Nov. 10, 1931. M. MALLORY 1,831,184

CIRCUIT BREAKER AND METHOD OF MAKING THE SAME

Filed Sept. 24, 1928

Fig. 1

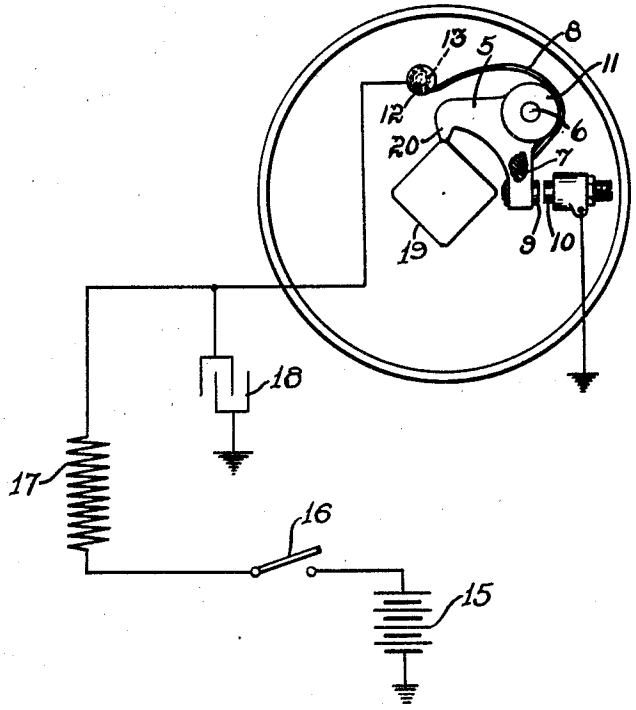
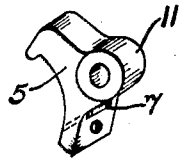


Fig. 2



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UNITED STATES PATENT OFFICE

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CIRCUIT BREAKER AND METHOD OF MAKING THE SAME

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This invention relates to a circuit breaker and method of making the same, with particular reference to its use in an ignition system for internal combustion motors. In circuit breakers of this type; as hitherto constructed, the movable arm which carries one of the contact points has usually been made from metal by a stamping process and formed at one end with a bearing about which the arm is adapted to rock. It is impossible to make these stampings uniform, because of variations in the thickness or the hardness of the metal. Then, too, a rubbing block must be secured to this arm, to be engaged by the cam to open the primary circuit at the proper times. If the stationary contact point is grounded, the movable arm must be insulated from the chassis and the portion of the rubbing block which is engaged by the cam must be of insulating material. With these various sources of error, it has hitherto been necessary, in order to insure proper ignition at the proper time, to fit each circuit breaker individually and adjust the contact points.

With the above conditions in mind, the primary object of my invention is to provide a circuit breaker which may be made according to standardized methods, in large numbers, and at a moderate cost, each one being made precisely like all the others so that practically no individual fitting or adjustment is necessary. In obtaining this object, the arm which carries the movable contact is molded from bakelite or similar material.

Another object in molding the movable member from such material is to make it light and to prevent a rebound when it is operated. Metal has such a high specific gravity that its inertia causes the circuit breaker to chatter when running, especially at high speed.

The specific construction of my improved circuit breaker and a practical method of making the same will be more fully described in connection with the accompanying drawings, which illustrate the preferred embodiment of the invention.

In the drawings:—

Figure 1 represents a diagrammatic view of the circuit breaker and the circuit with which it is associated.

Figure 2 is a perspective view of a molded block constituting a part of the circuit breaker.

According to the invention, the circuit breaker comprises a block 5, in the form of a bell crank and composed of bakelite or other suitable insulating material, preferably molded. This bell crank is mounted on a pivot pin 6 and one of its arms is formed with an obliquely disposed slot 7 for receiving a flat spring 8. One end of this spring, adjacent the inner end of the slot 7, is secured to a contact 9, which extends through the end of the arm in the direction of the adjustable stationary contact 10. The intermediate portion of the spring 8 is bent about the bearing portion or elbow 11 of the bell crank, and its other end is bent to engage about a pin 12, from which it is insulated by a bushing 13.

The spring 8 constitutes a part of the primary circuit, which extends from the battery 15 through a switch 16, a primary coil 17, spring 8, contact points 9 and 10 and thence to the battery 15 either through a ground or through an insulated connection. A condenser 18 is also connected to the circuit. The bell crank 5 is mounted in cooperative relation to the usual cam 19, which is adapted to engage an inturned lip 20, formed on the end of the bell crank remote from the contact 9, to break the circuit at the proper time.

The bell crank 5 is preferably formed from bakelite or similar insulating material which may be molded with great accuracy to the form and size desired, so that the circuit breakers may be manufactured in large numbers at a low cost, all substantially alike, and may be readily installed with substantially no individual adjustment. If desired, however, even greater accuracy in the shape and size of the block 21 may be secured by milling. The bell crank 5 is also extremely light and responds quickly to the influence of the cam 19 and the spring 8. The spring is so tensioned and so arranged with reference to the pivots 6 and 12 that the contacts 9 and 10 are held normally closed, until opened by the engagement of the cam with the lip 20.

While I have shown and described the preferred embodiment of the invention, it is to be understood that this is merely for the purpose of illustration and that various modifications may be made therein without any material departure from the scope of the invention as claimed.

What I claim is:

1. In a circuit breaker, the combination of a pivoted bell crank composed of insulating material and having a slot extending obliquely through one of its arms, a spring extending about the outside of the elbow of said bell crank and through said slot and terminating at the end of said arm, said spring constituting part of the circuit, a fixed contact, a contact secured to the spring at the end of said arm, said spring being so tensioned as to normally hold the contacts closed, and means acting on the other arm of the bell crank for rocking the latter and thereby opening said contacts.

2. In a circuit breaker, the combination of a pivoted bell crank composed of insulating material and having a slot through one of its arms, a spring constituting part of the circuit and extending about the outside of the elbow of said bell crank and through said slot and terminating at the end of the arm, a contact secured to and extending through the end of the slotted arm and secured also to the end of the spring adjacent the slot, a fixed contact opposed to the contact on the arm, a pin to which one end of the spring is connected and from which it is insulated, said spring being so tensioned as to normally hold the contacts closed, and means acting on the other arm of the bell crank for rocking the latter and thereby opening said contacts.

3. A circuit breaker comprising a bell crank of insulating material, one arm of said bell crank having a lip projecting toward the other arm, a cam engageable with said lip to rock the bell crank in one direction to break the circuit, and a spring to return the bell crank and close the circuit, as the bell crank is released by the cam, said spring constituting a part of the circuit.

4. A circuit breaker comprising a bell crank of insulating material having a slot extending obliquely through one of its arms, the other arm of the bell crank having a lip projecting toward the other arm, a cam engageable with said lip to rock the bell crank in one direction to break the circuit, and a spring extending about the elbow of said bell crank and through said slot and tensioned so as to return the bell crank and close the circuit as the bell crank is released by the cam, said spring constituting a part of the circuit.

5. A circuit breaker comprising a pivoted member of insulating material having a slot extending obliquely through one end portion thereof, a conductor extending through said slot, and a contact secured to the pivoted member and to the end of the conductor adjacent said slot.

6. A circuit breaker comprising a pivoted member of insulating material, means for securing one contact and the adjacent portion of the circuit to one end of said member, and a cam engageable directly with said member to rock the same to open the circuit.

7. A circuit breaker comprising a pivoted member of insulating material with a contact at one end, a spring mounted on said member and operable to rock the same in one direction, said spring being connected to said contact and constituting part of the circuit, and a cam engageable directly with said member to rock said member in the other direction.

8. In a circuit breaker for ignition systems, a rotatable metallic cam, a rockable member having two extensions and composed of non-flexible insulating material, a contact carried by one of said extensions, a fixed contact engageable by the first mentioned contact, the other of said extensions being engageable by the cam to open said contacts, and a spring connected to the movable contact to constitute part of the circuit, said spring being so tensioned as to hold the contactc normally closed.

9. In a circuit breaker for ignition systems, a rotatable metallic cam, a rockable member having two extensions at opposite sides of the cam and composed of non-flexible insulating material, a contact carried by one of said extensions, a fixed contact engageable by the first mentioned contact, the other of said extensions being engageable by the cam to open said contacts, and a spring extending about said rockable member outside of the angle defined by said extension, said spring being connected to the movable contact and constituting a part of the circuit and being so tensioned as to hold the contacts normally closed.

10. In a circuit breaker for ignition systems, a rotatable metallic cam, a rockable member having two extensions in different directions from its axis and composed of non-flexible insulating material, a contact carried by one of said extensions, a fixed contact engageable by the first mentioned contact, the other of said extensions being engageable by the cam to open said contacts, and a spring extending about said rockable member outside of the sector within which the cam is located, said spring being connected to the movable contact and constituting part of the circuit and being so tensioned as to hold the contacts normally closed.

In testimony whereof I have hereunto signed my name to this specification.

MARION MALLORY.