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SWITCH

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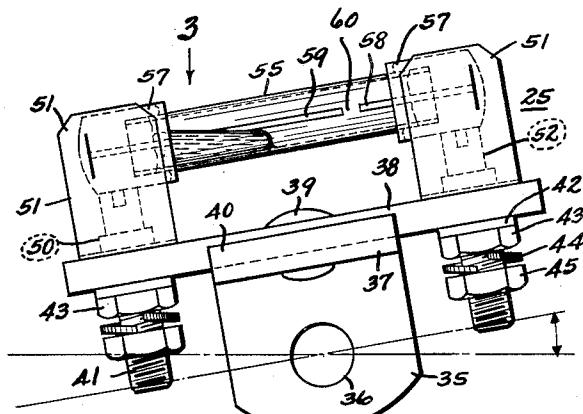


Fig. 2

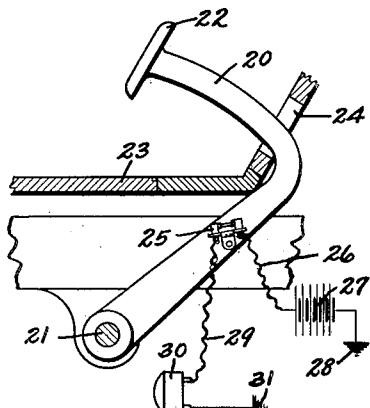


Fig. 1

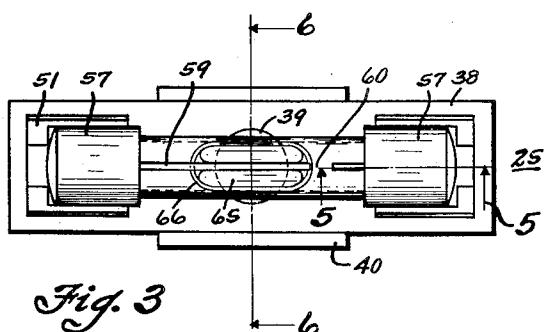


Fig. 3

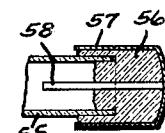


Fig. 5

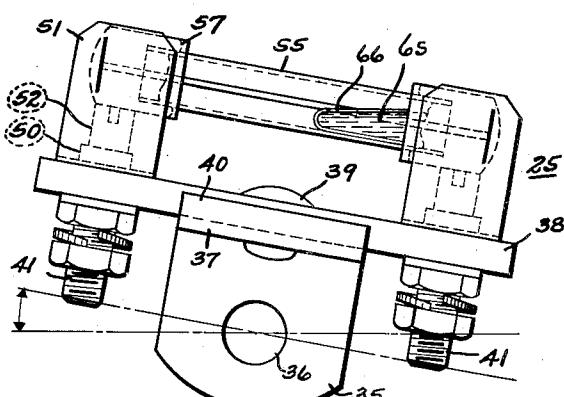


Fig. 4

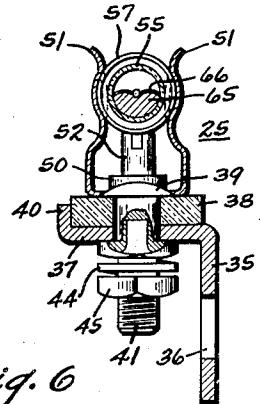


Fig. 6  
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284

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## UNITED STATES PATENT OFFICE

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## SWITCH

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3 Claims. (Cl. 200—152)

This invention relates to improvements in signal circuits of automotive vehicles, and has for an object the provision of an adequate circuit closer of the conductive fluid type.

5 Another object of the invention is to provide a signal switch which will be responsive to slight movements of a control member, the function of which it is designed to indicate.

Another object of the invention is to provide 10 a circuit closer of the type referred to, the operation of which will not be affected by moisture, water, oil or other foreign substances that usually affect the efficiency of signal circuit switches.

Further objects and advantages of the present 15 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.

20 In the drawing:

Fig. 1 is a schematic diagram of a signal circuit applied to an operative of a motor vehicle, which signal circuit includes the improved circuit closer herein to be described.

25 Fig. 2 is an enlarged view in side elevation, of the conducting fluid circuit closer contributing to the instant invention, the same being illustrated in the circuit open position.

Fig. 3 is a plan view of the circuit closer unit

30 substantially as indicated by the arrow 3 of Fig. 2.

Fig. 4 is a side elevation of the circuit closer unit, the same being tilted to the circuit closing position.

35 Fig. 5 is a fragmentary view in longitudinal section of the circuit completing means, substantially as indicated by the line and arrows 5—5 of Fig. 3.

Fig. 6 is a transverse sectional view of the device 40 substantially as indicated by the line and arrows 6—6 of Fig. 3.

With the above indicated objects in view, and with particular reference to the drawing, 20 indicates a control member of an automotive vehicle, and comprises a rotatable shaft 21 secured to 45 frame work of the vehicle in the usual manner, as shown in the illustration; the shaft 21 being connected with the several brake elements or other functioning devices as the option may demand. The control member 20 is provided with 50 a foot pad 22 above the floor boards 23 of the vehicle and movable through an aperture 24 thereof for actuation of the shaft 21 and associated members. Affixed to the control member 20, as below the floor boards 23 there is a circuit 55 closing device of the conducting fluid type 25,

which is connected by a lead 26 with a battery 27 that is grounded at 28, and by a lead 29 to a signal device 30 that is in turn grounded at 31. In the present instance the signal device 30 is 60 designed to be a lamp popularly known as a stop light and designed to warn the public of the application of brakes or the like, in the natural course of bringing the vehicle to a stand-still.

The particular features of the conducting fluid 65 circuit closer contributing to my invention are illustrated in detail in Figs. 2 to 6 inclusive, and include a bracket member 35 apertured at 36 to provide attachment to the control member 20 or other suitable mount. The bracket includes an 70 angular extension or table 37 to which is fixed a nonconducting base 38 by means of a rivet 39 or other appropriate securing device, the table 37 providing an upturned flange 40 disposed along the side of the base 38 so as to prevent turning 75 of the base relative to the portion 37. At each end of the base 38 a terminal screw 41 is provided that is secured within the base by reason of lock washer 42 and clamping nut 43. Each terminal member 41 is further provided with a lock washer 44 and a nut 45, whereby the members 41 provide 80 binding posts for suitable electrical conductors as 26 and 29 hereinbefore described, and may be retained thereon by means of the securing devices 44 and 45.

85 Each terminal screw 41 is provided with a specially formed head primarily including a flange 50 acting as a head to secure a U-shaped spring clamp 51 to the base 38, and is formed beyond the flange 50 with a slotted stud like portion 52, projecting upwardly from the bottom of the clamp 51 substantially as indicated in Fig. 6. This structure provides a spring clip receiving member at each end of the base 38 that is adapted 90 for the reception of a cartridge or fuse like conducting fluid circuit closer of the type illustrated.

95 The conducting fluid circuit closing capsule embodies a tube 55 as of glass, each end of which is embedded in a quantity of nonconducting cement or sealing compound 56 inclosed within a 100 metallic cap 57. Each cap 57 is electrically connected with a conducting wire 58 or 59 that is also embedded in the cement 56 and projects into the tube 55 substantially as indicated in the drawing. It is preferred that the conducting elements 53 and 59 be so proportioned in length that the ends thereof terminate within the tube 55 adjacent one end thereof and at close proximity to one another as illustrated, providing a gap 105 60 between the ends of the elements 58 and 59.

110 Confined within the capsule so as to be freely

movable therewithin is a quantity of conducting fluid 65 immersed in a bath of friction reducing material 66 as illustrated. In the present instance the conducting fluid selected is that of mercury, which being a metal is well adapted to the transmission of electric currents, and when the same comes into engagement with both of the conductor elements 58 and 59, bridging the gap 60, will complete the circuit therethrough if the terminals are properly connected with a suitable source. In order to reduce the friction of movement of the mercury within the capsule, so as to be efficient in its opening and closing circuits through the conductors 58 and 59, a quantity of light oil or equivalent friction reducing substance is added to the capsule before the same is sealed so that the conducting fluid 65 is literally bathed in the friction reducing substance which enables the same to flow over the surface of the glass more readily than would otherwise obtain.

The capsule, or conducting fluid circuit closer thus constructed with its terminating caps 57, is readily adaptable to be received within the spring clip 51 and in so doing automatically makes connections with the leads 26 and 29 forming part of the signal circuit. The stud like portions 52 of the terminal screws form a stop against which the ends of the capsule are supported and aid in completing the contact between the cap 57 and the terminal screws 41. Thus a single relation obtains in which the capsule and its carriage may be assembled, whereby failure of operation will never ensue, since the capsule must always be associated in substantial parallelism with the base 38.

The herein described switch suit, when mounted upon the control member 20 of the vehicle is readily adaptable to warning signals that may be desired to be indicated. In practice the unit 25 is mounted upon the control member 20 so that when the member 20 is in its normal or raised position, that the capsule 55 will be inclined to the horizontal, say about 10°, which will be substantially that position illustrated in Figs. 1 and 2. This inclination, when the fuse unit is assembled with the clips 51 as illustrated, will cause the conducting fluid 65 to flow toward the lower end of the fuse unit, which, as illustrated in Fig. 2, will sever the electrical connection between the elements 58 and 59. Thus, assuming the device as applied to the brake pedal and the same being in the normal position, then no indicia will appear at the signal device 30, but upon slight depression of the control member 20, the switch unit will be tilted to and beyond the horizontal plane whereupon the conducting fluid 65 will quickly flow toward the other end of the capsule, electrically connecting the members 58 and 59 and bridging the gap 60. The signal circuit from the battery through the signal device 30 is then completed and the desired indicia are manifest.

It is thus seen that a signal circuit closer is provided which is readily adaptable for use upon automotive vehicles, and one that is not affected by changes of weather conditions or by the deposits of foreign matter as moisture, water, mud, oil or grease upon the switch unit, since the portion of the circuit that is opened and closed is within the tube 55 and adequately protected against these deleterious elements. The switch is readily responsive to slight movements of the control member 20 and is therefore efficient in

operation. As soon as the member 20 is actuated a slight amount the signal circuit is closed and the appropriate indicia indicated at the signal device 30 substantially as soon as an attempt is made to bring the vehicle to a stop, and the public is thereby given a timely warning of the operator's intention to bring the vehicle to a stop. The circuit controlling device is sensitive to the first movements of the controller 20 and therefore functions to warn the public at the first intention of the operator to stop his vehicle, as compared with those devices in the prior art which invariably begin to function after the operator has materially consummated this stopping of the vehicle. That is, the prior art devices function to warn the public that the operator has applied his brakes a considerable distance and slackened the travel of the vehicle before the driver of the other vehicle in the rear will be aware of a warning. In contrast with this, applicant's device gives a warning after a slight movement of the controller 20. Thus it is seen that manipulation of the control member 20 operates to alter the circuit condition of the conducting fluid circuit closer at an early stage in its functioning, since a slight depression thereof will operate to electrically connect the members 58 and 59 through the common engagement by the conducting fluid 65.

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. In a mercury stop light switch, the combination comprising, a mercury containing capsule, said capsule comprising a tube, a cap member for each end thereof, a conducting element electrically connected with each cap member and spaced from each other within the tube, and a sealing compound of insulating material substantially filling each cap member and closing the ends of the tube, said sealing compound in each of the cap members supporting its respective conducting element and securing the cap members to the tube.

2. In a stop-light switch, the combination comprising, a tube; a cap for each end of said tube; cooperating electrodes disposed at one end of said tube and spaced from each other, said electrodes being electrically connected with said cap members; a conducting liquid movable to and from said spaced ends of said electrodes within said tube; and a di-electric sealing compound supporting said electrodes longitudinally of said tube, and said sealing compound closing each end of said tube and securing said caps about said tube to prevent oxidation of said contacting elements.

3. In a stop-light switch, the combination comprising, a mercury cartridge including a tube, a pair of terminal caps, a pair of electrodes, said electrodes providing contact points adjacent one end of said tube, a quantity of conducting fluid in said cartridge adapted to engage both of said contact points to close a circuit, and a sealing compound supporting said electrodes longitudinally within said tube and in electrical connection with said caps, and said sealing compound sealing said caps to said tube to prevent oxidation of said contacting elements.