July 31, 1934. C. W. HUNT 1,968,081

MERCURY SWITCH

Filed Aug. 26, 1932

Fig. 1.

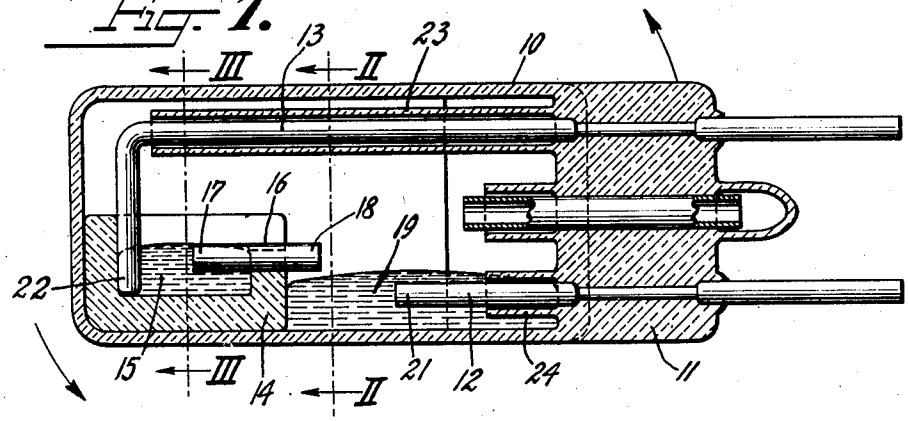


Fig. 2.

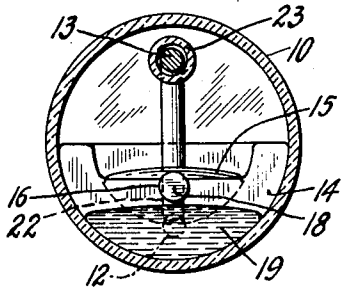


Fig. 3.

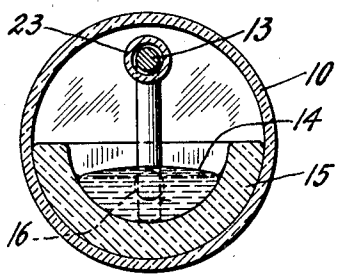
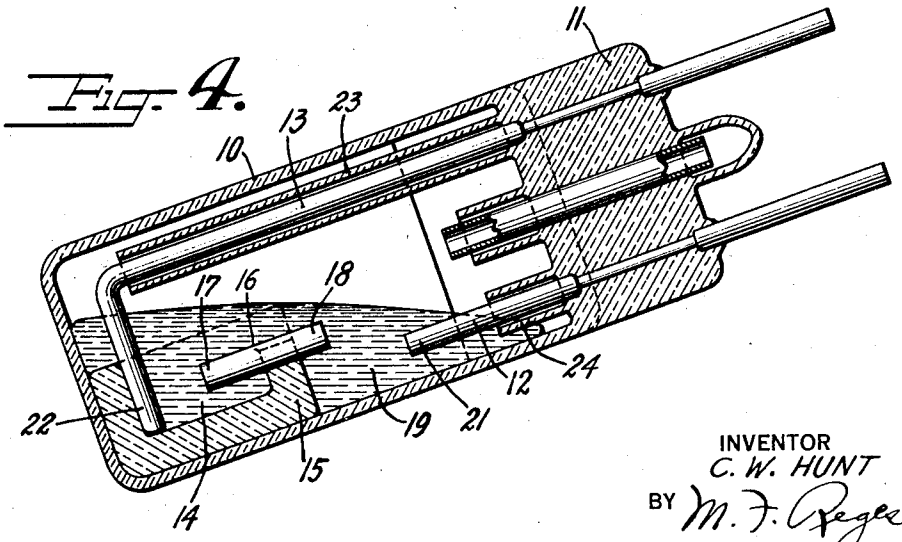


Fig. 4.



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MERCURY SWITCH

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Application August 26, 1932, Serial No. 630,508

3 Claims. (Cl. 200—152)

This invention relates to mercury switches and relates particularly to switches which must momentarily pass heavy loads.

The present switch is of particular advantage in connection with circuits including incandescent electric lamps of the tungsten filament type. In such lamps, burning on the commercial lines, when the filament is cold an initial lighting may cause a flow of current of from 80 to 90 amperes which reaches normal of 10 amperes as the filament heats up. When such a circuit is closed by bringing two bodies of mercury together an arc is produced and the excessive heat generated is often detrimental to the life of the switch.

A switch constructed to make and break an electric lighting circuit must therefore be of generous proportions and is often cumbersome in an attempt to provide sufficient contact and cooling area. It will be understood that one of the main uses for a lighting switch is in the form of a wall switch which must necessarily be compact to fit the space allotted and must compete in size and cost with the usual mechanical switch.

It is an object of the present invention to provide a mercury switch of compact form capable of passing heavy currents in the absence of overheating of the electrodes.

Another object of the invention is to provide a mercury switch wherein means are provided to temporarily limit the flow of current.

Another object of the invention is to provide a switch operable to limit and release a flow of current.

Other objects and advantages of the invention will be readily apparent from the following description and appended drawing wherein:

Fig. 1 is a longitudinal sectional view of a switch embodying the present invention;

Fig. 2 is a view taken on line II—II of Fig. 1;

Fig. 3 is a view taken on line III—III of Fig. 1; and

Fig. 4 is a view similar to Fig. 1 but showing the device tilted so that the mercury bodies unite to close a circuit.

A switch constructed in accordance with the present invention may comprise a sealed envelope 10 having a press portion 11 through which electrical conductors 12 and 13 are sealed. Within the envelope is an insulative element having a cup 14 of lavite or other suitable material to hold a mercury pool 15. Extending through and supported by a wall of the cup is a resistance element 16 which may be silicon carbide, a carbon resistance element, tungsten carbide or other suitable high resistance material. One end 17 of the element is disposed in contact with the mercury pool 15 and the other end 18 extends from the cup for contact with a movable mercury body 19.

The mercury body 19 is in contact with an end 21 of the electrical conductor 12 and an end 22 of the electrical conductor 13 is disposed in contact with the mercury pool 15. An insulative sleeve 23 is provided for the conductor 13 and a similar sleeve 24 partially encloses the conductor 12.

It will be evident that the resistance 16 is so disposed as to be connectible in series with the pool 15 and the mercury body 19. Thus as the device is tilted, as shown in Fig. 4, the mercury body 19 first contacts with the resistance and the flow of current is limited. For example, if the resistance is 10 ohms, at 100 volts, only 10 amperes will pass whereas if the mercury bodies contacted at once a relatively heavy current would flow by reason of the cold filaments of lamps to be lighted. By reason of the resistance element, however, a low current flow is attained giving the filaments time to heat up so that as the two mercury bodies unite to carry the current the amount thereof will be within the carrying capacity of the mercury bodies and over heating or other detrimental effects are avoided.

It will be evident that the present invention provides a structure wherein a resistance element is mounted within a sealed container in such a manner that, when the device is tilted to operate the same, the resistance serves as a current-limiting element preparatory to the union between the mercury bodies. It will be obvious that, if desirable, the end 18 of the resistance element 16 may be disposed in a pocket of mercury so that, when the body of mercury 19 is moved, it will first make contact with a mercury pool instead of making direct contact with the end of the resistor 18. The operation of the device will otherwise be the same since, as the device is tipped, the movable body of mercury would flow over the resistance and the several bodies of mercury would be united for the flow of electrical energy.

As hereinbefore mentioned, devices of the present character are of advantage where initial surges of heavy flows of current occur and by reason of the present construction a switch is provided to avoid the derimental overheating and meets practical operating conditions.

Although a preferred embodiment of the invention is shown and described herein it is to be understood that modifications may be made

therein without departing from the spirit and scope of the invention as set forth in the appended claims.

What is claimed is:

1. A mercury switch device comprising a sealed envelope, a pair of electrical conductors, the ends of said conductors being disposed in spaced relation, a mercury body in contact with one of said conductors, an insulative body between said mercury body and the end of the other conductor and a resistance element supported by said body.

2. A mercury switch device comprising a sealed envelope, a pair of electrical conductors extending through and sealed into the wall of said envelope, a refractory body having a pocket, a mercury pool in said pocket, a resistance element supported by said refractory body, and in contact with said mercury pool, a movable mercury body, one of said conductors being in contact with said pool the other conductor being in contact with said movable body of mercury.

3. A mercury switch device comprising a sealed envelope, a pair of electrical conductors extending through and sealed in the wall of said envelope, a mercury pool, a movable body of mercury, a resistance element in contact with said pool one of said conductors being in contact with said pool, the other conductor being in contact with said movable body of mercury and said resistance element being positioned to electrically connect said mercury pool and body when the device is tilted.

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