

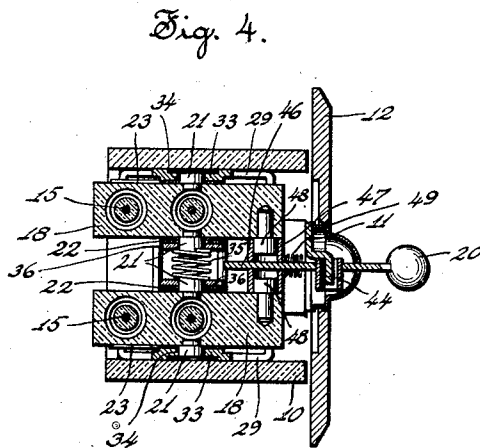
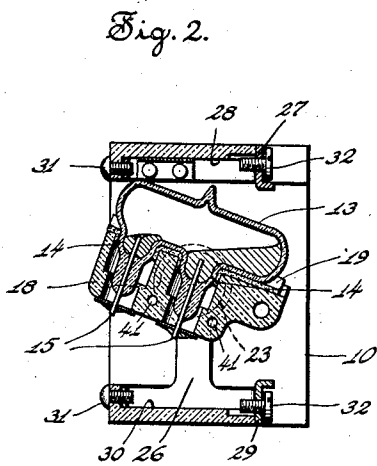
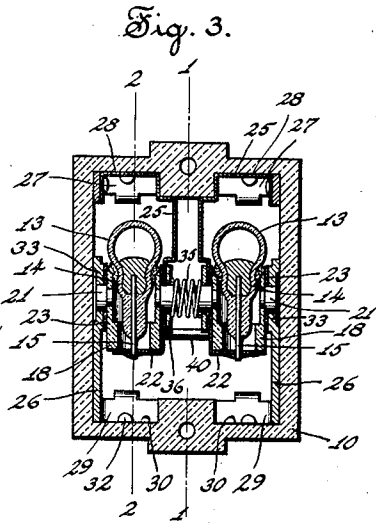
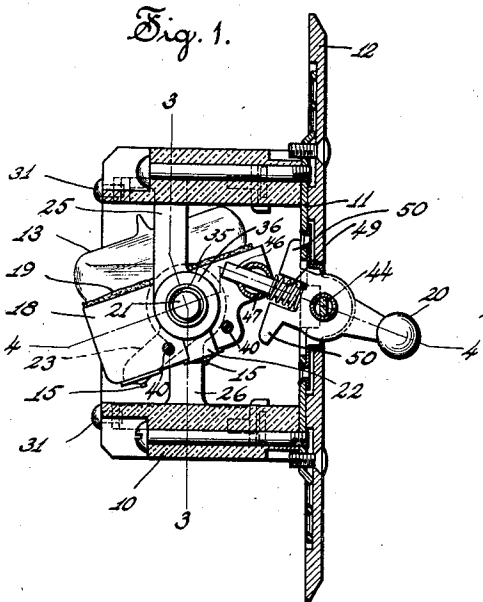
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SWITCH MECHANISM

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## UNITED STATES PATENT OFFICE

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## SWITCH MECHANISM

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This invention relates to an electric switch having one or more mercury tubes.

The aim of the invention is to provide a switch mechanism of this sort having various features of novelty and advantage.

More particularly, an aim of the invention is to provide an improved form and arrangement of parts wherein flexible wires leading to the electrodes or terminals of the mercury tube or tubes, together with the disadvantages incident to such wires, are eliminated.

Another object of the invention is to provide an efficient and durable switch mechanism which is composed of relatively few parts, which is inexpensive to manufacture, which is simple to assemble and disassemble, which is rugged in construction, and which is positive in its operation.

Other objects will be in part obvious and in part pointed out more in detail hereinafter.

The invention accordingly consists in the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereinafter set forth, and the scope of the application of which will be indicated in the appended claims.

In the accompanying drawings, wherein 1 have shown, for illustrative purposes, one of the embodiments which the present invention may take, it being understood that this disclosure is by way of illustration only:

Figure 1 is a vertical sectional view taken through the switch mechanism, this view being taken substantially on line 1—1 of Fig. 3.

Fig. 2 is a sectional view taken substantially on line 2—2 of Fig. 3;

Fig. 3 is a vertical transverse sectional view taken substantially on line 3—3 of Fig. 1; and

Fig. 4 is a horizontal sectional view taken substantially on line 4—4 of Fig. 3.

Referring to the drawings in detail, 10 designates a casing or base preferably formed of insulating material and of any suitable construction. Secured to the forward face of this base is the usual bridge or supporting plate 11 and a flush plate 12. In the present

illustrative disclosure, there are mounted within this casing two mercury tubes, it being evident, however, that the switch mechanism may have more or less than two such tubes, depending on the use or application of the mechanism. Each of these tubes has a tube or envelope 13 provided with two depending wells 14 into which extend the upper ends of electrodes 15, these electrodes being suitably sealed in the bottom wall of the tube. Each of the tubes is carried by a pivoted retainer or support 18 formed of suitable insulating material, such as bakelite. The upper ends of these retainers are grooved, as illustrated, so as to accommodate the tubes and, by preference, there are interposed between the retainers and the tubes strips of felt 19 for the purpose of cushioning the tubes. The retainers have vertical openings through which the electrodes are adapted to extend, as shown most clearly in Figs. 2 and 3. The retainers are pivoted on a common axis for tilting movement under the influence of an operating lever 20, and to this end each of the retainers is provided at each side with a bearing stud 21. These studs are preferably formed of insulating material and may be made integrally with the retainers. In the present instance, the studs are shown as being made separately from the retainers and as being fitted in openings in the sides of the retainers.

The electrodes of each tube are respectively connected to contact members 22 and 23. In the present instance, the contact member 22 is electrically connected to the foremost electrode and extends upwardly along the inner side of the retainer. It has an opening through which one of the projections 21 extends. The other contact member 23 is electrically connected to the rear electrode, extends upwardly along the outer side of the retainer and has an opening through which the other of the pivots or projections 21 extends. These contact members are preferably formed of sheet metal and are carried by and are movable with the retainers.

Each of the retainers is pivotally supported by, and has its contact members 22 and 23 respectively in electrical connection with,

conductors 25 and 26. The conductors 25 are preferably formed of spring metal and are respectively connected to contact posts 27, these posts being located in grooves 28 in the upper wall of the base 10. The conductors 26 are shown in the present illustrative disclosure as being formed integrally with contact posts 29 located in grooves 30 in the bottom wall of the base. The contact posts 27 and 29 are secured in place by screws 31 and carry the usual terminal screws 32. The conductors 26, which are preferably rigid, extend upwardly along the side walls of the casing or base and have, adjacent their upper ends, bosses or offset portions 33 provided with aligned openings 34 in which the outer or extreme projections or pivots 21 of the retainers are adapted to have a bearing. The inner faces of the bosses 33 engage against the contact members 23. The conductors 25 have, adjacent their lower ends, openings through which the opposed projections 21 extend, and these conductors are in frictional engagement with the contacts 22. The conductors 25, as stated, are preferably of spring metal, and when the parts are assembled, these conductors resiliently engage the respective retainers and urge the same towards the respective conductors 26. Supplemental to the spring pressure of the conductors 25 is a coiled spring 35 having its opposite ends respectively surrounding the opposed projections 21. Interposed between the ends of this spring and the conductors 25 are insulating washers 36. In order to insure proper alignment of the mercury tubes and operation of these tubes in unison, one of the retainers, in the present instance the left hand one, carries a pair of transversely extending pins or rods 40. The right hand ends of these rods have a close sliding fit in openings 41 in the other retainer.

Any suitable means may be employed for rocking the mercury tubes in order to make and break the circuits, but by way of example, I have shown the lever 20. This lever is pivoted or journaled on a tongue 44 formed integrally with the bridge 11. The lever is provided with a tang 46 having sliding engagement in a tube 47 which is journaled on studs 48 carried by the supports 18 adjacent their forward ends. About the tang 46 and engaging the tube 47 is a spring 49 for throwing the mercury switches from one position to another with a snap movement after the dead center is passed. The lever also has projections 50 for limiting the extent of movement of the lever.

From the foregoing description taken in connection with the accompanying drawings, it will be seen that the mercury tubes are supported by the conductors and the terminals of the tubes are electrically connected to these conductors by fixed contacts. The use of flexible wires leading to the terminals or elec-

trodes is avoided. The improved switch has a very long life and has other advantages as heretofore pointed out.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

I claim as my invention:

1. In a switch mechanism, a base, a pair of sheet metal conductors fixed thereto and having aligned openings, a support pivoted between said conductors and having studs extending into said openings, one of said studs having a bearing in one of said openings, a mercury tube on said support and having depending electrodes extending therethrough at a distance from said studs, a sheet metal contact connected to one of said electrodes extending upwardly at one side of said support and engaging one of said conductors, and a sheet metal contact connected to the other of said electrodes extending upwardly at the other side of said support and engaging the other of said conductors.

2. In a switch mechanism, a base, two pairs of conductors having aligned openings, a support pivoted between the conductors of each pair, a mercury tube carried by each support, a pair of contacts carried by each support respectively connected to the electrodes of the tube thereon and frictionally engaging the respective conductors, said contacts having openings registering with the openings in said supports and projections carried by said supports and engaging in the openings of said conductors and contacts, and means for operating said supports in unison, one of said supports carrying a transverse rod and the other of said supports having an opening slidably receiving said rod.

3. In a switch mechanism, a base, two pairs of conductors having aligned openings, a support pivoted between the conductors of each pair, a mercury tube carried by each support, a pair of contacts carried by each support and frictionally engaging the respective conductors, said supports having projections engaging in said openings, and a spring between the two inner conductors and pressing the same towards the outer conductors.

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