the improved switch housing.

Referring to the drawings, in which like elements are identified by like numerals, 10 represents the base of the housing for an electrical switch, and 11 represents the top or cover portion of the switch housing. The electrical switch device generally identified by the numeral 12 is supported on three studs 13 in the base 10 of the housing. Two of the studs 13 are positioned in the rear portion of the base 10 of the housing, and the third stud 13 is positioned toward the front central portion of the base 10. The triangularly

shaped base of the switch mechanism 12 is secured to the supporting studs 13 by screws 14.

The electrical circuit controlled by switch 12 is opened or closed as a result of the up or down movement of the pivoted spring biased switch lever 15. The lever 15 is provided with a cross bar 16 for engagement with the motion transmission tongs 17 of the switch actuating plunger 18. The plunger 18 extends out of the housing through an opening in the cover portion 11 of the switch housing.

The plunger 18 is slidingly or frictionally supported in an extended bushing or sleeve 19, press-fitted and sealed into the plunger aperture in the cover section 11 of the switch housing. The hand grip element 20, preferably made of rubber or like material, is secured to the top of the plunger shaft 18 and sealingly overlaps the upper portion of the bushing 19 extending above section 11 of the switch housing, as clearly shown in Figure 2 of the drawings. By virtue of the described arrangement between the bushing 19, plunger shaft 18 and hand grip 20, the plunger opening through the cover 11 of the switch housing is thoroughly sealed against water vapor or the like, as well as sealed against water and other liquids.

The tongs 17, as illustrated in Figure 2 of the drawings, are secured to the lower portion of the plunger shaft 18 by the two nuts 21 immediately below a condensate deflector element 22. The element 22 is supported on the plunger shaft 18 by the tongs 17 and abuts against the shoulder 23 of the shaft 18.

The upward motion of the plunger shaft 18 and the switch actuating tongs 17 is limited by the engagement of the deflector element 22 with the lower extremity of the bushing 19. The downward motion of the plunger shaft 18 and motion transmission tongs 17 is limited by the engagement of the stud extension 24 at the lower end of the shaft 18 with a stop block 25 in the base 10 of the switch housing.

The two sections 10 and 11 of the switch housing are secured together by anchor bolts 26 which extend upwardly through suitable openings in the lower section 10 of the housing and are anchored in lugs 27 in the upper portion 11 of the switch housing.

To protect the electrical elements of the switch from the exposed metal surfaces of the upper portion or cover 11 of the switch housing, insulation strips 28 are secured to the interior of the cover 11.

To provide against the contingency of the possible accumulation of condensate in the switch housing, the lower portion or base 10 is provided with a number of condensate drain openings 28', whereby any accumulated condensate or other liquid which has found its way into the interior of the switch housing may freely drain therefrom.

To assure the avoidance of the drainage of any condensed water vapor or other like liquid into the electrical conductor conduit connected to the coupling 25, through which the electrical wires enter the switch housing and to which the conduit for the electrical wires is secured, the coupling 29 is provided on the interior of the switch housing with a raised flange 30 extending above the inner surface of the base 10 to a point substantially in alignment with the line of division between the sections 10 and 11 of the switch housing.

In the operation of the switch the electrical circuits may be connected or disconnected by the appropriate upward or downward movement of

the plunger 18 which, by means of the tongs 17 and the cross bar 16 on the switch lever 15, will move the switch lever 15 in such a manner as to connect or disconnect the electrical circuits associated with switch 12 in a manner common in the electrical switch art.

The preferred embodiment of applicant's invention as just described provides a new and novel housing for an electrical switch of sturdy construction which is especially well adapted for use under adverse conditions of moisture and under circumstances in which the switch housing is from time to time exposed to liquid and in which from time to time the switch housing may be subjected to severe abuse.

Having thus described the illustrated and preferred embodiment of this invention in an improved housing for an electrical switch, the invention is not to be restricted to the specifically illustrated embodiment thereof as set forth in the drawings and as heretofore described, except in so far as necessary by the prior art and the appended claims.

The invention is hereby claimed as follows:

1. A device of the class described comprising, in combination, a housing, mechanism within said housing having an element adapted to be moved with respect to the remainder of said mechanism and with respect to said housing, a friction sleeve extending through an opening in said housing and secured thereto, a plunger slidably and frictionally supported interiorly within and by said sleeve and extending at its ends beyond said sleeve, and tong means carried by said plunger and adapted to engage said element for the movement thereof upon the movement of said plunger.

2. A device of the class described comprising, in combination, a housing, mechanism within said housing having an element adapted to be moved with respect to the remainder of said mechanism and with respect to said housing, a friction sleeve extending through an opening in said housing and secured thereto, a plunger slidably supported interiorly within and by said sleeve and extending at its ends beyond said sleeve, tong means carried by said plunger and adapted to engage said element for the movement thereof upon the movement of said plunger, and means secured to said plunger and sealingly engaging a portion of said sleeve extending out of said housing.

3. A device of the class described comprising, in combination, a sectional housing, mechanism within said sectional housing having an element adapted to be moved with respect to said housing and with respect to the remainder of said mechanism, a friction sleeve extending through an opening in said housing and sealingly secured thereto, plunger means slidably and frictionally supported interiorly within and by said sleeve and extending at its ends beyond said sleeve for moving said element, and means associated with said plunger for abutment against said sleeve and said housing for limiting the motion of said plunger.

4. A device of the type described, comprising, in combination, a casing, mechanism within said casing adapted to be actuated in response to the movement of a plunger, a friction sleeve extending through an opening in said casing and secured thereto, a plunger slidably and frictionally supported in said sleeve and extending at its ends beyond said sleeve, and means connecting said plunger and said mechanism for the actu-

5

ation of said mechanism upon the movement of said plunger, said plunger being provided with means for abutment against said sleeve and said casing for limiting the motion of said plunger.

ADOLPH J. LIPPOLD. 5

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
836,352	Youmans	Nov. 20, 1906
1,039,248	Bliss	Sept. 24, 1912
1,413,058	Richardson	Apr. 18, 1922

Number
1,472,242
1,745,766
1,783,784
1,814,880
1,818,038
1,997,209
2,108,883
2,188,685
2,225,945
2,240,922
2,250,977
2,344,441
2,399,451
2,454,962

6

Name	Date
Covi	Oct. 30, 1923
Meunier	Feb. 4, 1930
Grondahl et al.	Dec. 2, 1930
Young	July 14, 1931
Buker	Aug. 11, 1931
Douglas	Apr. 9, 1935
Furnas et al.	Feb. 22, 1938
Josephson	Jan. 30, 1940
Appleton	Dec. 24, 1940
Bissell	May 6, 1941
Walker	July 29, 1941
Lorenz	Mar. 14, 1944
Rothacker	Apr. 30, 1946
Brown	Nov. 30, 1948