W. H. RATCLIFF.

CIRCUIT BREAKER.

APPLICATION FILED FEB. 24, 1917.

1,305,165.

Patented May 27, 1919.

Fig. 1

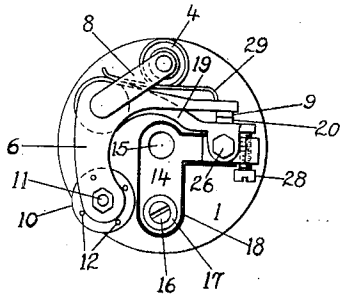


Fig. 2

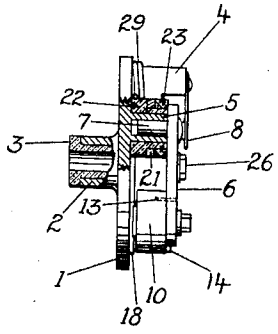
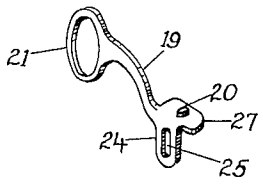


Fig. 3



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CIRCUIT-BREAKER.

1,305,165. Specification of Letters Patent. Patented May 27, 1919.

Application filed February 24, 1917. Serial No. 150,650.

To all whom it may concern:

Be it known that I, WILLIAM H. RATCLIFF, a citizen of the United States, residing at 68 9th avenue, Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Circuit-Breakers, of which the following is a specification.

This invention has to do with circuit breakers for ignition systems and the like. In particular it concerns means for periodically controlling the primary circuit of a high tension magneto, and embraces certain adaptations, and coöperative association of parts, to be fully set forth and claimed hereinafter.

Circuit breakers of this character consist in general of a pair of contacts electrically connected in the primary circuit, together with actuating elements, operated by some suitable means such as the shaft of a magneto for the purpose of opening and closing said contacts to thereby interrupt the primary current at the proper intervals, and in the correct time relation with the movement of the pistons of a gas engine, with which the breaker is especially adapted to coöperate. The high tension ignition current induced as a result of thus breaking the primary circuit depends for its strength largely upon the manner in which the breaker contacts coöperate with each other. In other words it is desirable that the contact points present their full surface area to each other in order that the best results be obtained. Again the various breaker elements, especially the cam actuated member, continually being subjected to impulses, wear away, with the tendency of reducing the opening gap of the contact points. It therefore becomes necessary in the course of time to make certain adjustments to compensate for wear. It has been the practice heretofore to provide for this by mounting the stationary contact point so as to be adjustable in a straight line direction. Such a method, while capable of accomplishing any required distance opening of the contact gap, is, nevertheless, attended by one serious defect namely; that there is but one point throughout the entire range of adjustment in which the breaker points contact each other over their full surface areas. The reason for this will be obvious when it is considered that the motion of the movable contact is along the arc of a circle, whereas the movement of the stationary contact, when adjusted, is along a straight line. Consequently when adjustment is made said contacts are thrown out of parallel, and to obviate the imperfect contact resulting therefrom it becomes necessary to dress the points, which is objectionable in that valuable material, such as platinum which is generally used, is wasted.

Viewing the above conditions my invention seeks to provide means whereby the breaker points contact each other over their full surfaces for any desired adjustment, thus making it unnecessary to resort to such make-shift methods as filing or dressing. I accomplish this by novelly arranging the stationary contact so that its line of motion, when adjusted, coincides with the path of the movable contact.

While my invention in its broad scope is applicable to all breakers of the class aforementioned, yet for the purpose of illustration I have shown it as incorporated in and constituting an improvement of the specific type involved in Patent No. 1,125,715, issued to J. H. Richards, January 19, 1915.

I will describe the invention with particular reference to the accompanying drawing wherein Figure 1 is a front elevation of the breaker plate showing the several members mounted thereon. Fig. 2 is a left hand side elevation of Fig. 1 with certain parts shown in section. Fig. 3 is a perspective showing of the stationary pivotally mounted arm upon which the stationary contact is located.

Considering said drawings, wherein reference characters are used to identify the various elements, 1 is the breaker mounting plate which has an integral hub portion 2 whereby said plate may be conveniently attached to the shaft of a magneto or the like. An insulating bushing 3 is adapted to receive a suitable current conveying means for connecting the insulated contact of the breaker to the live end of the magneto primary. Said winding and connecting means are not shown since they form no part of this invention and are well understood by others skilled in the art. Mounted upon the plate 1, either in integral or detachable relation therewith, are two upright posts 4 and 5, the latter of which is hollow as seen in Fig. 2. A bell-crank arm 6 is pivotally support-

ed by post 5 by means of a stud 7 carried by said arm and which is adapted to fit freely within the hollow opening in said post. A spring 8, of comparative stiffness, mounted on post 4 has its free end bearing on arm 6 to hold the same securely in position, also affording a means of readily detaching said arm whenever desirable. Carried by one end of the arm 6 is the movable breaker contact 9. Fastened to the other end of arm 6 is an element 10 held thereon as by a screw 11. This element constitutes the means for operating the bell-crank arm, being adapted to be brought into engagement with suitable cams (not shown) as the breaker plate is revolved. Element 10 is preferably of some good wearing material, as fiber, and in order to be adjustable to present a new surface to the cams, it is provided with a series of holes 12 into which a pin 13 is adapted to fit. Said pin is carried by the lever 6 and serves to hold the element 10 in place as is well explained in the patent heretofore mentioned.

Mounted upon plate 1 is an L-shaped block 14 having a hole 15 therein alining with the bushing 3, and through which a terminal connecting bolt (not shown) is adapted to pass. Block 14 is secured to the breaker plate by means of screw 16 which is surrounded by an insulating bushing 17. To further prevent block 14 from contacting the plate 1 a strip of suitable insulating material 18 is interposed therebetween. 19 is a member which I shall refer to as a stationary arm and to which is fastened the stationary contact 20. Said arm may be made of any suitable shape depending upon the particular arrangement of the various other elements mounted upon the breaker plate, but when applied to a breaker of the particular type shown I prefer to construct it substantially as illustrated in Figs. 1 and 3. One end of said stationary arm is ring shaped as as 21 being of suitable diameter to fit on over a shouldered insulating sleeve 22 surrounding the post 5. An insulating washer 23 spaced between ring 21 and lever 6 serves to hold said arm 19 in place and also to insulate it from the other parts of the breaker mechanism. The other end of arm 19 has an ear portion 24 provided with an elongated opening or slot 25. When said arm 19 is assembled in position the ear 24 over-laps block 14, a screw 26 passing through slot 25 into a tapped hole in said block serving to hold the arm securely thereto. The stationary arm also has a lug portion 27 to which is fixed the stationary contact 20, above referred to. 28 is an adjusting screw threaded into a tapped hole in the block 14 with its end bearing against the lug 27 of arm 19.

Observing Fig. 1 it will be seen that with the various elements of the device arranged in position the contact 9 engages the stationary contact 20 and coöperates therewith to successively open and close the circuit in which they are adapted to be connected. A spring 29 coiled about post 4 with one end bearing against sleeve 22 and the other end against arm 6 constantly tends to maintain the breaker contacts in their closed position.

Let it be assumed that due to wear or other causes it becomes necessary to adjust the stationary contact so as to attain a proper distance separation when the arm 6 is rocked about its fulcrum post 5. This may be accomplished by loosening up the screw 26 and turning screw 28 so that the stationary arm 19 may be rotated about post 5 to thereby carry the stationary contact 20 to any position desired, the screw 26 then being set up again to hold said arm in place. During said adjustment the surface of contact 20 does not change its relation with that of contact 9 and consequently said contacts when closed present to each other their full surfaces as before the adjustment was made, thus obviating the necessity of filing in order to make them bear evenly on one another. I secure this feature as above mentioned by arranging to have the stationary contact adjustable along the arc of a circle, and select as the center therefor the same center about which the movable contact operates.

I do not care to be limited to the exact details of construction shown and described, it being understood that such modifications may be made as come within the scope of the appended claims.

Having thus described my invention what I claim is:—

1. In a device of the character described, the combination of a mounting plate having a post located thereon, a breaker arm pivotally attached to said post and means for rocking the breaker arm about said post as a center, a contact point located on said arm to move therewith, a stationary arm having a contact point thereon adapted to coöperate with said first contact, one end of said stationary arm being pivotally attached to said post, a terminal block mounted upon said plate, and means on said block coöperating with the other end of said stationary arm to adjustably secure the latter in position.

2. In a device of the character described, the combination of a mounting plate having a post located thereon, a breaker arm pivotally attached to said post and having a contact point fixed to one end, means on the other end of said arm to rock the same about said post as a center, a stationary arm having a contact point opposing the first said contact, means at one end of said stationary arm whereby the same is rotatably fastened to said post, and means acting on said stationary arm to secure the said second contact in its proper position.

3. In a device of the character described, the combination of a mounting plate having a bearing post thereon, an oscillating arm supported by said post and having a contact point adapted to move with said arm about said post as a center, a stationary contact opposing the first contact and adapted to be engaged and disengaged thereby, said stationary contact being fixed to a second arm one end of which is pivoted to said post, means adapted to act on said second arm for the purpose of rotating the same together with the stationary contact about said post as a center to thereby effect an adjustment of said stationary contact, and means to retain said last mentioned contact in its adjusted position.

4. In a device of the character described, the combination of a mounting plate having a post and a terminal block located thereon, a breaker arm attached to said post for rocking movement thereabout, a contact point fastened to and adapted to participate in the rocking motion of said arm, a stationary arm one end of which is rotatably mounted on said post, screw means adapted to fasten the other end thereof securely to said terminal block, a second contact fastened to said stationary arm in coöperative relation with the first mentioned contact point, and a second screw means acting between said terminal block and stationary arm whereby the latter may be rotated about said post to effect an adjustment of the said second contact point.

5. In a device of the character described, the combination of a mounting plate having an integral post thereon, a terminal block mounted upon but insulated from said plate, a breaker arm carrying a contact, said arm being attached to said post and operable to move said contact in a circular path about said post as a center, a stationary arm having one end formed and adapted to be pivotally attached to said post and means for insulating the same therefrom, a second contact fastened to said stationary arm in coöperative relation with said movable contact, adjustable locking means coacting between said terminal block and stationary arm whereby said second contact may be moved in a circular path coincident with the working path of said movable contact to any desired position of adjustment, and means tending to maintain said contacts in their closed position.

6. In a device of the character described, the combination of a mounting plate, a breaker arm carrying a contact and having a pivotal mounting on said plate, a second arm having a stationary contact, said second arm being adjustable about said pivotal mounting as a center, and means for locking the same in its adjusted position.

7. In a device of the character described, the combination of a mounting plate having a post thereon, two arms attached to said post, and a contact point carried by each arm to coöperate with each other, one of said arms being adapted to rock about said post to open and close said contacts, the other of said arms being movable about said post to adjust the opening of said contacts.

8. In a device of the character described, the combination of two coöperating contact points, one of said contacts being movable about a fixed point into open and closed relation with the other of said contacts, said latter contact being adjustable about the same point to vary the distance of opening.

9. In a device of the character described, the combination of two opposed contact points, one of said contacts adapted to operate along the arc of a circle to engage and disengage the other of said contacts, said latter contact being movable along the same arc for the purpose of adjustment.

10. In a device of the character described, the combination of a movable member carrying a contact and a normally stationary member carrying a contact to coöperate with the first mentioned contact, a support for the normally stationary member, and means for moving said stationary member and contact so that each part thereof has a curved path independent of said support for the purpose of adjustment.

11. In a device of the character described, the combination with a movable breaker arm having a contact point thereon, of a mounting plate with pivot means for supporting said arm thereupon, a normally stationary arm having a ring formation at one end whereby said arm is adjustably attached to said pivot means, the other end of said stationary arm being provided with a slotted ear and a lug portion, a second contact fastened to said lug, and screw means coöperating with said lug and slotted ear for the purpose of adjusting and locking said second contact in position.

12. In a circuit-breaker, the combination with two normally engaged contacts, means for separating the same for breaking the circuit through them, and means for mounting them for their adjustment about a common center, whereby the amount of their separation may be varied without disturbing the parallelism of their engaging faces.

In witness whereof I affix my signature.

WILLIAM H. RATCLIFF.