Aug. 23, 1932. H. E. NORVIEL 1,873,142

SWITCH

Filed Oct. 8, 1930

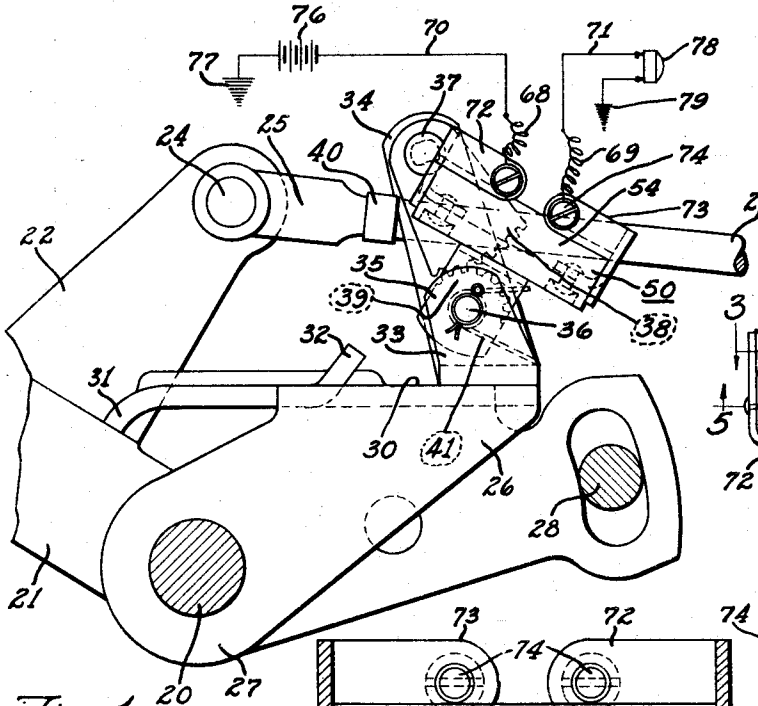



Fig. 1.

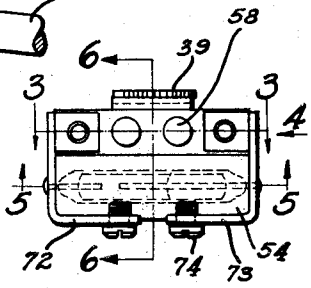



Fig. 2.

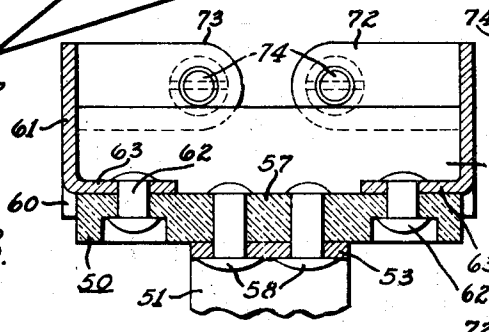



Fig. 3.

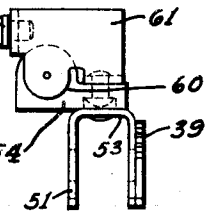



Fig. 4.

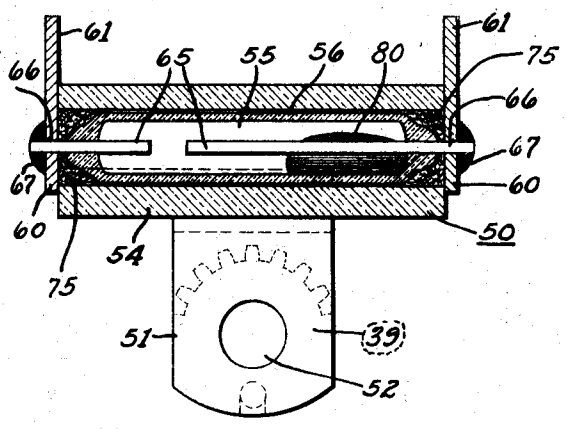



Fig. 5.

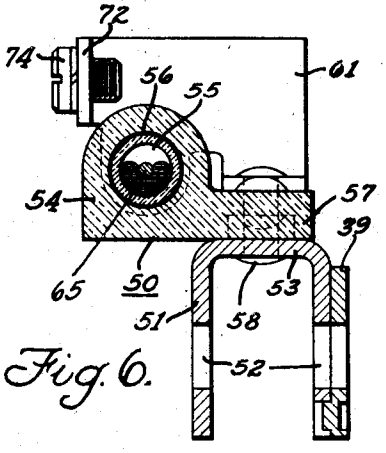



Fig. 6.

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# UNITED STATES PATENT OFFICE

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## SWITCH

Application filed October 8, 1930. Serial No. 487,201.

This invention relates to circuit closers or electrical switches of the conductive fluid type, and has for one of its objects to protect the fragile shell containing the conductive fluid against undue breakage due to rough usage.

It is a further object of the invention to provide a support and enclosure for the fragile capsule of mercury type switch, that will insure the same against breakage and eliminate corrosion of the electrical connections therewith.

A further object of the invention is to improve the actuating support of the circuit closing unit of a conductive fluid circuit closer.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawing wherein a preferred embodiment of one form of the present invention is clearly shown.

In the drawing:

Fig. 1 is a view in elevation, illustrating the improved circuit closer device as mounted upon an actuating structure, and how it may be inserted in an electrical circuit, such as a signal circuit of an automotive vehicle.

Fig. 2 is a plan view of the improved circuit closer.

Fig. 3 is a longitudinal section through the circuit closing unit, substantially as indicated by the line and arrows 3—3 of Fig. 2.

Fig. 4 is an end elevation of the unit, substantially as indicated by the arrow 4 of Fig. 2.

Fig. 5 is a longitudinal section, through the unit substantially as indicated by the line and arrows 5—5 of Fig. 2.

Fig. 6 is a transverse sectional view through the unit, substantially as indicated by the line and arrows 6—6 of Fig. 2.

With particular reference to the drawing, 20 represents a cross rod or shaft of an automotive vehicle, and which forms a pivotal support for a foot pedal 21, having a lug 22 operatively connected to a brake rod or other reciprocating member 23 through a pivot 24 making connection with a yoke 25. A pedal stop member and switch support 26 has an engagement about the rod 20 as at 27, and is secured to the frame of an automotive vehicle in adjusted position by a clamp stud 28, all as is well known and usual in the art. The member 26 provides a table portion 30 with extensions 31 and 32 that act as stops for the pedal 21 and for a switch device respectively, as will presently appear. To the table portion of the member 26 is attached a switch bracket 33 that has parallel extending arms 34 and 35 carrying a pivot pin 36 that forms a pivotal support for an oscillating circuit closing device 50. The arm 34 of the bracket is extended beyond the arm 35 to provide a bearing for a pin 37 drivingly connected to a segmental gear 38 having interfitting engagement with a pinion 39 provided by the circuit closing device. The segment 38 is to be actuated by the reciprocation of the rod 23 through the agency of a clamp collar 40 carried by the said rod.

The details of the switch device 50 are illustrated in Figs. 3, 5 and 6 on an enlarged scale, and include an inverted U-shaped actuating member 51, the parallel arms of which are apertured at 52 for disposition about the pivot pin 36, and to the bridge 53 of which is secured a support or protective shell 54 housing a conductive fluid circuit closing unit 55. In the preferred form, and that illustrated, the protective member exists in a molded bakelite shell providing a cylindrical passage 56 for the housing of the capsule 55, and a substantially tangential flange 57 by which the protector is secured to the bridge 53 of the actuator by rivets or similar devices 58.

The support or protector 54 is designed to insure the fragile capsule 55 against accidental breakage, and therefore provides the bore or passage 56 for the disposition of the capsule 55, and further provides means for closing each end of the passage as in the ears 60 of clips 61. The clips 61 are carried by the flange 57 of the protector by the rivets 62 through angular extensions 63 and the said flange substantially as indicated in Fig. 3. The disposition of the closure portions 60 of

these clips is illustrated in Fig. 5 where it will be seen that the rigid conductive elements 65 of the mercury capsule 55 are each passed through the portion 60 at 66 and thence electrically connected to the clip 61 by solder or otherwise as indicated at 67. Connection with leads 68 and 69 of wires 70 and 71 of a signal circuit, is conveniently made by reason of terminal portions 72 and 73 carrying the connector screws 74. To insure rigidity of support and to further protect the fragile element against breakage, cotton or other fibrous material 75 may be packed against each end of the capsule 55 within the passage 56 so as to be compressed by the portion 60 when the clips 61 are secured to the protector.

The unit thus constructed and mounted upon the actuating structure as illustrated in Fig. 1, is readily adaptable to be inserted in a signal circuit as illustrated where the conductor 70 is attached to a source of energy as a battery 76 grounded at 77, and the conductor 71 is electrically connected with a signal device 78 which in turn is grounded at 79. Fig. 1 illustrates the association of the parts in a circuit open position and it will be readily seen from this, that when the pedal 51 is moved away from the stop 31 so as to allow movement of the rod 23 toward the left hand of the figure, the circuit closing device 50 will be actuated to a position of reverse inclination through the agency of the segments 38 and 39, that allow the device to oscillate about the pivot 36 by reason of the spring 41 wrapped about the pivot 36, until the carriage engages the stop 32. The ends of the spring 41 engage the switch bracket 33 and the actuating member 51 and urge the latter in a counterclockwise direction of rotation that causes it to follow up the retrograde movement of the rod 23. When thus actuated the reverse inclination of the capsule 55 will cause the conductive fluid 80 to flow to the other end of the glass container and bridge the gap between the rigid conductive elements 65, thus completing a circuit through the elements heretofore set out and causing a signal indicia to be manifest at the device 78.

As so positioned upon an automotive vehicle, the circuit closing device 50 is subjected to rather rough usage and is exposed to stones, sticks, water, mud and other foreign elements, that may be thrown against the same which sooner or later would result in breakage of the fragile element 55 if it is not adequately protected, or which would cause a corrosion of conducting elements, and all of which tend to deprive the unit of its efficiency and operation. By the structure that applicant has provided, the fragile element 55 is enclosed within a protective shell that insures the capsule against accidental breakage, and makes for the exclusion of water and other elements that might cause corrosion of the parts, thus effecting the longevity of the structure as a whole.

While the form of embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. A circuit closer of the class described, comprising in combination, an oscillatable bracket, a protector of dielectric material secured to the bracket and providing a capsule receiving passage, terminal clips secured to the protector, each of said clips providing a closure for the passage and a conductive fluid circuit closer within the passage having electrical connection with each of said clips, and means disposed between the closer member and clips securing the closer against movement relative to the protector.

2. A circuit closer of the class described, comprising in combination an actuating bracket, a protective shell enclosing a circuit closer of the conductive fluid type, said protector being of housed cylindrical form and providing a substantially tangential flange by which it is secured to the bracket, circuit closing means disposed in the shell, and terminal means secured to the flange of said shell and providing a closer for each end of the cylinder.

3. In a circuit closer of the class described, having a fragile conductive fluid circuit closer, the combination comprising, an actuator for oscillating said circuit closer, a protective shell carried by the actuator and enclosing said circuit closer, said shell carrying terminal members having portions completing the enclosure of said circuit closer, and means yieldingly engaging the circuit closer and each of said portions of the terminal members.

4. A switch device comprising, a tiltable operated conductive fluid circuit closer, said circuit closer having leads extending through each end thereof, a protective housing having a passage for receiving said circuit closer, terminals insulatingly supported by said housing, said terminals having ears adjacent each end of said passage for holding said circuit closer within said passage, said ears being connected electrically to said leads, and yieldable means supporting said circuit closer within said housing, said yieldable means being retained in said housing by said ears to insure said circuit closer against movement relative to said housing.

In testimony whereof I hereto affix my signature.

HARRY E. NORVIEL.