June 12, 1928.

1,673,676

J. D. HILLIARD

ELECTRIC SWITCH

Filed Feb. 10, 1923

Fig. 1.

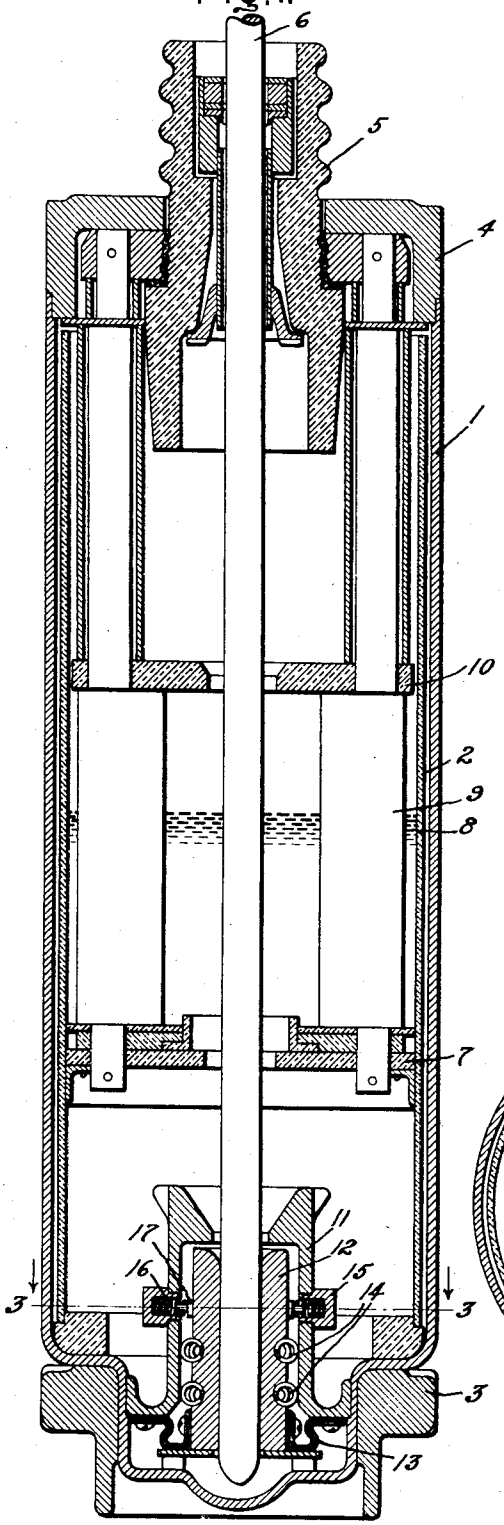


Fig. 2.

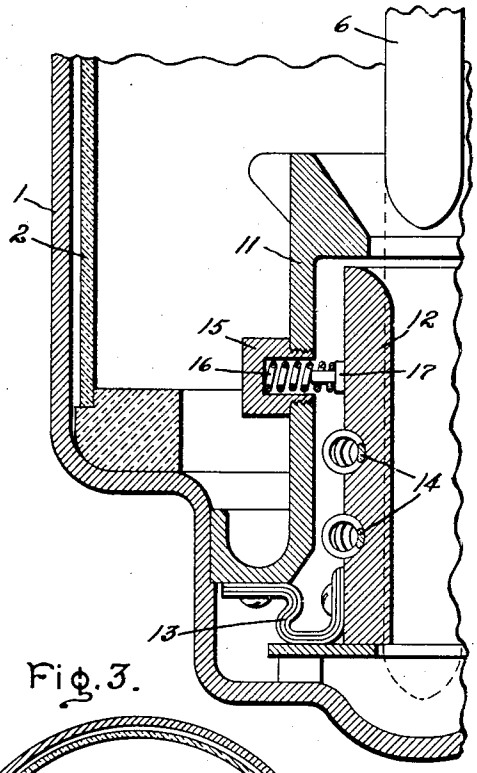
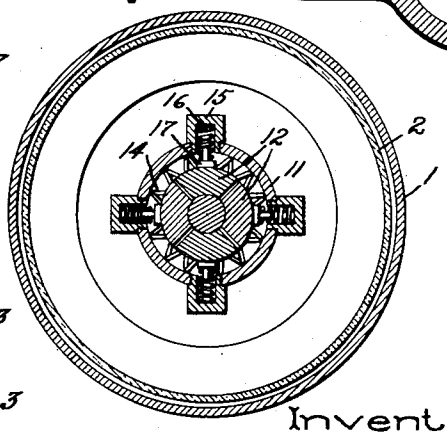


Fig. 3.



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UNITED STATES PATENT OFFICE.

JOHN D. HILLIARD, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ELECTRIC SWITCH.

Application filed February 10, 1923. Serial No. 618,181.

This invention relates to electric switches of the oil break type such as are employed in controlling high potential circuits and has reference particularly to the manner of supporting one of the contact members.

In the use of oil switches such as that shown for example in the patent to Hewlett and Eveleth, No. 1,093,051, where the stationary contact member has been made segmental in form with the segments held together by springs surrounding the contact member and lying in annular grooves in the outer faces of the segments, difficulty has been experienced by reason of the destructive action on the stationary contact member and on the springs by the arc formed between the contacts. It has been found that under heavy short circuit conditions the upper portion of a segment would be burned away to the first groove with the result that the remaining top portion of the segment would fall into the center bore and at the next closing movement of the switch it would be forced down through the bore and destroy the contact. It has also been found that the pressure of the hot gases formed at the arc would spread apart the segments forming the stationary contact member and in escaping between segments eventually burn up the upper spring. It is an object of the present invention therefore to provide a construction whereby these difficulties are overcome. Other objects relating to details of construction and arrangement of parts will appear from the following description, reference being had to the accompanying drawing forming a part hereof in which:

Figure 1 is a longitudinal sectional view of the oil pot and parts carried thereby of an oil switch illustrating the invention;

Fig. 2 is an enlarged fragmentary view of the lower portion of Fig. 1; and

Fig. 3 is a transverse sectional view taken on the line 3—3 of Fig. 1.

Referring now to the drawing, 1 represents the oil pot or vessel which is preferably a closed cylinder having an insulation lining 2 and supported by a member 3 which may be carried in the usual manner by an insulator, not shown. The cylinder is closed at the top by a cap 4 through which extends an insulator 5 and slidably mounted in this insulator is a movable contact rod 6. A baffle 7 is provided within the lining 2 of the pot and beneath the level of the oil 8. Resting on supports 9 is a partition 10 which is above the level of the oil. A contact holder 11 carried by the lower portion of the oil pot encloses the stationary contact member 12 which, as is usual with switches of this type, is tubular with the opening flared at the upper end and is made up of a number of segments electrically connected with the surrounding holder by means of flexible connectors 13. For holding the segments together and in proper position, two so-called "garter" springs 14 are employed, each of which comprises a helical spring bent around the group of segments forming the contact member and lying in an annular groove formed on the exterior faces of the segments. The uppermost spring, it will be noticed, is spaced a considerable distance, relatively, from the top of the stationary contact member and other means, now to be described, are employed for resiliently pressing against the upper portions of the segments.

At a point preferably mid-way between the side faces of each segment, the contact holder 11 is provided with a threaded opening into which is screwed a hollow plug 15 containing a helical spring 16 to the outer end of which a button 17 is attached. This button is preferably made of insulating material to prevent current passing through the spring. When the plug is in place the spring is compressed to hold the button in firm but yielding contact with the corresponding segment.

With this construction the entire upper portion of the stationary contact member may be burned away, yet, since there is no groove in that vicinity there is no danger of the upper portion of a segment breaking off and falling into the bore. Furthermore, with the springs 16 and buttons 17 located at points intermediate the openings between segments there is no danger of their being burned away by the discharge of hot gases unless of course the entire upper portion of a segment is burned off.

While I have described only one embodiment of my invention, I do not wish to be limited to the particular form shown and described as it will be apparent that many modifications therein may be made without departing from the scope of my invention as set forth in the appended claim.

What I claim as new and desire to secure by Letters Patent of the United States, is:

An electric switch of the liquid break type comprising a vessel for containing insulating liquid, a contact holder therein, a movable contact rod, a cooperating tubular contact relatively long compared to its diameter mounted in said holder and having a flared opening at one end adapted to receive the contact rod, said tubular contact being spaced from said holder permitting lateral and angular movement thereof in the holder and being formed of a plurality of relatively movable segments, flexible conductors connecting the segments with the holder, resilient means engaging the segments at points nearer to the end opposite the flared end of the tubular contact than to the flared end, and means yieldingly holding the tubular contact centrally in the holder comprising a separate radially acting spring for each segment arranged between the segment and the holder and nearer to the flared end portion thereof than to the other end and engaging the segment intermediate its side faces so that said springs are shielded from arc gases ejected from between the segments.

In witness whereof, I have hereunto set my hand this 9th day of February, 1923.

JOHN D. HILLIARD.