Oct. 14, 1924. 1,511,332

W. E. HARRISON

MAGNETIC DAMPER FOR ELECTRIC ARCS

Filed Nov. 20, 1920

Fig. 1.

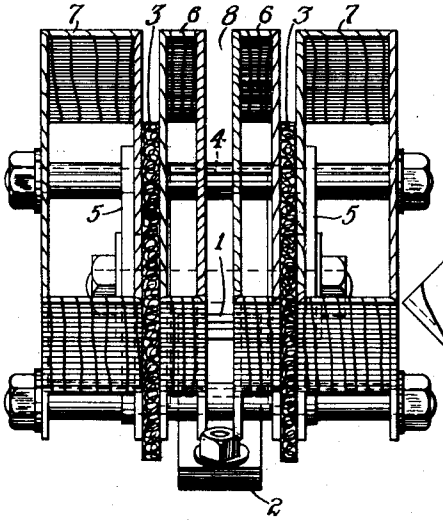


Fig. 2.

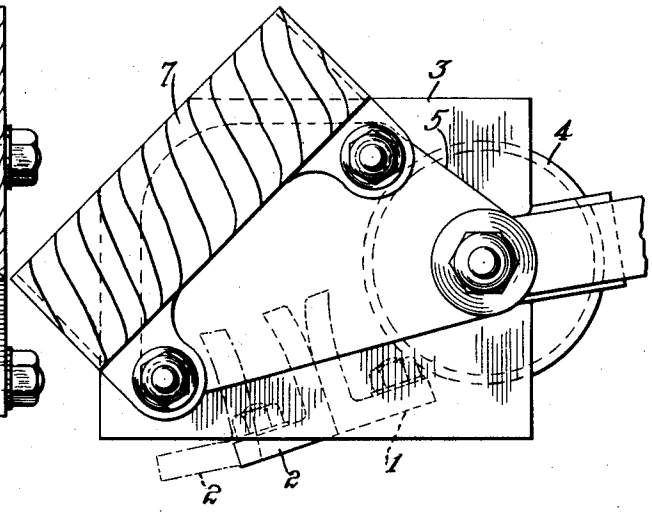


Fig. 3.

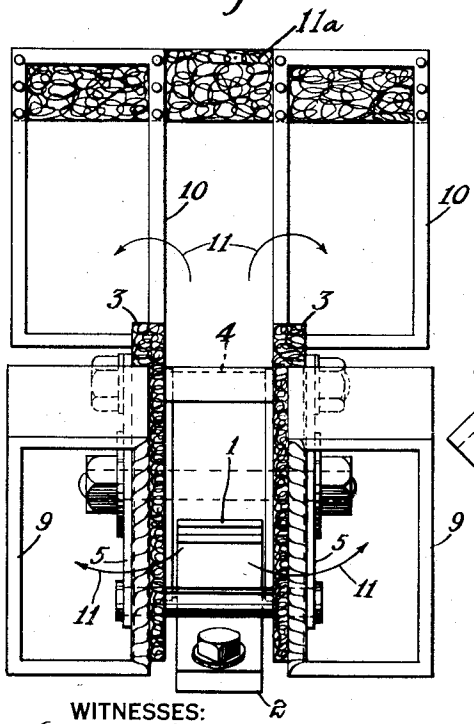


Fig. 4.

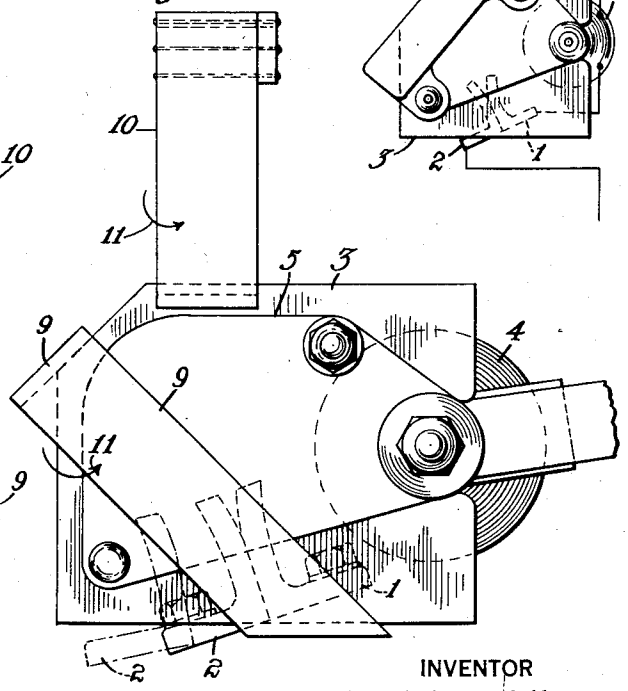


Fig. 5.

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UNITED STATES PATENT OFFICE.

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MAGNETIC DAMPER FOR ELECTRIC ARCS.

Application filed November 20, 1920. Serial No. 425,517.

To all whom it may concern:

Be it known that I, WILLIAM E. HARRISON, a citizen of the United States, and a resident of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Magnetic Dampers for Electric Arcs, of which the following is a specification.

My invention relates to circuit interrupters and particularly to means for controlling the arcs thereof.

One object of my invention is to provide means for preventing the deflection of arcs to adjacent objects.

Another object of my invention is to provide means for so affecting an arc as to permit it to assume a path of movement of substantially any desired shape.

Another object of my invention is to provide means responsive to the movement of an arc for inducing a magnetic flux field or fields which affect the arc.

Heretofore, it has been usual to assist in the suppression and extinguishment of electric arcs by means of electromagnetic flux fields induced by coils or windings. The fluxes so induced are adapted to react with an arc to disrupt it or to force it away from its point of origin, thus lengthening the arc and increasing its internal resistance until current ceases to flow and the arc is extinguished.

In practicing my invention, I provide means for inducing an electromagnetic flux field or fields at such selectively predetermined position or positions with respect to the normal arc path as to control or govern the path to be assumed by an arc. This means may take the form of flux-forming members that are energized by a separate circuit or from the circuit of the arc or it may, preferably, comprise conducting members that react with the arc to have fluxes for affecting the arc induced in them.

Figure 1 of the accompanying drawings is a front elevational view of a portion of a circuit interrupter embodying my invention, looking into the arc chute and through certain flux-forming loop members in which fluxes are induced by the arc.

Fig. 2 is a side elevational view of the device shown in Fig. 1.

Figs. 3 and 4 are views similar to Figs. 1 and 2 showing a different arrangement of the flux-forming loop members and

Fig. 5 is a diagrammatic view, similar to Fig. 1, showing a wound flux loop that is positively excited from the circuit of the arc.

As shown in Figs. 1 and 2, stationary and movable contact members 1 and 2, respectively, that may be supported and actuated in any usual or suitable manner (not shown), are disposed between the side plates 3 of the usual arc chute. A blowout coil 4, disposed between the plates 3 at the rear of the chute, co-operates, in a usual and well-known manner, with pole members or plates 5 to impel an incipient arc from the contact members, when the interrupter is opened.

My invention consists in the placing of magnetic-flux-forming members 6 and 7 that, in Figs. 1, 2, 3 and 4, are closed conducting loops, preferably of copper, in any advantageous position to divert or direct the arc as desired.

In accordance with the well-known principle that induced fluxes always oppose the action of the fluxes which set them up, the narrow loops 6, disposed diagonally across the inner sides of the plates 3, will tend to prevent the arc from passing therethrough and limit the arc to a relatively narrow path 8 between the loops 6.

Inasmuch as arcs sometimes tend to flash backwardly from the exit of the chute toward adjacent grounded objects or to hang on between structural parts of the interrupter on opposite sides of the contact members, the loops 7 on the outer sides of the plates 3 will intercept and react with such arcs as to prevent them from so doing.

The loops 6 and 7 are, preferably, covered with a fireproof material, such as asbestos tape or an enamel, to protect them against damage by the arcs. As shown in Figs. 3 and 4, conducting loops 9 are disposed diagonally along the lower outside surfaces of the plates 3, and loops 10 are disposed vertically above the arc chute to prevent arcs or portions thereof from being deflected in the general direction indicated by arrows 11. The loops 9 and 10 are similar in construction to the loops 6 and 7. In fact, conducting members similar to the members 6, 7, 9 and 10 of the above described forms of my invention may be va-

riously arranged to deflect and to govern the arcs in any desired manner and to cause it to assume any desired shape. A brace 11ª of asbestos lumber is riveted to the loops 10 for holding them in place.

As shown in Fig. 5, loop members 12, only one of which is shown, may be arranged similar to the loop members 7 of Figs. 1 and 2 and consist of wound coils connected in circuit with the blowout coil 5 and the contact members 1 and 2. In this form of my invention, the arc-controlling fluxes are caused by the positive passing of externally-applied current therethrough and not by the induced arc current, as shown in the above described form.

While I have shown and described particular forms of my invention, changes may be effected therein without departing from the spirit and scope thereof, as set forth in the appended claims.

I claim as my invention:—

1. In a circuit interrupter, the combination with relatively movable contact members, of means for controlling the shape of an arc thereon comprising a conducting member of loop shape capable of generating an electromagnetic flux field for affecting the arc and responsive to movements of said arc relatively thereto.

2. In a circuit interrupter, the combination with relatively movable contact members, of means for controlling the shape of an arc thereon comprising a plurality of conducting members of loop shape disposed in selective predetermined positions adjacent to the contact members and capable of generating electromagnetic flux fields for affecting the arc.

3. In a circuit interrupter, the combination with relatively movable contact members, of means for controlling the shape of an arc thereon comprising a conducting member of loop shape in which there is induced an electromagnetic flux field through which passage of the arc is opposed upon relative movement of the arc.

4. In a circuit interrupter, the combination with relatively movable contact members, of means for screening an arc against certain normally directed movements comprising a plurality of conducting loop members capable of generating a magnetic flux to oppose movement of the arc through the loops.

5. The combination with electrical terminal members, of a conductor disposed adjacent thereto and responsive to relative movement of an arc with respect thereto to generate a magnetic-flux field for affecting the arc.

6. In a circuit interrupter, the combination with relatively movable contact members, of a conductor of closed-loop shape disposed adjacent thereto and responsive to relative movement of an arc with respect thereto to generate a magnetic-flux field for affecting the arc.

7. In a circuit interrupter, the combination with relatively movable contact members and an arc chute therefor, of a plurality of conductors of closed-loop shape mounted on said chute, said conductors being capable of generating magnetic-flux fields in response to movement of an arc to direct the latter.

In testimony whereof, I have hereunto subscribed my name this 4 day of November, 1920.

WILLIAM E. HARRISON.