Oct. 7, 1924.

1,510,901

E. B. NOWOSIELSKI

MAGNETO CIRCUIT BREAKER

Filed Nov. 25, 1921

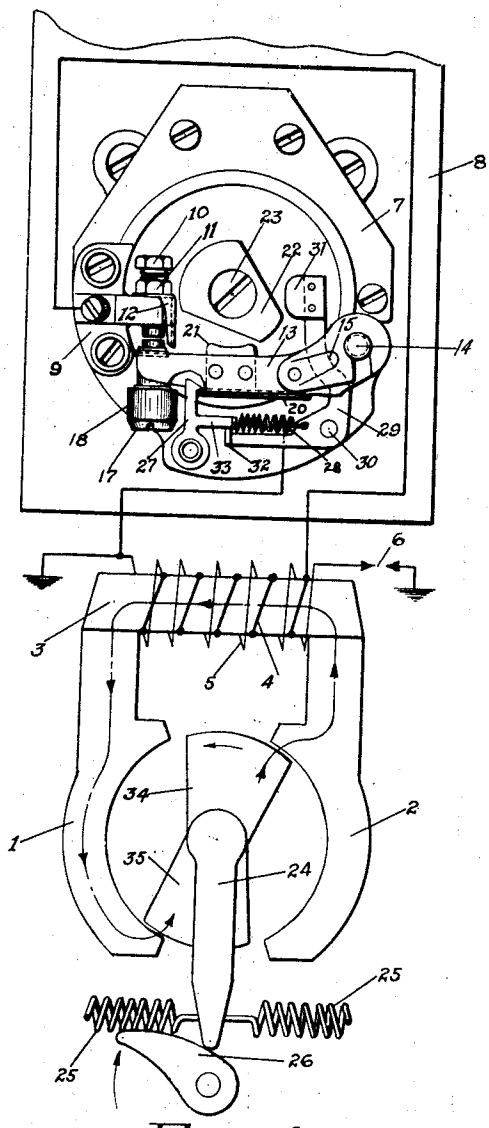
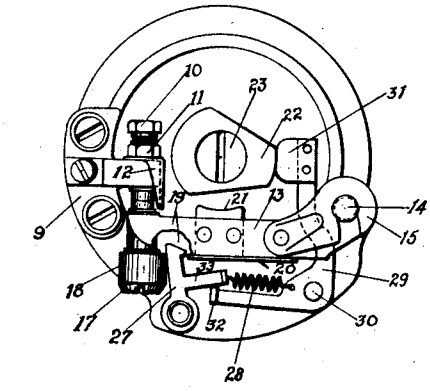


Fig-1



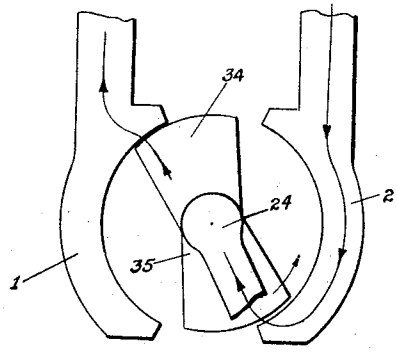


Fig-2

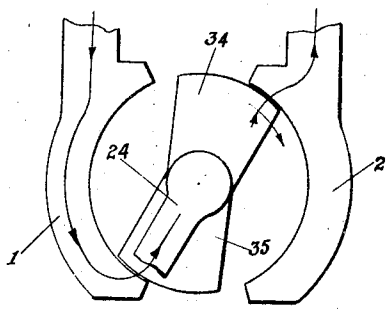


Fig-3

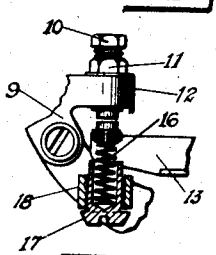


Fig-4

INVENTOR

E.B. NOWOSIELSKI

BY

A. D. T. Libby

ATTORNEY

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UNITED STATES PATENT OFFICE.

EDWARD B. NOWOSIELSKI, OF BLOOMFIELD, NEW JERSEY, ASSIGNOR TO SPLITDORF ELECTRICAL COMPANY, OF NEWARK, NEW JERSEY.

MAGNETO CIRCUIT BREAKER.

Application filed November 25, 1921. Serial No. 517,774.

To all whom it may concern:

Be it known that I. EDWARD B. NOWOSIELSKI, a citizen of the United States, residing at Bloomfield, in the county of Essex, State of New Jersey, have invented certain new and useful Improvements in Magneto Circuit Breakers, of which the following is a description, reference being had to the accompanying drawing and to the figures of reference marked thereon.

This invention relates to circuit breakers for ignition magnetos for internal combustion engines and especially to magnetos of the oscillatory type wherein a shaft, bearing inductors, oscillates between magnet pole pieces and induction coil core pole pieces, so that the flux through the core is alternately built up and discharged, the diminution of the flux being assisted by a reversal of flux through the coil. In the electrical circuit of the primary of the induction coil is interposed a circuit breaker movable in unison with the engine so as to make and break the circuit at the time when a maximum rate of change of flux is taking place within the core. It is the common practice to maintain the circuit breaker of such an ignition magneto closed until just prior to the time of firing a charge within a cylinder, when the circuit is opened, and the induced current in the secondary causes a spark to jump across the spark gap within the cylinders.

It is however a distinct disadvantage in a magneto and particularly in a magneto of the oscillatory type to maintain the primary circuit open during the time when the flux is building up in the core. In an oscillatory magneto this flux building up takes place during the so-called cocking operation of the rotor. As the rotor carrying the inductors tilts so that a greater amount of flux threads through the inductors and into the core, the rate of building up of the flux in the desired direction is dampened by the counter-magneto-motive force generated by the current in the coil of the primary circuit if the primary circuit is closed; as a consequence when the circuit is opened and there is simultaneously a diminution of the flux threading the coil due to the movement of the inductors from their maximum flux threading position to their minimum flux threading position, the total decrease of the flux, and the consequent rate of change of flux is not as great as it might have been, had the flux threading the coil been given the opportunity to build up to a greater value.

The object of this invention is to provide a novel latch mechanism for the circuit breaker so as to maintain the same open during the major portion of the time that the flux is building up in the coil, to thereby enable the flux to build up to a high value.

Mechanism of this character has already been disclosed in the patent to Leibing No. 1,461,128, issued July 10, 1923, and patent application of McKeown Serial No. 422787, filed November 9, 1920, but the particular mechanism herein disclosed is especially applicable where compactness is desired and where no room above the magneto shaft is available for the latch mechanism.

It is therefore another object of this invention to provide a compact latch mechanism of this character.

Other and further objects will appear after reading the following specification and claims in connection with the accompanying drawings, in which:

Figure 1 is a view of my circuit interrupter, the magneto magnetic circuit being shown diagrammatically, the parts being in the normal position;

Figure 2 is a similar view showing the parts at the completion of the cocking operation, the circuit interrupter being closed, and the rotor being about to return for its working stroke;

Figure 3 shows the rotor at the end of its working stroke, the contacts being then opened; and

Figure 4 is a partial sectional view through my contact mechanism.

Altho, for simplicity sake, I have chosen to illustrate by circuit breaker in connection with a rotor of the Dixie type as disclosed in the patent granted to Mason 1081760 issued December 16, 1913, wherein the inductors are always of constant polarity, it should be understood that my invention can be used in connection with any type of magneto rotor, wherein inductors are adapted to cause the flux from the permanent magnet to thread a core bearing an induction coil.

Referring now to the various figures in

which like parts are designated by like reference characters 1 and 2 illustrate the field poles of a magnetic field structure across which a core 3 is placed. Core 3 is illustrated as having a low tension winding 4 and a high tension winding 5. A spark gap 6 illustrating a plug in an engine cylinder is connected in circuit with the high tension winding 5. Between the field pole pieces is adapted to operate the inductors 34 and 35. The breaker base 7 attached to one end of the magneto generator 8 carries a stationary insulated block 9 carrying an adjustable contact screw 10. Underneath the locking nut 11 of the screw is a guard 12 adapted to protect the stationary and movable contacts of the breaker from dirt and oil thrown off by moving parts of the magneto. A breaker arm 13 is pivoted on a stud 14 secured to the breaker base 7 and a pivoted latch 15 is provided to retain the breaker arm in operative position. The contact on the breaker bar is urged into engagement with the stationary contact by means of a spring 16 housed within a hollow adjustable screw 17 threaded into a support 18 secured to the breaker base. Thus by turning the screw 17 the pressure of the contacts against each other may be regulated. The breaker bar comprises a channel bar having flanges 19 and a web 20. Between the flanges is secured a bumper 21 of fibre or other suitable non-wearing material against which is adapted to act a cam 22 mounted on the oscillatory magneto shaft 23, at the other end of which is fastened the lever arm 24. Said lever arm is normally held in the position shown in Fig. 1 by means of a pair of springs 25, the lever being adapted to be moved by a cam 26 driven from the engine. Upon oscillation of the magneto shaft, the cam 22 is adapted to engage the bumper 21 to depress the breaker arm against the force exerted by the spring 16.

When said bar has been depressed, a pawl 27 engages the edge of the web 20 as shown in Fig. 1. The pawl is urged to breaker arm latching position by means of a spring 28 secured to the pawl and a lever arm 29, pivoted on a stud 30 secured to the breaker base. One end of the lever 29 carries a bumper 31 in the path of movement of the cam 22, and the other end of the lever 29 is provided with an offset portion 32 adapted to engage beneath a projection 33 on the pawl 27 when the lever is operated by the cam 22.

Coming now to the operation of the device and assuming the parts to be in the normal or stationary position shown in Fig. 1, it will be noted that the circuit breaker contacts are held open by means of the pawl 27 and that the flux is threading the coil in the direction of the arrows. As the magneto shaft is moved by the member 26 rotating clockwise and rotating to the right against lever 24 it is seen that the lobes 34 and 35 as they move counterlockwise toward the position shown in Figure 2 will produce a change in number and direction of flux threading the coil, tending to set up a current in the primary winding 4. This current if set up would oppose the decrease of flux in one direction and hinder the building up of flux in the opposite direction. But this is obviated by the circuit contacts being held apart. As the lever 24 reaches the extreme position shown in Fig. 2, the cam 22 engages the bumper 31 to thereby cause the pawl 27 to release the breaker arm, permitting the contacts to close. It will be noted that during this so-called cocking operation of the magneto shaft that the primary circuit has been maintained open so as to permit unrestricted building up of the flux in the coil. As the shaft now recoils to a position just in advance of the position shown in Fig. 3, the flux threading the coil diminishes rapidly setting up a current in the coil, which current is at its peak when the lobe 34 breaks away from the pole piece 1. At this instant the cam 22 engages the bumper 21 to open the primary circuit and an instant later flux in a reverse direction is forced through the core 3 due to the position assumed by the inductors as shown in Fig. 3. The opening of the primary circuit causes an induced current in the secondary coil 5 which discharges itself through the spark plug gap 6.

The latching mechanism described provides a neat arrangement in which all of the operative parts are arranged toward one side of the cam and below the breaker arm, whereby the mechanism is arranged in a very compact form and the available space required is small in comparison to the arrangements set forth in the applications mentioned above.

Having thus described my invention what I claim is:

1. In a circuit breaker for a magneto of the oscillating type, a stationary contact, a breaker arm, yieldingly urged to circuit closing position, a cooperating contact carried thereby, and latching means for engaging the arm in open circuit position, a lever engaging the latching means, and cam mechanism for alternately engaging the lever and the breaker arm to alternately release said breaker arm to permit the circuit breaker to close and to cause the same to be latched in open position.

2. In a circuit breaker for a magneto of the oscillating type, a cam, a contact carrying element engageable by said cam to open a circuit through the breaker, a pawl engageable with said element to lock the circuit open, a lever engageable with said pawl to release the same from locking engagement with

said element, and a bumper on said lever engageable with the cam upon oscillation thereof.

3. In a circuit breaker for a magneto of the oscillating type, a cam, a contact carrying element engageable by said cam to open a circuit through the breaker, a pawl, resiliently urged toward locking engagement, engageable with said element to lock the circuit open, a lever engageable with said pawl to release the same from locking engagement with said element, and a bumper on said lever engageable with the cam upon oscillation thereof.

4. In a circuit breaker for a magneto of the oscillating type, a cam, a contact carrying element engageable by said cam to open a circuit through the breaker, a pawl engageable with said element to lock the circuit open, a lever engageable with said pawl to release the same from locking engagement with said element, a spring connecting said lever and pawl to urge the same to locking position, and a bumper on said lever engageable with the cam upon oscillation thereof.

5. In a circuit breaker for a magneto of the oscillating type, a circuit breaker comprising a stationary contact, a movable contact, said movable contact being mounted on a movable arm, a bumper on one side of said arm, a cam engaging said bumper for moving said arm, a latching mechanism on the opposite side of the arm for engaging the same when moved to open position and means for releasing said latching mechanism upon movement of said cam.

6. In a circuit breaker for a magneto of the oscillating type, a circuit breaker comprising a base, a stationary contact mounted on said base, a movable breaker arm pivoted on said base carrying a contact, a bumper on one side of said breaker arm, a latching pawl pivoted to the base on the other side of said arm adapted to latch the arm in open circuit position, a cam engaging the bumper to move the arm to pawl engaged position and means pivoted to said base on the opposite side of the arm from that of the pawl, for tripping said pawl to release the arm upon oscillation of said cam.

In testimony whereof, I affix my signature.

EDWARD B. NOWOSIELSKI.