Aug. 21, 1951 R. B. CLARK 2,564,832

CIRCUIT BREAKER

Filed July 27, 1946

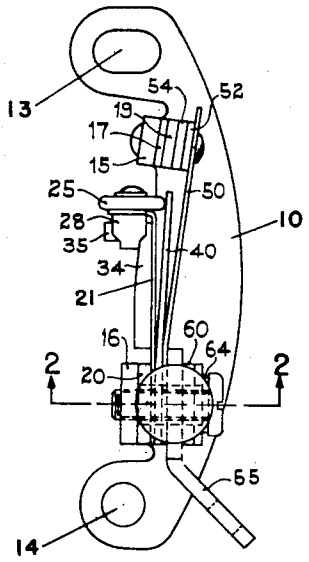


Fig. 1.

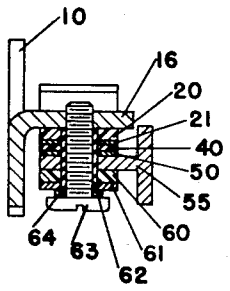


Fig. 2.

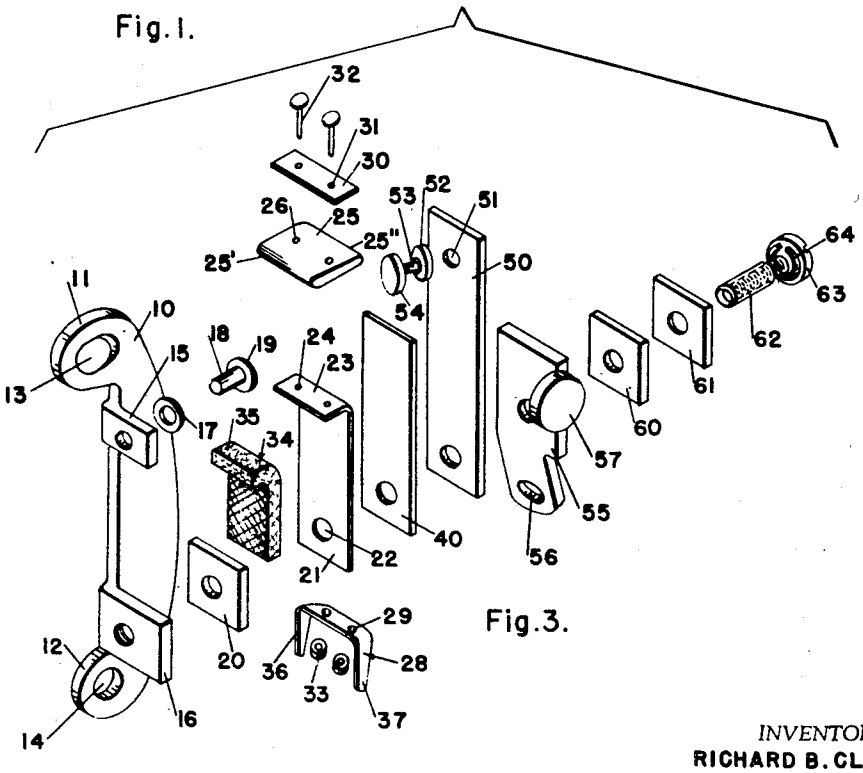


Fig. 3.

INVENTOR.
RICHARD B. CLARK

BY

Dale A. Bauer
ATTORNEY.

Patented Aug. 21, 1951

2,564,832

UNITED STATES PATENT OFFICE

2,564,832

CIRCUIT BREAKER

Richard B. Clark, Sidney, N. Y., assignor to Bendix Aviation Corporation, New York, N. Y., a corporation of Delaware

Application July 27, 1946, Serial No. 686,613

5 Claims. (Cl. 200—30)

1

This invention relates to a circuit breaker, and particularly to a circuit breaker of the type that is usefully employed in the construction of magnetos. The invention will be described in relation to the construction of a circuit breaker adapted for use as part of a magneto, but it is to be understood that the principles of the invention may be incorporated in other circuit breaking apparatus.

It is an object of this invention to reconstruct magnetos for efficiency and for cost in order that equal or superior efficiency may be obtained with a lowering of the manufacturing cost. In a copending application Serial No. 681,448, filed July 5, 1946, there is disclosed a magneto of new type, a prominent feature of which is a cam for operating the circuit breakers made of plastic material. It has been found that cam followers of prior art type are unsatisfactory with such magnetos. It is therefore an object of the invention to construct a circuit breaker of a type satisfactory in combination with cams of plastic material.

Resins and resinous compositions of various types are employed in the construction of cam rotors of the type involved in the construction of the new magnetos. For instance, phenol formaldehyde resins, vinyl resins, cellulosic ester resins, and other plastics which set up to a hard polymer are usefully employed alone or in combination with fabric or other type skeletons. The circuit breaker of this invention is useful with all such compositions, regardless of their constitution, and it has been discovered that although the cam follower of this invention is made of metal, it is satisfactory in such use.

The above and further objects and novel features of the invention will more fully appear from the following detailed description when the same is read in connection with the accompanying drawings. It is to be expressly understood, however, that the drawings are for purposes of illustration only and are not intended as a definition of the limits of the invention, reference for this latter purpose being had primarily to the appended claims.

In the drawings, wherein like reference characters refer to like parts throughout the several views,

Fig. 1 is an elevational view of a circuit breaker embodying the principles of this invention;

Fig. 2 is a section on the line 2—2 of Fig. 1; and

Fig. 3 is an exploded view of the dismantled circuit breaker.

In the drawings, 10 refers to a supporting plate which may conveniently be made of metal and which is provided with ears 11, 12 that are perforated with a slot 13 and a round hole 14, respectively, to provide adjustability of the breaker contact toward and away from the cam. The plate 10 carries two lugs 15, 16, of which

2

the former is perforated for the reception of a rivet and the latter is screw threaded for the reception of a bolt. The lug 15 receives the shank 18 of a rivet which has a head 19 of metal adapted to serve as a breaker contact. Brass or copper washer 17 spaces the contact 19 from the lug 15. The end of shank 18 is headed after it has been passed through the lug 15, making a permanent connection of the breaker contact to the support.

A number of devices are stacked upon the lug 16, including an insulating washer 20 that serves to space the cam follower assembly from the lug. The cam follower assembly includes a cam follower spring 21 having a hole 22 adapted to receive the insulating sleeve and the bolt that holds the parts together, and having a bent end 23 perforated by holes 24. The breaker arm is an insulated spring having a contact 54 resting under tension upon the grounded contact 18, thus diverging from spring 21, as indicated in Fig. 1. The cam follower itself is a small block of metal 25 having holes 26 that are adapted to be aligned with holes 24 in the spring 21. This cam follower is preferably made of hard metal such as steel, although others may be usefully employed. A wick holder comprising a yoke 28 of relatively flexible metal, having holes 29 that are adapted to be aligned with the holes 24, is provided. A brass plate 30 having holes 31 that are adapted to be aligned with the holes 24 is employed to secure the follower 25 to the follower spring 21. When the follower is moved against the face of flange 23 and the clamp 28 is moved against the back of that flange, the plate 30 is placed over the outer face of the member 25, and the rivets 32 are passed through all the aligned holes and through a pair of washers 33, over which they are headed. There is thus constructed a cam follower assembly having a metal cam follower firmly attached to the flanged end of a cam follower spring that carries on its inner side a wick. The wick is indicated by the numeral 34 and comprises a piece of felt of appropriate constitution and thickness which is attached to the cam follower by bending upwardly the end 35 and clamping it within the arms 36, 37 of the clamp 28. The upwardly bent end of the oil-impregnated wick is arranged to transmit the oil in a fine film to the surface of the cam as it rotates relative to the metal cam follower. If any excessive oil is found upon the cam, the wick absorbs it. In this way the lubrication of the contacting surfaces is satisfactorily cared for with a minimum of complication.

The cam follower rides with its edge 25' upon the cam disk of the magneto, and the edge 25'' is adapted under the impulse of the cam, to displace the breaker arm 50.

Between the spring 21 and the spring 50 is an insulating plate 40. This insulating plate is preferably made of springy non-metallic mate-

rial and extends between the edge 25'' and the opposed face of the breaker arm 50. This element contributes very largely to the success of the breaker and is to be regarded as an essential point in its construction, the importance of which is not to be minimized. Fish paper, a vulcanized rag stock impregnated with zinc chloride, is quite valuable in this use, and although not essential is much preferred. It has distinct spring action which helps to damp the vibration of the follower, and resists wear better than metallic or other non-metallic materials.

Toward the end of the spring 50 is a hole 51 through which, and through a brass or copper washer 52, passes the shank 53 of the breaker contact 54. The end of the shank 53 is headed on the other side of the plate 50.

A metal connector 55 abuts the metal spring 50. The connector is provided with a hole 56 for a cable connection and with a plate 57 which may also be used to make a connection, if desired. Beyond the connector 55 is an insulating washer 60 and a metal washer 61. Through appropriate holes provided in the elements 61, 60, 55, 50, 40, 21, and 20, passes a cylindrical insulating washer 62, preferably having a snug fit with each of the said elements. A screw or bolt 63 passes through the insulating sleeve 62 into the screw threads of lug 16 to hold the parts in assembled relation. A spring washer 64 serves the usual function of such washers.

The wick may be attached to the spring by a wire staple of the "Bostitch" type and may be provided with an opening within which the follower is received, so that part of the wick appears before and behind the follower.

An advantage of this invention is a material improvement in the efficiency and durability of magnetos having plastic cams. The invention has been calculated in such a manner to achieve this result without necessitating the replacement of certain standard parts. It is, of course, of the greatest advantage to employ standard parts where possible. It is therefore part of the advantage of this invention that the desirable results have been attained by the employment, to some extent, of parts which are standard.

Although only a single embodiment of the present invention is herein illustrated and described, it is to be expressly understood that the invention is not limited thereto. Various changes may be made in the design and arrangement of the parts and materials used without departing from the spirit and scope of the invention, as will now be apparent to those skilled in the art. For a definition of the limits of the invention, reference is had primarily to the appended claims.

What is claimed is:

1. A circuit breaker comprising a supporting plate, a follower assembly including a metal cam follower having a rounded contact edge, an oil wick holder and wick, and a follower spring extending between said cam follower and holder and adapted to support the cam follower and the holder, a metal breaker arm, a non-metallic spring between said breaker arm and follower, a cable connector in contact with the breaker arm, and insulated means to connect the follower assembly to the plate.

2. A circuit breaker comprising a supporting plate having projecting perforated ears, of which one is slotted to provide adjustability, and spaced lugs, of which one is adapted to hold a breaker spring and the other is adapted to hold a breaker contact, a follower assembly including a metal cam follower having a rounded contact edge, an oil wick holder and wick, and a follower spring adapted to support the follower and the holder, a spring breaker arm, a fish paper spring between breaker arm and follower, a connector in contact with the breaker arm, an insulating sleeve adapted to align said parts, and a bolt adapted to connect the follower assembly to a lug on the plate through said sleeve.

3. A circuit breaker comprising, a pivoted support, a fixed contact on said support, a movable contact normally engaged with said fixed contact, a spring arm carrying said movable contact at one end thereof and secured at the opposite end to said support adjacent the pivot for the latter, a metal cam follower adapted to actuate said spring arm and disengage said movable contact from said fixed contact, a spring arm carrying said follower at one end thereof and secured at the opposite end to said support at the same point as said first-named spring arm, said cam follower having portions projecting beyond opposite plane surfaces of its spring arm and the edges of said portions being rounded, and a non-metallic strip disposed between both said spring arms and having one end thereof engaged with said cam follower and the opposite end secured to said support at the same point as said spring arms.

4. A circuit breaker adapted for use with dynamo-electric machines that have revolving cams that includes a frame constructed and arranged at one end for pivotal attachment to the machine adjacent the revolving cam, and constructed and arranged at the opposite end to permit limited movement toward and away from the cam, a support on the frame adjacent the pivotal attachment, a circuit breaker arm attached to said support, a metal cam follower attached to said support, insulation between breaker arm and cam follower, and a cooperating breaker contact mounted near the said opposite end of the frame.

5. A circuit breaker comprising a supporting plate, a metal cam follower having a rounded contact edge, an oil wick holder disposed adjacent said cam follower, a follower spring having a portion disposed between the cam follower and the holder and adapted to support both the cam follower and the holder, a metal breaker arm adapted to be actuated by said cam follower, an oil wick carried by said holder in close proximity to said cam follower, a non-metallic strip between said breaker arm and cam follower, and means to connect said follower spring, breaker arm and strip to the plate at a common point thereon.

RICHARD B. CLARK.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,126,043	Livermore	Jan. 26, 1915
1,679,503	Siegrist	Aug. 7, 1928
1,735,706	Wood	Nov. 12, 1929
2,001,137	Hopkins	May 14, 1935
2,191,087	Spengler	Feb. 20, 1940
2,191,670	Kuhn et al.	Feb. 27, 1940
2,413,140	Griffith	Dec. 24, 1946