

Sept. 2, 1941.

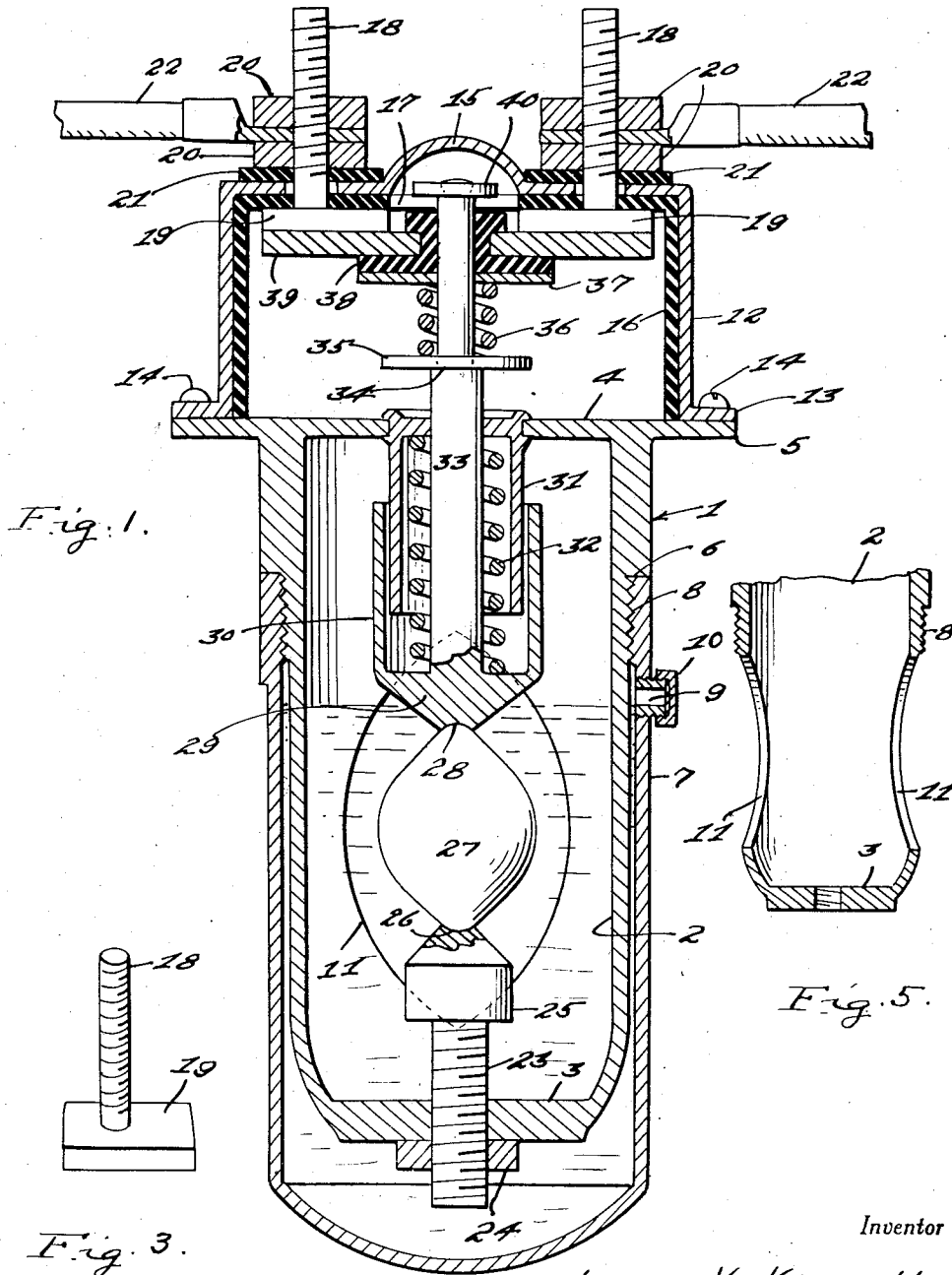
L. V. KIMMELL

2,254,294

SWITCH

Filed Aug. 8, 1940

2 Sheets-Sheet 1



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UNITED STATES PATENT OFFICE

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SWITCH

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Application August 8, 1940, Serial No. 351,797

2 Claims. (Cl. 200—52)

My invention relates to improvements in impact switches for use in the circuit of automobile or airplane power plants and the like.

The principal object of the invention is to provide a heavy duty, switch which will be operative under severe shock, or impact; as for instance, in a collision, to break the circuit in which it is interposed and which is constructed and arranged so that the current does not flow through the controlling mechanism, has more contact surface than present day impact switches, functions properly, and in which the control parts are submerged in oil so that they will not corrode or be affected in any way by moisture or atmospheric changes.

Another object is to provide a switch of the character and for the purpose above set forth which is simple in construction, easy to install and service and economical to manufacture.

To the accomplishment of the above, and subordinate objects presently appearing, a preferred embodiment of my invention has been illustrated in the accompanying drawings, set forth in detail in the succeeding description, and defined in the claims appended hereto.

In said drawings:

Figure 1 is a view in vertical section of the preferred embodiment of my improved switch, the parts being shown in circuit closing position,

Figure 2 is a similar view showing the parts disabled,

Figure 3 is a view in perspective of one of the binding posts and contact plate,

Figure 4 is a view in perspective of the bridge plate, and

Figure 5 is a detail fragmentary view in vertical section of the lower end of the shell.

Referring to the drawings by numerals, the illustrated embodiment of my improved switch comprises, as its basic element, a substantially cylindrical housing 1 adapted to be disposed in upended position and including a main shell 2 having a closed flat bottom 3, and a closed top 4 extending beyond the sides of the shell to provide a flange 5. The shell 2 is reduced to provide a shoulder 6 around the same adjacent its top 4. A cup-like oil container 7 fitting upwardly over the shell and spaced from the sides and bottom of the same is threaded, as at 8, onto the shell 2 adjacent the shoulder 6 in abutting relation to the latter. A filler nipple 9 having a closure cap 10 is provided in the container 7 adjacent the upper end thereof for introducing oil into said container to the level of the nipple. The shell 2 is provided with a pair of vertically elongated

openings 11, substantially oval, and in diametrically opposed sides of the shell, respectively, whereby the oil will fill the shell to the level of the nipple 9 also. The openings 11 serve an additional purpose presently explained.

Surmounting the top 4 of the shell, axially thereof, is a circular cap 12 of inverted cup shape having a lower edge flange 13 by means of which and screws 14 it is detachably secured to the flange 5, said cap having a central upwardly bowed portion 15 for a purpose presently seen. A lining member 16 of insulation material and having a central aperture 17 in the top thereof is fitted in the cap 12.

A pair of binding posts 18 extend upwardly through the tops of the cap 12 and lining member 16 upon diametrically opposite sides of the axis of the cap 12 and housing 1 and which are provided on the lower ends thereof with a pair of flat, rectangular contact plates 19 also disposed upon diametrically opposite sides of said axis. A pair of clamping nuts 20 are provided on each post 18 with subjacent insulation washers 21 for securing the posts 18 in position with the plates 19 clamped against the top of member 16, said nuts also serving for the attachment to the posts of a pair of terminals 22 by which the device may be connected in any suitable manner in one side of the circuit, not shown, of an automobile, or airplane power plant.

The following means is provided for normally bridging the contact plates 19.

Threaded into the bottom 3 of shell 2 is an axial stud 23 extending upwardly therein and locked thereto by a jamb nut 24. The stud 23 is provided with a head 25 having a conical top provided with a concave axial seat 26, said head being disposed slightly above the bottoms of the openings 11 for access thereto through the same.

Fitted at one end in the seat 26 is an upstanding substantially elliptical tumbler 27 of suitable metal having its opposite end fitted in a seat 28, similar to seat 26, and provided in the bottom 29 of a cylindrical cup 30, the cup being axially aligned with the stud 23 and the bottom thereof being tapered downwardly with the seat 28 in the axis of the cup and slightly below the tops of openings 11. Suitably secured at its upper closed end in the top 4 of shell 2, to depend axially therefrom is a sleeve 31 extending partway into the cup 30. A coil spring 32 interposed between the top of the sleeve 31 and the bottom 29 of the cup 30 urges the latter downwardly so that said tumbler 27 is yieldingly clamped between the seats 26, 28 and the cup

30 is held in an elevated position in opposition to the spring 32.

The bottom 29 of cup 30 has formed integrally therewith an axial shaft 33 extending upwardly through the spring 32 and slidably extended through the top of sleeve 31 into the cap 12. The shaft 33 has a reduced upper end portion in the cap 12 providing a shoulder 34 thereon seating a washer 35. A coil spring 36 sleeved onto the upper end of the shaft 33 and seating on the washer 35 yieldingly supports a metal washer 37 slidable on the shaft and supporting, in turn, a grommet-like member 38 of insulation to which is secured, intermediate its ends, a centrally apertured, rectangular bridge plate 39 of conductive material bridging the contact plates 19, said spring urging said washer 37, grommet member 38, and bridge plate 39 upwardly on the shaft 33. A head 40 on the upper terminal of the shaft 33 serves to limit upward movement of the washer 37, member 38 and plate 39 on said shaft, said head being normally spaced above said member 38 for a purpose presently seen.

As will now be seen, in the described normal position of the parts, the contact plates 19 are firmly bridged so that the device is maintained in circuit closing position by the tumbler 27. However, under severe impact, of a vehicle equipped with the switch, against an object, the tumbler 27 will be dislodged from the seats 26, 28. Under this condition the cup 30 and shaft 33 will drop under the urge of the spring 32 suddenly into the downward limit of movement thereof as established by engagement of the washer 35 with the top of sleeve 31. As a result of such downward movement of part 33, head 40 thereof will pick up and depress grommet-like member 38 on the shaft 33 to disengage bridge plate 39 from contact plates 19 and disable the switch. To reset the switch, the container 7 is removed, or detached, so that access to the tumbler 27 may be had, and also to the cup 30, by way of openings 11. By manually lifting cup 30 in opposition to spring 36 slightly above normal position, the tumbler 27 may be reset in seats 26, 28. Under such lifting of cup 30 the bridge plate 39 will be reengaged with contact plates 19 in opposition to spring 36. The central portion 15 of top 12 provides a clearance for the head 40 of shaft 33 so that it may be lifted above normal position.

The foregoing will, it is believed, suffice to impart a clear understanding of my invention without further explanation.

Manifestly the invention, as described, is susceptible of modification without departing from the inventive concept, and right is herein reserved to such modifications as fall within the scope of the subjoined claims.

Having described the invention, what I claim is:

1. In a switch, a substantially cylindrical housing having closed upper and lower ends, respectively, a hollow cap member surmounting the upper end of the housing, and forming a closed chamber therewith, an axial plunger shaft vertically slidable in the upper end of said housing and having an upper end in said chamber and a socketed lower end in said housing, a member upstanding axially from the lower end of said housing and having a socketed upper end therein, a substantially elliptical member having ends fitting in said sockets and holding the plunger shaft in a normal position and against downward movement, said elliptical member being adapted to be dislodged from said sockets under impact against an object of a vehicle equipped with the switch, a pair of contacts fixed in the upper end of said chamber upon diametrically opposite sides of said plunger shaft, means on said plunger shaft within said chamber yieldingly bridging said plates in the normal position of said shaft, and spring means urging said shaft downwardly, said housing being provided with a pair of diametrically opposite openings therein for access to said elliptical member.

2. In a switch, a substantially cylindrical housing having closed upper and lower ends, respectively, a hollow cap member surmounting the upper end of the housing, and forming a closed chamber therewith, an axial plunger shaft vertically slidable in the upper end of said housing and having an upper end in said chamber and a socketed lower end in said housing, a member upstanding axially from the lower end of said housing and having a socketed upper end therein, a substantially elliptical member having ends fitting in said sockets and holding the plunger shaft in a normal position and against downward movement, said elliptical member being adapted to be dislodged from said sockets under impact against an object of a vehicle equipped with the switch, a pair of contacts fixed in the upper end of said chamber upon diametrically opposite sides of said plunger shaft, means on said plunger shaft within said chamber yieldingly bridging said plates in the normal position of said shaft, spring means urging said shaft downwardly, said housing being provided with a pair of diametrical openings therein for access to said elliptical member, and a cup-like oil container fitting upwardly over said housing and threaded thereon, said container being spaced from the outer wall of the housing to provide for the passage of oil therefrom into said housing by way of said openings.

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