Nov. 21, 1967 G. J. FLYNN, JR 3,354,283

ELECTRICAL SWITCH

Filed Oct. 14, 1966

Fig. 1

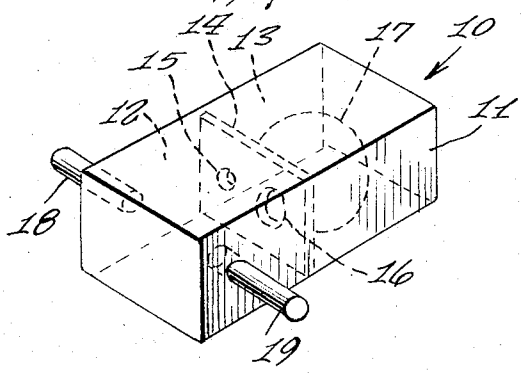



Fig. 2

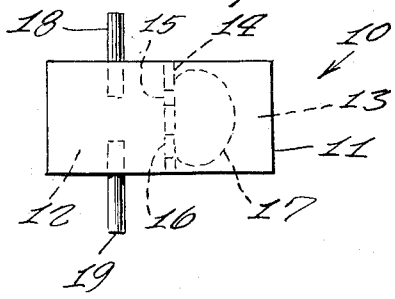



Fig. 3

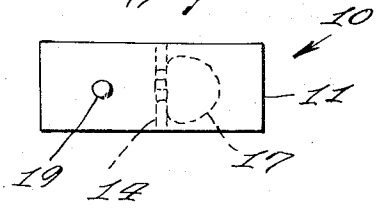



Fig. 4

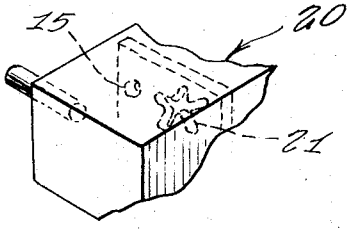



Fig. 7

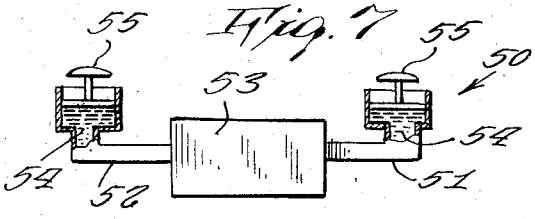



Fig. 5

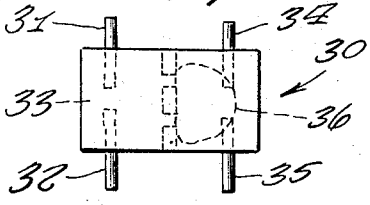



Fig. 8

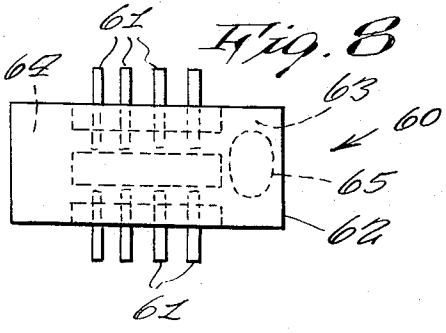
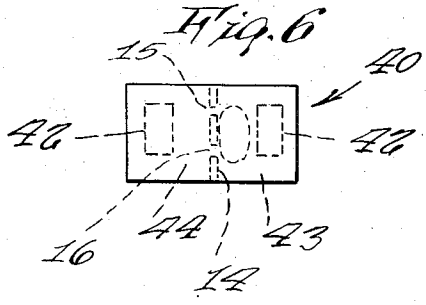



Fig. 6




INVENTOR.

GEORGE J. FLYNN, JR.

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# ELECTRICAL SWITCH

George J. Flynn, Jr., 5101 39th Ave., Long Island City, N.Y. 11104

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3 Claims. (Cl. 200—152)

## ABSTRACT OF THE DISCLOSURE

An electric switch that is automatically operated to open or close by a change in a momentum of a switch, the switch including a pair of chambers having a small opening therebetween through which a drop of mercury is forced to pass by the momentum change and thus either close a circuit between a pair of spaced apart electric contacts or open a circuit between a pair of spaced apart contacts depending upon whether the contacts are in the chamber into which the mercury is forced or the chamber out of which the mercury is forced.

This invention relates generally to electrical switches.

The principal object of the present invention is to provide an electrical switch which is inherently waterproof and which is designed so that it may be manufactured in a relatively very small size.

Another object of the present invention is to provide an electrical switch which is designed to be used for opening electrical circuit and completing another electrical circuit.

Yet another object of the present invention is to provide an electrical circuit which may be manufactured by operations that are simple and which may be highly automated.

Still another object of the present invention is to provide an electrical circuit which is adaptable for noncritical use such as where higher resistence may be tolerated and wherein a less expensive liquid than mercury may be used in its construction.

Still another object of the present invention is to provied an electrical switch that is automatically operated by a change in a momentum of the switch so as to force a drop of mercury through a relatively narrow opening from one chamber into another, thereby either completing an electrical circuit between a pair of spaced apart contacts, breaking a circuit between a pair of spaced apart contacts if such contacts are within the chamber from which the drop of mercury is forced outward, or momentarily closing an electrical circuit between spaced apart contacts located within the relatively narrow opening.

Still another object of the present invention is to provide an electrical switch that is non-arcing.

Another further object of the present invention is to provide an electrical switch that is adaptable for construction into flashlights, for cordless electrical toothbrushes or similar devices and which may be used for placement in otherwise inexcessible locations.

Other objects are to provide an electrical switch that is simple in design, inexpensive to manufacture, rugged in construction, easy to use and efficient in operation.

These and other objects will be readily evident upon a study of the following specification and the accompanying drawing wherein:

FIGURE 1 is a perspective view of one form of the present invention;

FIGURE 2 is a top plan view thereof;

FIGURE 3 is a side elevation view thereof;

FIGURE 4 is a fragmentary perspective view showing a modified form of the present invention;



FIGURE 5 is a plan view of another modified form thereof;

FIGURE 6 is a plan view of yet another modified form;

FIGURE 7 is a side elevation view shown partly in cross-section and illustrating a further modified form;

FIGURE 8 is a top plan view of still another modified form of the invention.

Referring now to the drawing in detail, and more particularly to FIGURES 1, 2, and 3, the reference numeral **10** represents an electrical switch according to the present invention wherein there is a container **11** that may be made from plastic material, glass or other non-conductive substance. The container encloses a pair of compartments **12** and **13** which are separated by means of a transverse nonconductive plate **14** having an orifice **15** therein. The opening **15** is relatively smaller than an orifice **16** provided in the plate **14**. As shown in FIGURES 1, 2 and 3, a drop of mercury or other conductive liquid **17** is placed within the compartment **13**.

A pair of metal contacts **18** and **19** protrude into the container and the compartment **12** as shown. The opening **15** is sufficiently small so that the drop of mercury will not pass therethrough as long as the switch is maintained in a stationary position. The surface tension of the mercury retains it in a singular drop, thereby preventing a portion thereof to squeeze through the relatively small opening **15**.

In operative use, to transfer the mercury from one chamber or compartment to the other, and thus switch on a circuit controlled by the switch, simply tap the entire device against a stationary object such as the palm of a person's hand or the top of a table. The momentum thus imparted to the mercury by the action will cause the mercury to pass through the relatively larger orifice **16** into the other chamber. Gas contained within the other chamber will at the same time pass through the smaller opening **15** into the chamber from which the mercury has left, thereby assisting the mercury to transfer and preventing the mercury from reentering the original chamber. To reverse the switch, the opposite end of the device is tapped against a stationary object so to repeat the process in a reverse direction. The switch will not change its state unless it is tapped or otherwise is subjected to a critical acceleration.

In a modified construction shown in FIGURE 4 of the drawing, the electrical switch **20** includes a larger orifice **21** which is of geometric configuration as shown so to permit more fluid to pass there-through. Thus a higher electrical rating may be attained.

In FIGURE 5 a further modified construction is shown wherein the electrical switch **30** is shown to have a pair of contacts **31** and **32** communicating with one chamber **33** and another pair of contacts **34** and **35** which communicate with a chamber **36**. In this construction, when the mercury is passed from one chamber to the other, one circuit may be broken and another one connected.

In FIGURE 6 a further modified electrical switch **40** is shown which includes masses **41** and **42** within each chamber **43** and **44** respectively. The masses **41** and **42** are for the purpose of aiding the fluid to transfer from one chamber to the other.

In FIGURE 7 a further modified electrical switch **50** is shown which includes arms **51** and **52** on opposite sides of the housing **53**, and wherein the arms may be filled with either gas or liquid **54** against which a manually controlled push-bottom **55** may be downwardly depressed. This comprises a push-button type of operation.

In FIGURE 8 a further modified electrical switch **60** is shown which includes a multiple of contacts **61** protruding from opposite sides into the housing **62** at a central portion thereof between chambers **63** and **64**. In

this construction when the drop of mercury 65 is transferred from one chamber to the other, it makes a plurality of momentary contacts between opposite contacts as it passes thereby.

Obviously other forms of the invention may be made such as placement of a screen or mesh over the orifice 16 and the like.

While various changes may be made in the detailed construction it is understood such changes will be within the spirit and scope of the present invention as defined by the appended claims.

I claim:

1. An electrical switch, comprising in combination, a housing, said housing enclosing a pair of spaced apart chambers, said chambers being spaced apart by a transverse plate, said housing and said plate being of a non-electrical conducting material, a pair of openings through said plate communicating between said chambers, one of said openings being relatively smaller than the other, a drop of mercury within said housing, said drop of mercury being movable through the relatively larger of said openings in said plate between said chambers by a sudden change in movement momentum of said housing, said relatively smaller opening in said plate serving to displace air into one of the chambers from which said drop of mercury has been evacuated by said sudden change in momentum of movement and said housing further including a pair of spaced apart contacts engageable by said drop of mercury so to either close an electrical circuit, open an electrical circuit, or momentarily engage the closing of a circuit.



2. The combination as set forth in claim 1 wherein said pair of spaced apart electrical contacts protrude into one of said chambers where they may be electrically connected when said drop of mercury enters said chamber.

3. The combination as set forth in claim 1 wherein said pair of spaced apart electrical contacts are located upon opposite side diametrically within said opening of said plate through which a drop of mercury is forced, thereby producing a momentary engagement of said contacts while said drop of mercury is passing through said opening of said plate.

**References Cited**

UNITED STATES PATENTS

| | | | |
|---|---|---|---|
| 2,182,216 | 12/1939 | Staley | 200—33.1 |
| 2,935,579 | 5/1960 | Fishman | 200—33.1 |


ROBERT K. SCHAEFER, *Primary Examiner.*

H. HOHAUSER, *Assistant Examiner.*