May 30, 1933. H. E. NORVIEL 1,911,526

SWITCH

Filed March 20, 1930

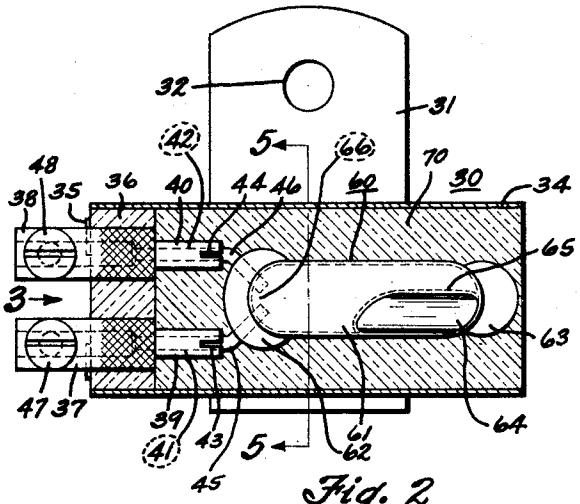


Fig. 2

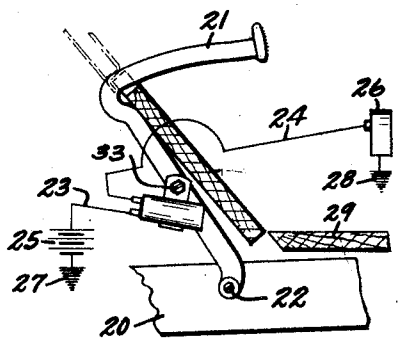


Fig. 1

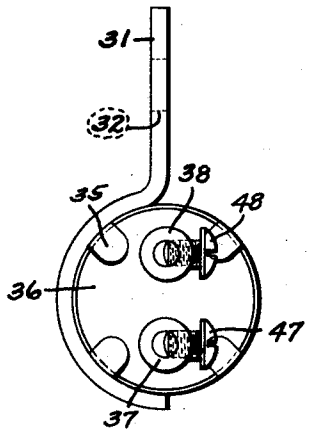


Fig. 3

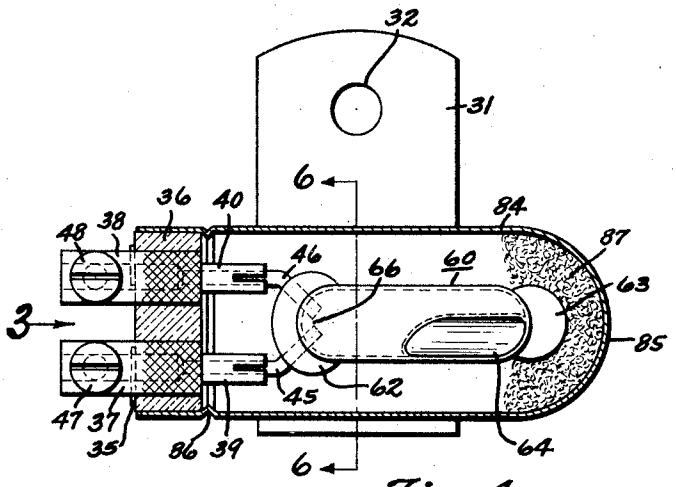


Fig. 4

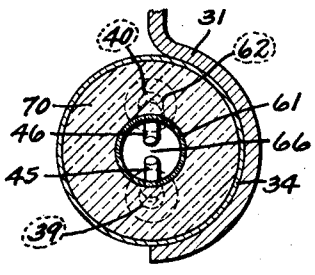


Fig. 5

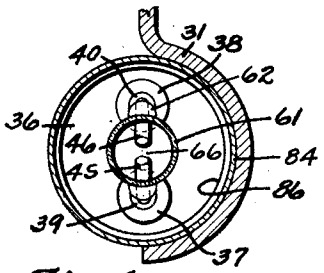


Fig. 6

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UNITED STATES PATENT OFFICE

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SWITCH

Application filed March 20, 1930. Serial No. 437,524.

This invention relates to circuit closers of the conductive-fluid type, and is particularly directed to those switches adaptable for use in signal circuits.

One of the objects of the invention is to provide a conductive-fluid switch of simple design, that will be efficient in operation and that may be produced at low cost.

A further object of the instant invention is to provide a conductive-fluid switch that will be comparatively insured against breakage by accident.

A further object of the instant invention is to so mount the circuit closing element of a conductive-fluid switch, so that blows or damage rendered to an enclosing casing will not be readily transmitted to the circuit closing assembly.

A further object is to provide a relatively nonfragile circuit closer of the conductive fluid type.

A further object of the instant invention is to improve conductive-fluid circuit closers in general.

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 fragmentary view, illustrating in diagrammatic form an adaptation of my improved conductive-fluid circuit closer as it is applied to the signal circuit of an automotive vehicle.

Fig. 2 is a longitudinal sectional view of the switch contributing to the instant invention.

Fig. 3 is an end view thereof substantially as indicated by the arrows 3 of Figs. 2 and 4.

Fig. 4 is a longitudinal sectional view similar to Fig. 2 but of a modified form.

Fig. 5 is a transverse sectional view of my preferred form, substantially as indicated by the line and arrows 5—5 of Fig. 2.

Fig. 6 is a transverse sectional view of a modified form substantially as indicated by the line and arrows 6—6 of Fig. 4.

With particular reference to the drawing, 20 indicates a side rail of the vehicle structure to which is pivoted, in any desired manner, a break lever or pedal 21 as at 22, and that supports my improved circuit closing device 30 as illustrated. The terminals thereof are connected by leads 23 and 24 with a battery 25 and signal lamp 26, each grounded at 27 and 28 respectively. Of course, it is understood that the main portion of the lever 21 is disclosed below the floor boards at 29, of the vehicle cab, as illustrated in Fig. 1, the foot pad being presented for engagement by the operator as desired.

One form of my improved circuit closer is illustrated in Fig. 2, and comprises an attaching bracket 31 having a lug apertured at 32 by which the unit may be supported upon the break pedal 21, by a screw 33 as illustrated in Fig. 1. The bracket 31 is deformed into semi-cylindrical form, or otherwise fashioned, to substantially embrace a metallic shell or housing member 34, where it may be secured by spot-welding or the like. In the form illustrated in Fig. 2, the protective shell 34 exists in the form of an open ended tubular member, in which one terminating edge is provided with tangs 35 struck inwardly to provide radial extensions as illustrated in Fig. 3, and that form abutments against which a terminal supporting member 36 of dielectric material is disposed.

The housing and bracket assembly is complete in itself, and by the provision of the tangs 35 operates to support and retain a conductive-fluid circuit closer as will be seen. This circuit closer assembly embraces the terminal supporting member 36 hereinbefore referred to, and a pair of terminal members 37 and 38 that may be secured within the member 36, as by molding the member thereabout or otherwise securing them together. Each of the terminal members 37 and 38 provide extensions 39 and 40 respectively that are counter-bored at 41 and 42 respectively, and bifurcated at 43 and 44 respectively, for the reception of an electrode 45 or 46 of a conductive-fluid unit 60.

In the construction of the contact closer

assembly the unit 60 with the electrodes 45 and 46 is attached to the terminal support 36 by inserting the electrodes in their respective conductor members 39 and 40, whereupon the union of the members 39, 45 and 40, 46 are secured by pinching the conductors about the electrodes, or by solder administered at the slots 43 and 44 respectively, or by both pinching and soldering. The assembly thus constructed comprises the terminal head 36 with the terminals 37 and 38 electrically connected with the electrodes 45 and 46 of the unit 60 by the connectors or coupling elements 39 and 40. It is thus seen that the unit 60 is then supported by the head member 36 solely through the members 45 and 46.

The contact closer assembly just described is supported within the protective housing 34 in a manner to relieve the strain upon the electrodes 45 and 46, and so as to secure the unit 60 and associated parts securely within the housing in order to protect the same from fracture or blows administered to the shell being administered to the fragile unit 60. In the usual form, the unit 60 is composed of a glass capsule 61 sealed at each end as 62 and 63 to confine a conductive-fluid 64 as mercury, in an oil bath 65. The seal 62 is usually a means for securing the electrodes 45 and 46 within the capsule, and provides their terminating ends in spaced relation as indicated at 66.

This structure when assembled with the terminal head 36 is inserted in the housing 34 at the right hand end thereof, as illustrated in Fig. 2, and passed along so that the head 36 is disposed against the retaining tangs 35. With the parts in this position the shell 34 is filled with a quantity of semi-fluid wax 70, so as to fill substantially all the voids of the casing about the contact closer assembly. In practice, it is found best to use a wax of fairly high melting point, and before adding it to the assembly, to preheat the bracket assembly with its associated contact closer assembly to a pre-determined temperature, as for instance 100° F. and then add the wax 70 in its fluid state. This assembly is then cooled to normal temperatures, whereupon the wax will solidify and tend to retain the circuit closing assembly within the shell 34 and to insulate the unit 60 from any shocks that may be administered to the shell 34. The wax, being of dielectric material tends to insulate the electrodes 45 and 46 from one another and to reduce the tendency of short-circuits between adjacent parts that may result from moisture or other foreign deposits.

In the form illustrated in Fig. 4, the circuit closing assembly is practically identical in that the head member 36 is provided with the terminal members 37 and 38 having the connectors 39 and 40 in communication with the electrodes 45 and 46, which electrodes form the contact elements on either side of the gap 66 within the unit 60. The bracket and closure assembly is somewhat different, in that the protective shell conforms to a cup-like housing 84, having a closed end 85 and a peripheral inwardly directed flange or ridge 86 near the opposite end thereof. In assembling this form a cushion member 87 of fibrous material such as wadded cotton, wool or the like, is placed in the housing 84 against the closed end 85, in sufficient quantity to engage the sealed end 63 of the unit 60 when the contact closer assembly is inserted from the left hand end of the shell as illustrated in Fig. 4. The quantity of packing at 87 is sufficient to firmly hold the remote end of the unit 60 when thus inserted, and so that a firm pressure must be exerted upon the head 36 in order to maintain it against the seating flange 86. When this is done the tangs 35 are bent over into place as illustrated in Fig. 3, so as to hold the parts in assembled form. The completely assembled unit is illustrated in Fig. 4.

It will be seen that by the invention disclosed I have provided a simple conductive-fluid circuit closer that is practically insured against destruction from blows that may be administered to the enclosing shell, and that the life thereof is prolonged to a great extent. The switch, whether constructed after the fashion of Fig. 2 or Fig. 4, may be mounted upon the brake pedal or other member as illustrated in Fig. 1, and it is readily seen that the depression of the pedal 21 will rotate the same about its pivot 22 whereby the switch unit 30 is oscillated in effect, so that the conductive-fluid 64 may bridge the circuit across the gap 66, and when the switch is connected with the leads 23 and 24 as by the terminal screws 47 and 48, that a circuit will be completed from the battery 25 to the signal lamp 26, and thence by way of the ground connections 27 and 28, whereby the desired indicia may be manifest at the lamp 26. Release of the member 21 will tilt the unit 30 to the illustrated position of Fig. 1, in which the signal circuit is open by reason of the conductive fluid 64 flowing away from the gap 66.

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. An electric switch comprising in combination, a base, a pair of terminal members carried thereby, a conductive-fluid circuit closer supported by the terminal members and having a pair of electrodes each

of which is connected to one of said terminal members, supporting said circuit closer, a shell secured about said base and enclosing said circuit closer, and means insulating said circuit closer from shock administered to said shell.

2. An electric switch comprising in combination, a mercury unit circuit closer providing a pair of electrodes, a base having terminal members electrically connected with said electrodes and supporting said circuit closer axially thereof, a shell secured to said base and enclosing said circuit closer, means for insulating said circuit closer from shocks administered to said shell, and means supporting said switch for oscillation whereby the electrodes of said switch may be optionally connected.

3. A mercury switch comprising in combination, an enclosing shell, a terminal head supporting a mercury unit within said shell, and wax filling said shell to aid in support of said unit.

4. A stop light switch comprising in comprising in combination; a tubular housing; a base supporting a pair of terminals and closing one end of said housing; a conductive fluid circuit closer having a pair of electrodes located within said housing and having each of said electrodes connected to one of said terminals to support said circuit closer free of said housing; and means within the housing for aiding said circuit closer against breakage.

5. An electric switch comprising in combination; a cup-shaped housing; a head closing the open end of said housing, said head carrying a pair of terminal members; a conductive-fluid circuit closer having a pair of electrodes each of which is connected to one of said members and supported longitudinally thereof with respect to said housing; and means adjacent the closed end of the housing for insulating said circuit closure from shock administered to said housing.

6. An electric switch comprising in combination; a tubular housing provided with stops; a dielectric head fitting into said housing and engaging said stops to close one end of said housing; terminal inserts carried by said head extending into said housing; a conductive-fluid circuit closer having electrodes connected with said terminals, said terminals supporting said circuit closer free of said housing; and shock absorbing means protecting the circuit closer from damage through said housing and holding said head against said stops.

7. An electric switch comprising in combination, a tubular housing, a base, a plurality of terminal members carried thereby, a conductive-fluid circuit closer supported by the terminal members and having electrodes each of which is connected to one of the terminal members, a shell about the base and enclosing the circuit closer, and means tending to support the circuit closer against breakage.

In testimony whereof I hereto affix my signature.

HARRY E. NORVIEL.