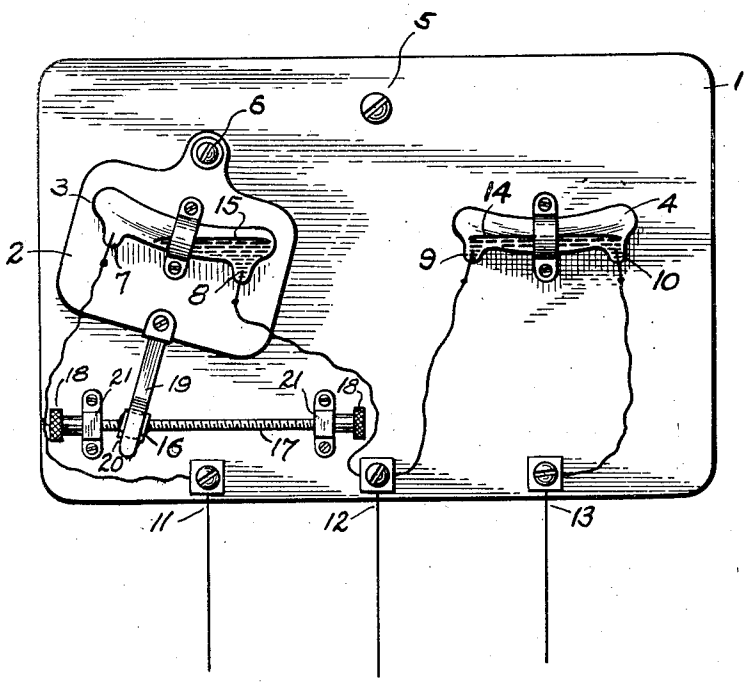
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R. D. MAILEY

SWITCHING APPARATUS

Filed Oct. 12, 1923



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UNITED STATES PATENT OFFICE.

ROY D. MAILEY, OF EAST ORANGE, NEW JERSEY, ASSIGNOR TO COOPER HEWITT ELECTRIC COMPANY, A CORPORATION OF NEW JERSEY.

SWITCHING APPARATUS.

Application filed October 12, 1923. Serial No. 668,092.

This invention relates to mercury electric switches of the type in which mercury is used to close one electric circuit the instant another circuit is opened, and vice versa. It more particularly relates to an improvement in such switches whereby the time of opening and closing of the circuits may be regulated to provide that the making and breaking occur at the same instant.

In the three contact type of mercury switch in which three contacts are sealed into the side of a curved glass tube containing a quantity of mercury it is very difficult in making the switch to adjust the curvature of the tube, the positions of the electrodes and the quantity of mercury to insure the making and breaking of circuits by the flow of mercury to occur in the same instant.

This device is, therefore, particularly valuable in its application to electric clocks, railway signals, automatic substations, and other automatic and semi-automatic machinery for the reason that by means of my improvement the making of one circuit and the breaking of another at the same time can be made to occur with precision. This improvement is valuable also because of the low cost at which it can be made as compared to the three contact tube type of switch because the difficult and costly adjustment of the shape of the tube is eliminated and the means of adjustment employed in this device is simple and inexpensive.

This easy and accurate adjusement is obtained through the use of two-contact switches mounted on a pivoted support such as a panel, and adjusting the position of one of them with respect to the other by means of a screw so that the circuit is opened in one of them at the instant it is closed in the other. The two switches may be mounted on a swinging panel, or oscillating shaft, or on a pendulum, one of the switches being fixed and the other being adjustably mounted or both being adjustably mounted on the support.

In the drawing the panel 1 is mounted on a pivot 5. On this panel a two point mercury switch 4 is fixed and the two point switch 3 is pivotally mounted to 1 by means of the panel 2 which is pivoted at 6. Panel 2 is connected by arm 19 to nut 16 through a sliding connection 20. The nut rides on a screw 17 which is mounted in the ways 21 and has at its ends knurled heads 18. Contacts 7 and 8 of switch 3 are connected to leads 11 and 12 and contacts 9 and 10 of switch 4 are connected to leads 12 and 13.

In the operation of my device the making or breaking of the respective circuits is accomplished by oscillating panel 1 about its pivot whereby the mercury 14 and 15 of the switches is caused to flow. Panel 2 being fixed to panel 1 by means of 6 and the nut 16, the mercury in the two switches will flow at the same time. The exact timing of the making and breaking occurring in the two circuits can be adjusted by changing the position of 3 in respect to 4 by means of the knurled heads 18. By this means adjustments can be made for changes which might occur from time to time for any reason, as well as the adjustment which can be made on first setting up the apparatus.

Now this device is not limited to uses in which the making of one circiut is desired to be instantaneous with the breaking of another circuit or vice versa. This adjustability permits its use in switching where a lag is desired between the complete operation of one switch and that of the other. It is also perfectly apparent that this switch is adjustable for various other relations between the actions of the two switches. For instance, the position of switch 3 with respect to switch 4 may be so adjusted as to insure that switch 4 will not be opened until switch 3 is actually closed and the interval between the closing and opening can be very closely adjusted. Or the switches can be so adjusted that switch 3 is not closed until switch 4 is opened. Other similar arrangements can be made for various different relations between the actions of the two switches, as the switches are operable to function in sequence, to open in sequence, to close in sequence,—to open and close in sequence, and to open and to close together, all of which various operations are brought about by suitably positioning the switches to ac-

complish the particular result desired, or in the structure shown in the drawings by turning the knob 18 to set the switch 3 in the desired position relative to the switch 4, and for this purpose, the switch 4 is also provided with the adjusting mechanism 16—21, in those embodiments of my invention where adjustability of both switches is desired.

I claim as my invention:

In an electric circuit making and breaking apparatus, in combination, a pivoted panel, a mercury switch mounted thereon, a second panel pivotally mounted on the first panel, a mercury switch mounted on said second panel, and means connected to the two panels for adjustably moving the second mercury switch with respect to the first.

Signed at Hoboken in the county of Hudson and State of New Jersey this 11th day of October A. D. 1923.

ROY D. MAILEY.