

No. 716,833.

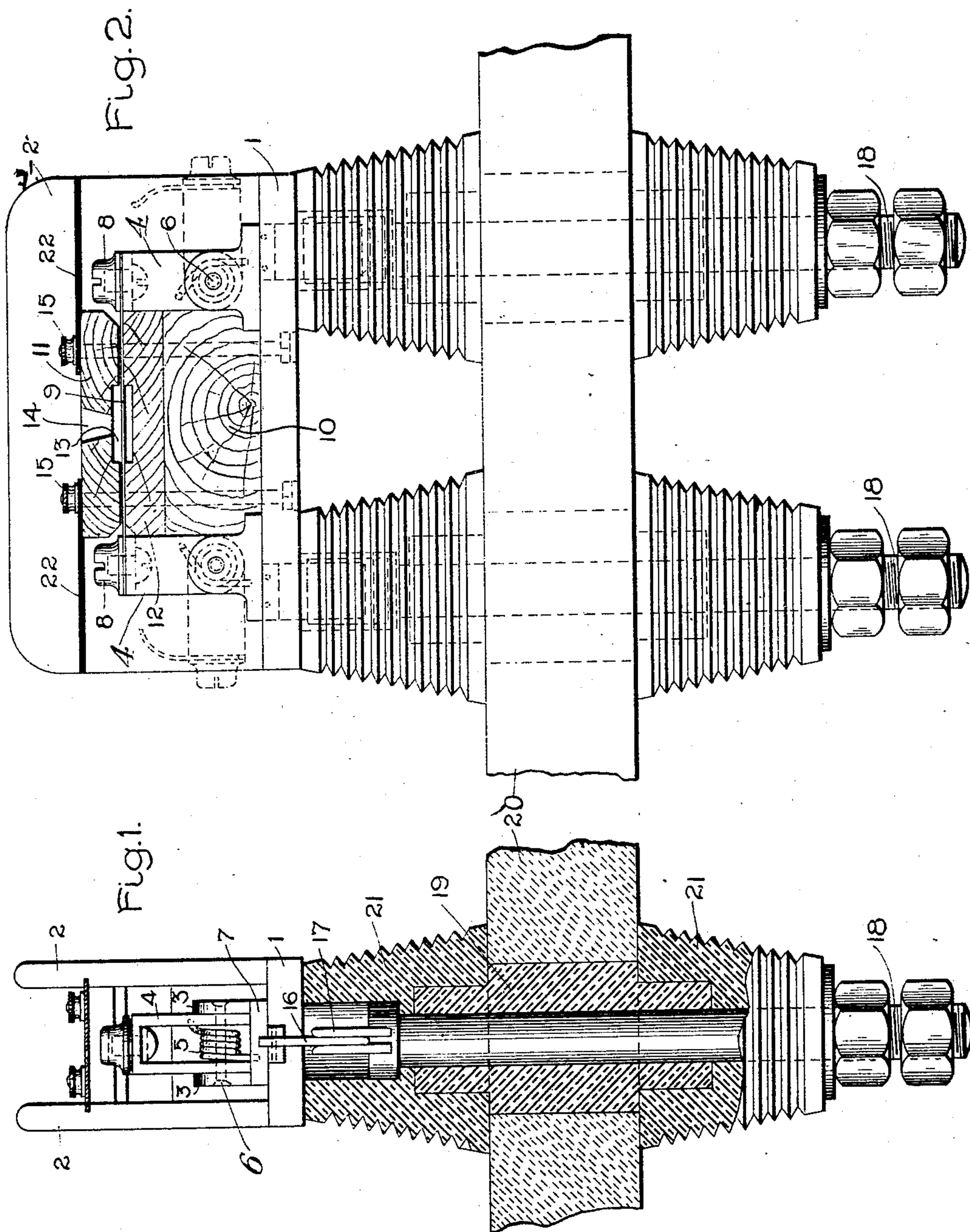
Patented Dec. 23, 1902.

W. L. R. EMMET.

METHOD OF BREAKING ELECTRIC CURRENTS.

(Application filed Apr. 9, 1902.)

(No Model.)



Witnesses.

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UNITED STATES PATENT OFFICE.

WILLIAM L. R. EMMET, OF SCHENECTADY, NEW YORK, ASSIGNOR TO
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METHOD OF BREAKING ELECTRIC CURRENTS.

SPECIFICATION forming part of Letters Patent No. 716,833, dated December 23, 1902.

Original application filed August 24, 1898, Serial No. 689,378. Divided and this application filed April 9, 1902. Serial
No. 102,084. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM L. R. EMMET, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Methods of Breaking Electric Currents, (Case No. 2,831,) of which the following is a specification.

This application is a division of my pending application, Serial No. 689,378, filed August 24, 1898, and is made in accordance with the requirement of the Patent Office.

The present invention relates to a novel method of rupturing electric currents and extinguishing the arc formed by such rupture. It is particularly applicable for service in connection with safety-fuses, though it is applicable in its broader features also to circuits not containing such fuses.

The invention is carried out by forming the arc within a contracted chamber and stretching it along a path of small cross-section, by which its resistance is rapidly augmented, thereby weakening its power and contributing toward its extinguishment. To further assist this result, I cause an expulsive blast to be directed laterally of the arc-stream, which tends to sever or cut the stream into two parts, and thereby extinguish it.

The invention may be carried out by different forms of apparatus, one effective device being indicated in the accompanying drawings, in which—

Figure 1 is an end elevation, partly in section, of a cut-out operating in accordance with my invention. Fig. 2 is a side view, partly in section, of the same.

The cut-out proper is composed of a base-plate 1, of insulating material, having attached thereto side plates 2 2, which serve as guards. Mounted on the base-plate at suitable distances apart are two castings, having ears 3 3. Pivoted to each pair of ears is a bifurcated or U-shaped spring-actuated arm 4. The actuating-spring 5 is coiled about the pivot 6 between the bifurcations of the arm 4. One end of the spring engages the arm and the other end the body of the supporting-casting 7. The springs are so arranged as to urge the upper ends of the arms away from

each other. Suitable clamping devices 8 are arranged at the outer extremity of the arms, between which a fuse 9 is secured, so as to hold the arms in a position perpendicular to the base 7, as shown. The fuse is thus normally maintained in a state of tension. Permanently mounted between the arms and overlapping an end of each of the castings 7 is a block of insulating material 10. Superposed thereon are two renewable blocks 11 and 12, of insulating material, each block having a hollow formed therein, so that when placed together, as shown in the drawings, a chamber 13 is formed. An opening 14 in the upper block 11 communicates with the chamber so formed. The arms and insulating-blocks are so proportioned and arranged as to allow the fuse 9 to pass freely between the blocks 11 and 12 and through the chamber 13. That portion of the fuse passing through this chamber is made of smaller cross-section than the remaining parts in order to insure the formation of the arc within the chamber instead of between the insulating-blocks.

In order to prevent any possibility of the arc formed in the chamber 13 from passing to either of the spring-actuated arms, I find it advisable to provide barriers, which in this case are plates 22, of fiber or other insulating material, sliding in grooves in the side plates 2. The barriers, together with the insulating-blocks, are all held in place by bolts provided with thumb-screws 15. By removing the thumb-screws and pressing back the bolts the barriers may be slid out of the grooves and so withdrawn in order to permit the insertion or renewal of the fuse.

In order to make connections with the fuse, I provide the castings 7 with fins 16, which extend through the base-plate and are adapted to engage spring-clips 17, carried by the connecting-bolts 18. The connecting-bolts are passed through a bushing 19, which is fitted in an opening in the switchboard 20. Insulators 21 fit over the reduced ends of each of the bushings. The insulators and bushings are held firmly in place by the clamping-nuts on the connecting-bolts. Thus it will be seen I provide channels through which the two poles of the current are rapidly moved

when the current is broken, said channels being of approximately the same size as the poles themselves, in this particular case said poles being constituted by the ends of the fuse-strip. Thus the arc is stretched in a confined space and its resistance rapidly augmented, and at the same time the gases due to the arc, the fuse-vapors, and the hot air are driven violently out from the vent, tending to split the arc-stream into two parts, and this is of course the more easily effected by means of the rapidly-increasing resistance, which alone if carried to a sufficient extent would extinguish the arc. When the fuse blows, the air within the central recess or chamber is very suddenly heated, and the resulting pressure causes the vaporized metal and other gases to be violently expelled through the opening in the chamber, thus blowing out the arc. As soon as the fuse parts the spring-arms come into action and instantly withdraw the ends of the fuse from the chamber and from

contact with the insulating-blocks. By the simultaneous expulsion of the gases from the chamber and the withdrawal of the fuse ends the continuance of the arc formed by rupture of the fuse is rendered practically impossible.

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

The method of opening an electric circuit, consisting in maintaining a fusible conductor under tension, restraining the spread of arc-gases developed on metallic or similar conductive rupture axially of the fuse toward the terminals, and simultaneously expelling such gases from the fuse in a direction at an angle to its axis.

In witness whereof I have hereunto set my hand this 5th day of April, 1902.

WILLIAM L. R. EMMET.

Witnesses:

BENJAMIN B. HULL,
HELEN ORFORD.