Jan. 10, 1928.

1,655,464

H. J. H. HUBER

ELECTRIC SWITCH

Filed April 10, 1922

Fig. 1.

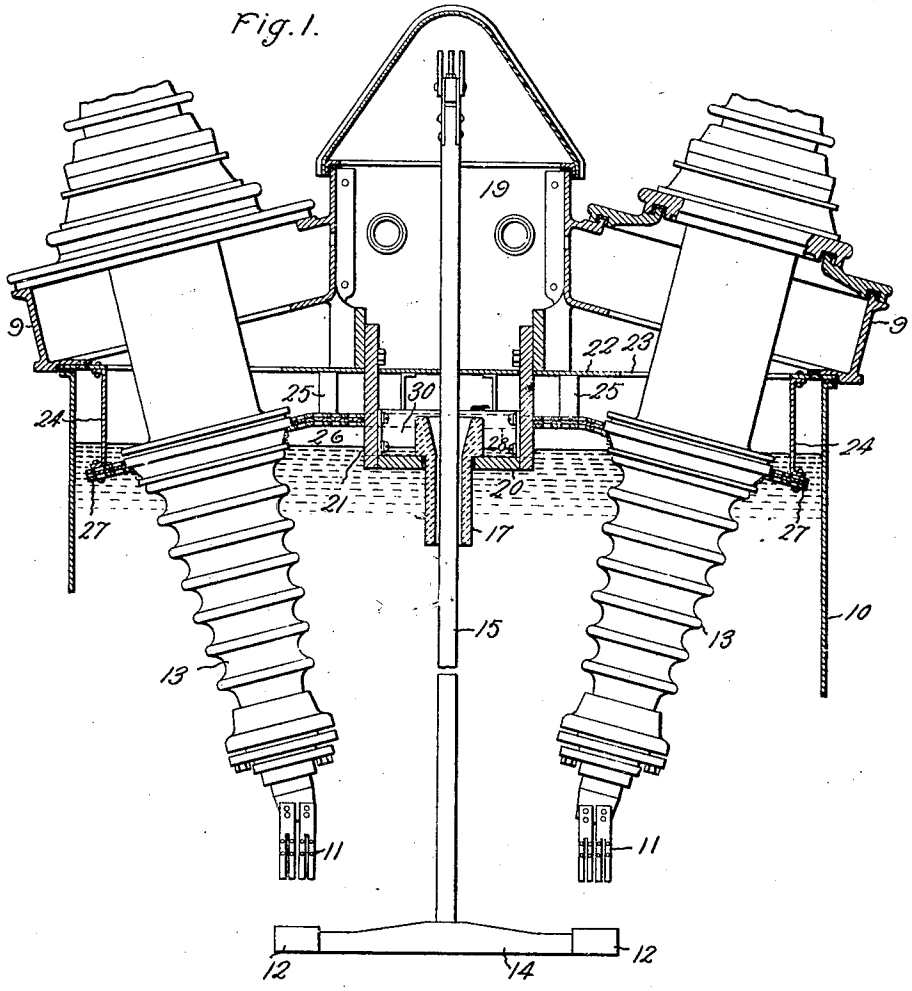
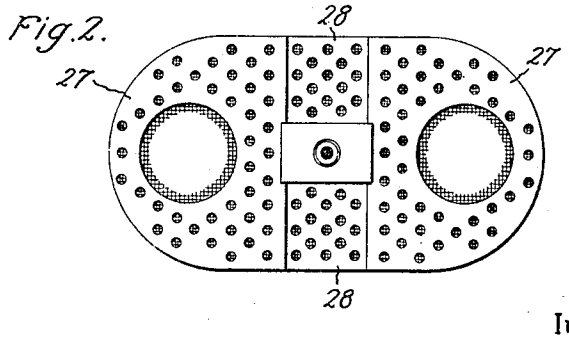


Fig. 2.



Inventor:
Herman J. H. Huber,
by Albert G. Davis
His Attorney.

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UNITED STATES PATENT OFFICE.

HERMAN J. H. HUBER, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ELECTRIC SWITCH.

Application filed April 10, 1922. Serial No. 551,265.

This application is a continuation in part of what is disclosed in my Patent No. 1,509,758, September 23, 1924.

My invention relates to electric switches and particularly to switches having contacts separable in an insulating liquid.

In opening power circuits under oil the arc formed upon the separation of the switch electrodes causes a certain amount of oil to be dissociated or volatilized, thus producing a quantity of highly heated gas. The pressure produced may be sufficient to throw oil out of the oil tank and this oil being generally carbonized forms a black deposit upon surrounding objects. Following the oil is the highly heated gas which upon contact with air may ignite.

One object of the present invention is to provide a novel means for impeding the progress of the material ejected by the arc which means also causes the breaking up and the cooling of the ejected gases so that they are reduced to a temperature at which they will not ignite upon contact with the air.

A further object of my invention is to provide a special means for progressively impeding the movement of the material ejected in such a manner as to avoid injury to the container.

Other objects and advantages will appear from the following description taken in connection with the accompanying drawing wherein Fig. 1 is a sectional view, partly in elevation and partly broken away, of a switch embodying my invention, and Fig. 2 is a plan view of the baffle employed in the construction shown in Fig. 1.

Referring to Fig. 1, 10 represents a suitable container or receptacle adapted to contain oil or other liquid to the level indicated, and 11 and 12 are respectively fixed and movable contacts adapted to be operated beneath the surface of the oil. The stationary contacts 11 are supported upon insulators 13 which extend upwardly through openings formed in the cover structure 9. The movable contacts 12 are carried by a conducting bridging member 14 which in turn is supported and moved by means of a rod 15. The rod 15 extends upwardly through an insulator 17 into a chamber 19 formed in the cover structure. The chamber 19 in the type of switch here illustrated is adapted to contain the operating means for the movable contacts but as the same is no part of the present invention it will not be further described.

The insulator 17 is carried by the plate 20 which is secured to side plates 21. The plates 21 are connected by end plates 30 and the latter plates together with the plate 20 form a lower extension of the chamber 19. Surrounding this extension and forming a part of the cover structure is a plate 22 which is provided with openings 23 for the insertion and removal of the insulators 13. To the plate 22 are secured a plurality of struts 24 and 25 which serve as supporting means for the baffle 26.

The baffle 26 is composed of two end sections 27 and two central sections 28. Each of the sections is formed of a wire screen held between perforated plates. It will be observed that the end sections 27 are supported so as to be partly submerged in the oil while the central sections are supported a short distance above the surface of the oil. When the contacts separate and arc gases form in the oil, the oil level rises quickly submerging the whole baffling member. The rise in the level of the oil is in the nature of a "slap" which exerts considerable pressure. The baffling member is held rigidly supported to withstand the slap of the oil by the struts 24 and 25 and as the end sections are inclined the oil pressure is progressively delivered as the oil level rises. The passage of the gases through the openings of the baffling member cause the gases to be broken up and cooled sufficiently so that they will not ignite the gaseous mixture in the space above the oil. Due to the wire screen no highly heated particles can be ejected from the chamber. When the oil level subsides the small space above the oil and beneath the baffle is so rich in hydrocarbon gases that it is non-inflammable so that even should heated particles and hot gases come in contact therewith they will not explode.

If desired the central sections 28 may be inclined in a manner similar to the end sections 27 so that they also will be partly submerged in the oil.

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

1. In an electric switch, the combination

of a vessel, an insulating liquid therein, relatively movable cooperating contacts separable therein, and means comprising a member arranged above the liquid and having a portion inclined to the level thereof for impeding at a progressively increasing rate the sudden upward movement of the liquid upon the formation of an arc between the contacts.

2. In an electric switch, the combination of a vessel having a cover and adapted to contain an insulating liquid, switch contacts adapted to be separated beneath the surface of the liquid and means for reducing the slap of liquid against the cover of the vessel incident to the sudden formation of gas at the separation of the contacts, said means comprising a baffle arranged in the space between the cover and the liquid and having portions inclined to the level of the liquid.

3. In an electric switch, the combination of a vessel adapted to contain a liquid, relatively movable co-operating contacts separable in said liquid, a perforated baffle having an inclined portion arranged normally to be partly submerged within said liquid so as to progressively decrease the rate of movement of the material ejected from the vicinity of the contacts upon their separation and to cool the gaseous material so ejected to a point below that at which it will ignite upon contact with the atmosphere.

4. In an electric switch, the combination of a vessel adapted to contain an insulating liquid, a cover structure for said vessel, relatively movable cooperating contacts separable within said liquid and a cooling and baffling member supported from said cover structure and provided with screened openings, said member being so arranged that the force exerted by the liquid upon said member when said contacts separate is progressively applied.

5. In an electric switch, the combination with a vessel adapted to contain an insulating liquid, a cover structure for said vessel, relatively movable cooperating contacts separable within said liquids, a member provided with openings and supported from said cover structure to baffle and cool the arc gases formed as the contacts separate, said member having a horizontal portion and inclined end portions and so arranged that the pressure exerted upon the liquid when the contacts separate is progressively applied.

In witness whereof, I have hereunto set my hand this 8th day of April 1922.

HERMAN J. H. HUBER