March 31, 1925. 1,531,667

J. W. LEGG

CIRCUIT INTERRUPTER

Filed Dec. 16, 1920

Fig. 1.

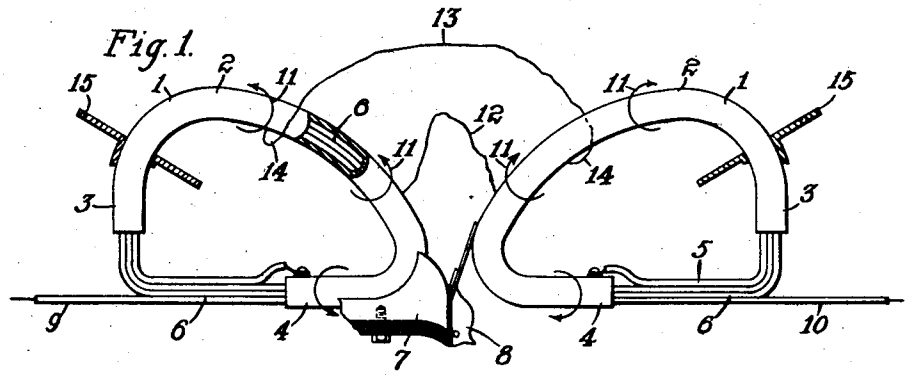
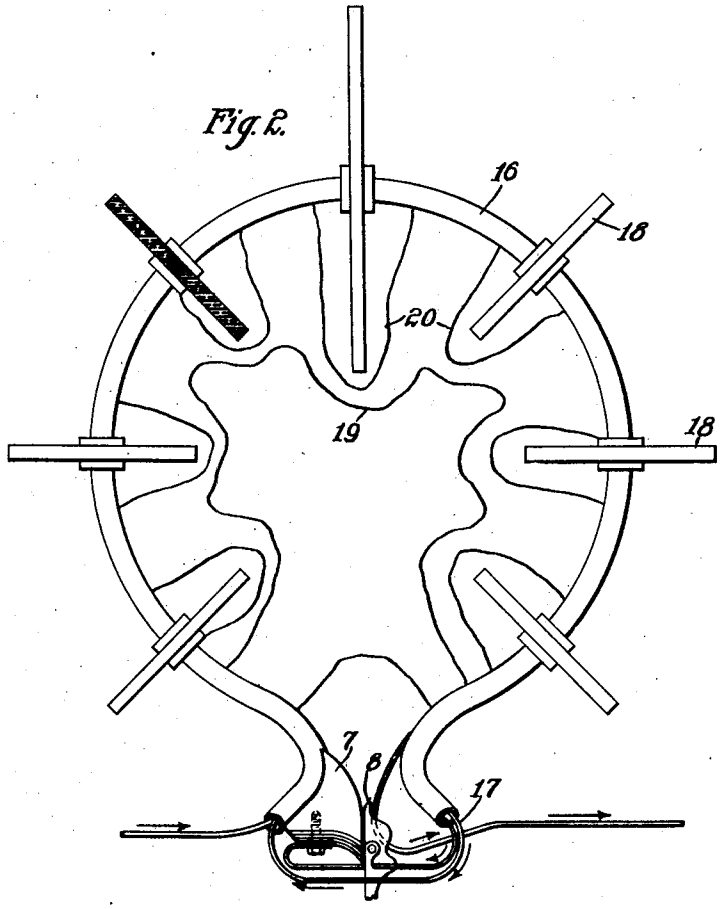


Fig. 2.



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UNITED STATES PATENT OFFICE.

JOSEPH W. LEGG, OF WILKINSBURG, PENNSYLVANIA, ASSIGNOR TO WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

CIRCUIT INTERRUPTER.

Application filed December 16, 1920. Serial No. 431,128.

To all whom it may concern:

Be it known that I, JOSEPH W. LEGG, a citizen of the United States, and a resident of Wilkinsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Circuit Interrupters, of which the following is a specification.

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

The object of my invention is to provide a device of the above indicated character that shall insure the proper direction of the arc to, thereby, prevent reignition, to conserve the apparatus and to cause the interrupter to open the circuit thereof in an efficient and effective manner.

In my co-pending application, Serial No. 432,322, filed Dec. 21, 1920, is disclosed a device for so stabilizing and controlling arcs as to ensure the effective opening of a circuit and which, in certain respects, is somewhat similar to my present invention.

In practicing my invention, I provide a coil or coils formed to the shape of horn-gap or arc-conducting members that are shielded with conducting material to take the arc and which set up a magnetic flux to force the arc in a proper direction.

By my invention, the arcs are propelled away from the contact members to dissipate the energy of the circuit upon their first occurrence.

Figure 1 of the accompanying drawings is a diagrammatic side view of horn-gap members constructed in accordance with my invention and

Fig. 2 is a similar view of a circuit interrupter and a modified form of arc-conducting or limiting member embodying my invention.

As shown in Fig. 1, tubular conducting members 1, preferably of copper, are formed to have arcing horn portions 2, end or side portions 3 and bottom portions 4, through which coils 6 that are formed of insulated conductors, extend and are connected in series with relatively movable contact members 7 and 8 which are adapted to be actuated in any suitable manner (not shown) or as shown in the above mentioned co-pending application.

The coils 6 are so wound and related to conductors 9 and 10 as to generate a magnetic flux, indicated by arrows 11, near the horn portions 2 of the members 1.

Upon separation of the contact members 7 and 8, an incipient arc, somewhat as indicated by the line 12, will form on the horn portion 2 and be propelled outwardly toward and beyond a position indicated by the line 13 until the stored energy of the circuit is dissipated and the circuit is broken. Even should the arc tend to form under the horn portions 2, as indicated by portions 14 of the line 13, it will be impelled outwardly. Forming of arcs, as in the latter instance, on ordinary arcing horns causes the arc to travel back toward the contact members, which action may occur several times before the arc is extinguished.

Arc shields or barriers 15 are disposed around the members 1 to disrupt the arc at substantially its weakest parts and to prevent it traveling around the members 1.

As shown in Fig. 2, a tubular member 16 is of substantially circular or looped form and embraces a single coil 17 of any desired number of turns connected in series with the contact members 7 and 8. Arc-splitter or barrier members 18 of discoidal form, embrace the member 16 to elongate or break up the arc, as indicated by lines 19 and 20.

A circuit interrupter constructed in accordance with my invention is particularly adapted for outdoor service, since there is no arc chute, or other similar part, on which rain, snow or sleet may readily accumulate to cause short-circuit conditions.

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. The combination with arcing members, of means for conducting the arcs away therefrom comprising a tubular member having a conductor connected to one of the arcing members disposed therein, and an arc shield disposed on the tubular member.

2. The combination with arcing members, of means for conducting the arcs away therefrom comprising a tubular member of substantially loop-shape having a conductor connected in the circuit of the arcing members disposed therein.

3. The combination with arcing members, of means for conducting the arcs away

therefrom comprising an insulated coil connected in circuit with the arcing members and constituting a loop having a relatively large central air space, and a conducting sheath embracing the coil for engagement with the arcs, the sheath constituting an arc horn and the turns of the coil being in a direction lengthwise thereof.

4. The combination with arcing members, of means for conducting the arcs away therefrom comprising a pair of coils formed to the shape of arc-horn members and connected in the circuit of the arcing members.

5. The combination with arcing members, of means for conducting the arcs away therefrom comprising a pair of coils formed to the shape of arc-horn members and connected in the circuit of the arcing members, and a tubular member embracing each of said coils.

6. The combination with arcing members, of means for conducting the arcs away therefrom comprising a pair of coils formed to the shape of arc-horn members and connected in the circuit of the arcing members, and a conducting tube embracing each of said coils.

7. The combination with arcing members, of means for conducting the arcs away therefrom comprising a pair of coils formed to the shape of arc-horn members and connected in the circuit of the arcing members, and a shield of conducting material for said coils.

8. The combination with arcing members, of a conductive coil connected in series with one of the members and constituting a loop having a relatively large central air space and an arcing horn connected to the said member substantially surrounding the coil and substantially corresponding in shape thereto.

9. The combination with arcing members, of a conductive coil connected in series with one of the members and constituting a loop having a relatively large central air space, an arcing horn connected to the said member substantially surrounding the coil and substantially corresponding in shape thereto, and an insulating barrier extending transversely of the arcing horn and disposed between the ends thereof.

In testimony whereof, I have hereunto subscribed my name this 3rd day of December, 1920.

JOSEPH W. LEGG.