Feb. 10, 1931. W. DORN 1,791,888

ELECTRICAL CONTACT BREAKER

Filed Feb. 6, 1928

Fig. 1.

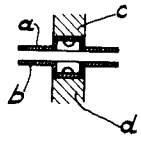


Fig. 2.

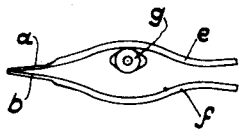


Fig. 3.

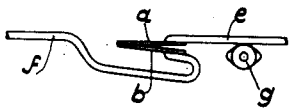
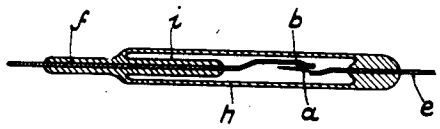


Fig. 4.



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UNITED STATES PATENT OFFICE

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ELECTRICAL CONTACT BREAKER

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The invention relates to contacts for make and break devices working in a vacuum or in a chamber filled with inert gases. The invention is particularly suitable for make and breaks operating at high frequencies such as for example is the case with electrical ignition apparatus such as magnetos or ignition coils.

It is well known that in electrical contacts of this type, a transference of the metal of the contact from one electrode to the other takes place owing to the arc effect. This frequently results in the formation of a deposit on the cathode in the form of a point opposite a corresponding depression in the anode. In vacuum make and break devices the reverse takes place. In such cases it may happen that the proportion of deposited metal melts into the opposing depression in the other electrode and the contacts become welded together. This result is particularly disadvantageous in the case of make and break apparatus in which resilient contact carriers are used and which have a high frequency of operation.

In order to avoid this disadvantage, according to this invention one or both of the contacting electrodes, in any case that which is burnt away by the arc is made in the form of a thin sheet of metal and without any metallic backing or support in the line of the axis of the arc. Consequently this contacting electrode becomes completely burnt away by the arc and thus holes are formed or its surface decreases.

Several examples of construction of the invention are shown in the drawings.

In Figure 1 the contact consists of two thin metallic sheets *a* and *b* which are made in the form of plates and are secured by rivets to their supports *c* and *d*. The rivet heads are counter-sunk in the central recesses or depressions in the plates. The opposite faces of the annular edges are the contact faces. According to operating conditions, the edge of the upper or lower electrode will be gradually burnt away by the arc as the metal passes in the arc to the opposite electrode and is deposited there. As the plate in question is very thin it will be completely burnt away at the point where the arc forms. Holes or indentations are thus formed in the metal plates.

Figure 2 shows a form of construction in which the electrodes *a* and *b* are formed by rolling out the ends of the two wires *e* and *f*. The electrodes are preferably arranged at an acute angle to one another and are brought into contact at the ends by the resiliency of the two bent wires *e* and *f* themselves or by a special spring mounting. A rotating cam *g* is provided in order to open the contacts. In this form of construction one of the electrodes will be gradually burnt away from its free end. The point of contact between the contacting electrodes thus moves gradually owing to the burning away of one electrode, which movement affects but slightly the degree of separation or amount of movement necessary to close and open the contacts.

A similar form of construction is shown in Figure 3. In this case however, the wires *e* and *f* are not arranged alongside one another but one behind the other in line. The end of the wire *f* is bent into the form of a hook so that the electrode *b* secured thereto points backwards. Thus the two electrodes are again brought into an acute angled relative position in which their free ends contact.

Figure 4 shows a vacuum make and break provided with a contact according to the invention. The glass vessel *h* is tubular and is provided with a glass rod *i* fused into it. The wire *f* is fused into this glass rod. The contact can be opened by pressure on the outer end of the rod *i* which is possible by reason of the elasticity of the glass. The wires *e* and *f* are bent at the superimposed ends which contact so that the electrodes *a* and *b* can be mounted between them in the manner shown in the drawing.

The contact plates or electrodes preferably consist for known reasons, of tungsten, molybdenum or other metals with high temperatures of vaporization.

I claim as my invention:

1. An electrical contact breaker comprising in combination a vessel, connections sealed in said vessel and contacting electrodes carried by said connections and made of metal sufficiently thin to be gradually burned away

by the arc and extended in a direction to present new contacting points progressing along lines at an acute angle to each other whereby wearing away of the contacting electrodes produces comparatively slight variation of their separation.

2. An electrical contact breaker comprising in combination a vessel, connections sealed in said vessel and contacting electrodes inclined at an acute angle to one another, arranged to contact only at the apex of the angle and made of metal, sufficiently thin to be gradually burned away by the arc in a direction from the apex to the base of the angle.

3. An electrical contact breaker comprising in combination a vessel, connections sealed within said vessel, a contacting electrode of metal sufficiently thin in the direction of the axis of the arc to permit gradual burning completely through, a second electrode contacting therewith, said electrodes being arranged at an acute angle to one another, and means to interrupt said contact.

4. An electrical contact breaker comprising a pair of contacting electrodes arranged at an acute angle to one another, one of said electrodes being made of fusible material and being sufficiently thin in the direction of the axis of the arc to permit gradual burning away of said electrode.

5. An electrical contact breaker comprising, in combination, a vessel under vacuum, contacting electrodes made of fusible material and arranged at an acute angle to one another in said vessel, said electrodes being made sufficiently thin in the direction of the axis of the arc formed therebetween to permit gradual burning away at the point of contact, and means for interrupting said contact.

6. An electrical contact breaker comprising, in combination, a vessel under vacuum, an electrode made of fusible material in said vessel, a second electrode of fusible material in said vessel and arranged at an acute angle to and contacting with said first electrode, and means for interrupting said contact, said first electrode having a contacting area of such considerable extent as compared with its thickness as to permit penetration by arc erosion at points where welding would otherwise take place.

In testimony whereof I have hereunto affixed my signature.

WALTER DORN.