

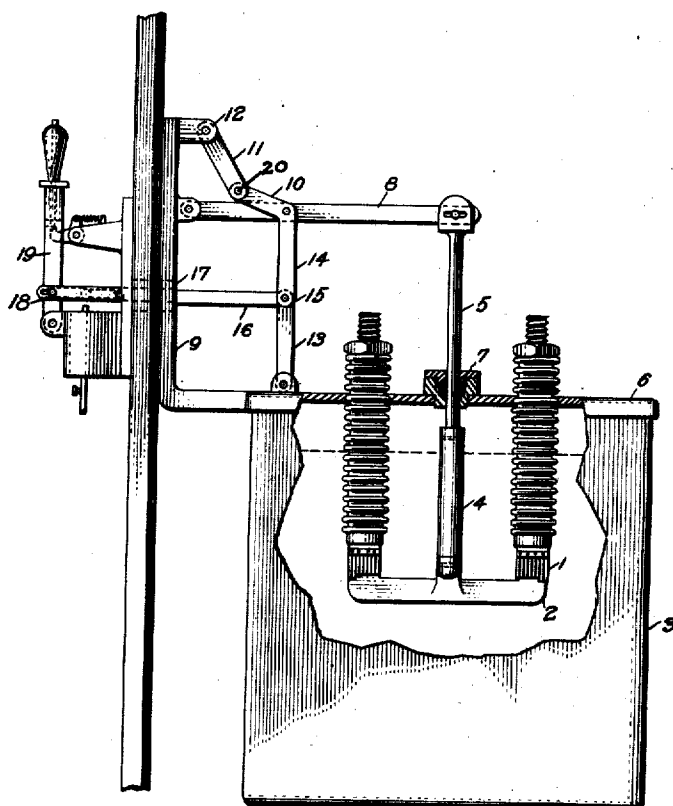
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J. D. HILLIARD

AUTOMATICALLY LOCKED OPEN AND CLOSED CIRCUIT BREAKER

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UNITED STATES PATENT OFFICE.

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AUTOMATICALLY LOCKED OPEN AND CLOSED CIRCUIT BREAKER.

Application filed July 8, 1921. Serial No. 483,295.

To all whom it may concern:

Be it known that I, JOHN D. HILLIARD, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Automatically Locked Open and Closed Circuit Breakers, of which the following is a specification.

My invention relates to electrical switches and particularly to those of a high potential type wherein the moving contacts are enclosed in a vessel and are operated by means external thereto. In many of the oil switches in use at the present time, movement of the contacts is effected by means of rods or similar members which extend through the top or walls of the switch vessel and the arrangement is usually such that in the opening of the switch the operating rod moves toward the interior of the vessel. In the case of switches carrying considerable current the opening of the circuit causes a high pressure to be developed within the vessel by reason of the vaporization and dissociation of the oil or other liquid in which the contacts are immersed, and this pressure acting upon the operating means which passes through the wall of the vessel causes the same to move in a direction to close the switch. If the switch has been tripped open by reason of a short circuit its automatic reclosing may result in a reestablishment of the short circuit, with the result that the system may be considerably damaged. In high power switches wherein the expulsion of the arc gases from the vessel is retarded and in which there is consequently developed very high pressure the provision of some means to prevent the reclosing of the switch in the manner described is a matter of urgent necessity. One of the objects of the present invention is to provide such a means which in the present instance serves to lock or otherwise hold the switch contacts separated whenever the switch is open.

Another object is to provide a holding means of this character which will be simple in construction and shall involve but a slight modification of operating means now commonly employed in switches of this type.

Other objects and advantages will appear from the following description taken in connection with the accompanying drawing which represents in side elevation, partly

broken away, a switch embodying my invention.

In the drawing 1 and 2 represent respectively the stationary and movable switch contacts and 3 the vessel adapted to contain oil or similar insulating fluid in which the contacts 1 and 2 are immersed. In the particular form of switch illustrated the vessel is constructed to withstand considerably internal pressure and all joints are made tight to prevent the oil being thrown out of the vessel when the switch interrupts a heavy short circuit. It is understood that in the type of switch here shown there are two stationary contacts and two movable contacts the latter being carried at the ends of an insulating rod 4. Rod 4 is secured to and adapted to be operated by means of a metal rod 5 which passes through an opening in the cover 6 of the vessel 3. Suitable packing 7 is provided to secure a tight connection between the rod 5 and cover 6 of the vessel 3. Rod 5 is secured at its upper end to the outer end of the lever 8 the latter being pivoted to a stationary frame 9. Secured to the lever 8 is the link 10 of a toggle 10-11, the remaining link 11 of this toggle being pivoted at 12 to the frame. Toggle links 13 and 14 are each pivoted at 15 to a rod 16 which passes through the frame at 17 and is secured at 18 to the operating handle 19. The operating means thus far described is that commonly employed in switches of this type. It is understood, of course, that means are provided by which the switch contacts are biased to circuit opening position and in the normal operation the circuit is opened by buckling the toggle comprising links 13 and 14, which then permits the lever 8 to fall and the contacts to separate.

It is also understood that the operating means may embody the usual trip-free feature which will enable the buckling of the toggle and the opening of the circuit regardless of the position of the operating handle. As the particular trip-free feature is no part of my present invention it will not be further described.

At 10 I have shown an extension of the link 14 which forms a link of the second toggle. This toggle is completed by means of a link 11 pivoted at 20 to extension 10 of the link 14 and at 12 to the frame. It will be noted that when the switch is open by

reason of the buckling of the toggle 13—14 and the swinging down of the lever 8, the toggle 10—11 will become straight. When the contacts 12 are fully separated the pressure within the receptacle 3 which might tend to move the rod 5 upwardly through the cover of the receptacle will fail to accomplish this result because of its inability to buckle the toggle 10—11. Should the operator, however, move the operating means to straighten the toggle 13—14 this will immediately effect a buckling of the toggle 10—11 and permit the lever 8 to swing upwardly and the contacts to close.

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

1. An electric switch comprising a closed vessel adapted to contain an insulating fluid, cooperating contacts in said vessel, a contact operating member extending into said vessel and adapted to move outwardly therefrom to close said switch, a toggle for preventing movement of said member to open said switch and a toggle for preventing movement of said member to close said switch, said toggles having a link member common to each.

2. An electric switch comprising a closed vessel adapted to contain an insulating fluid, cooperating relatively movable contacts in said vessel, a contact operating member extending into said vessel and movable inwardly and outwardly therefrom respectively to open and to close said switch, and two pairs of toggle links for locking said member against said movements, one link of each of said pairs of links comprising a uni-

tary member, the construction being such that when one pair of links is straight the other pair is buckled.

3. An electric switch comprising a closed vessel adapted to contain an insulating fluid, movable and stationary contacts in said vessel, an operating rod slidably mounted in said vessel and movable outwardly to cause said contacts to engage, an operating member for said rod, a lever pivoted at a point intermediate its ends to said member, a link pivoted to one end of said lever and forming therewith a toggle for holding said contacts in closed position, a link pivoted to the other end of said lever and forming a toggle therewith for holding said contacts in open position and means for actuating said lever.

4. A switch adapted to break high power circuits, a stationary frame, a vessel adapted to contain insulating fluid constructed to withstand high internal pressure, contacts within said vessel, an operating member for said contacts extending into said vessel and movable toward the interior thereof to separate said contacts, a trip-free toggle connected to said member and adapted to lock said contacts in closed position, said toggle having one of its links extended, a link pivoted to the extending link and to the frame, and forming with said extending link a second toggle, said second toggle serving to lock said contacts in open position and means for moving said extended link.

In witness whereof, I have hereunto set my hand this 7th day of July, 1921.

JOHN D. HILLIARD.