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BREAKER ADJUSTMENT FOR MAGNETOS

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Fig. 1

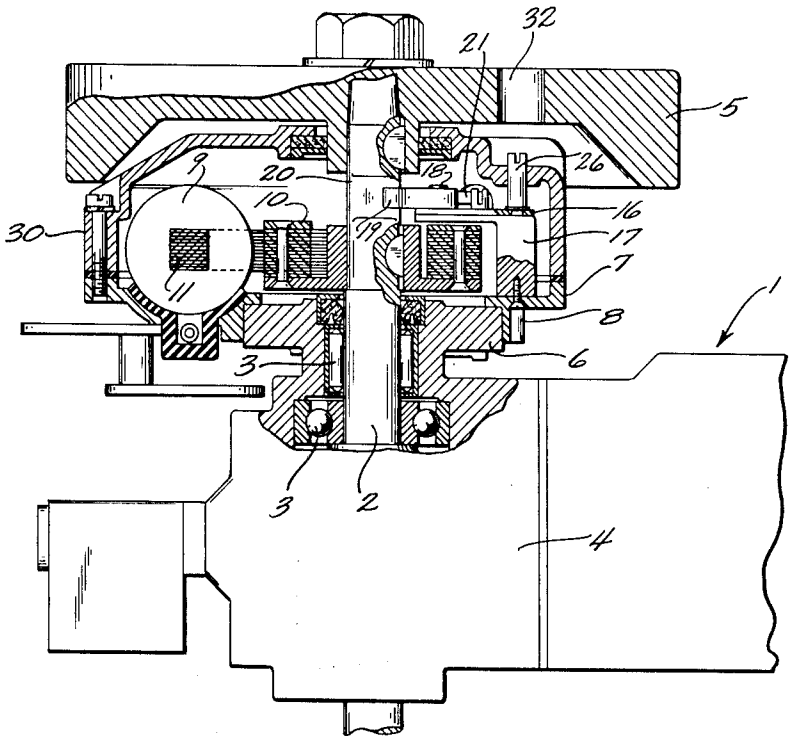


Fig. 2

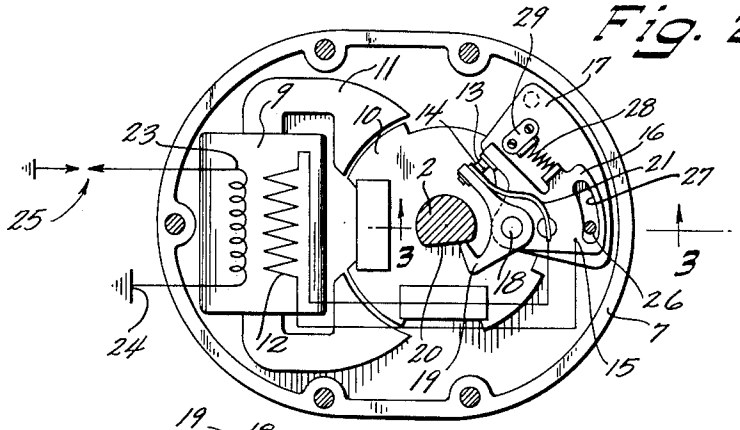
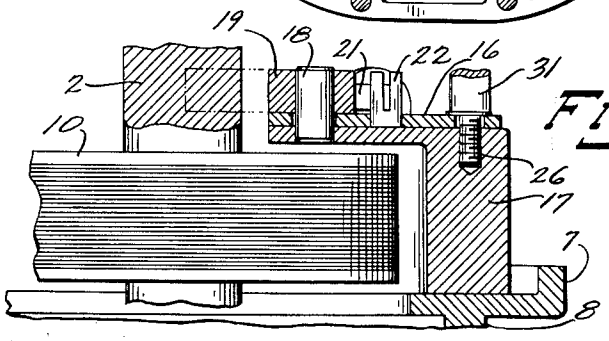


Fig. 3



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BREAKER ADJUSTMENT FOR MAGNETOS

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This invention relates to magnetos for engines and particularly to the adjustment of the breaker mechanism in timed relation to the rotation of the engine crankshaft and cam.

The invention provides for the biasing of the movable contact member by a spring carried by the normally fixed member and the pivotal adjustment of the latter on the axis of the movable contact member by relatively weak spring means whereby release of the fixed member allows both members to follow the cam and resecurement of the fixed member provides immediate opening of the contact members upon further cam rotation.

An object of the invention is to provide a circuit breaker which is more readily adjusted in timed relation to crank shaft rotation.

Another object is to allow adjustment of the breaker and magneto to be made without direct access thereto.

Another object is to provide uniform pressure of the cam operating means to establish the dependable operation of the breaker mechanism in predetermined timed relation to crank shaft rotation.

These and other objects and advantages will appear in connection with the following description of an embodiment of the invention illustrated in the accompanying drawings.

In the drawings:

Fig. 1 is a side elevation of an engine with parts thereof broken away and secetioned to show the magneto and breaker mechanism operated by a cam carried by the crank shaft;

Fig. 2 is a plan view of the magneto and breaker mechanism as mounted on the base of the magneto stator plate with the electrical circuits of the magneto shown diagrammatically; and

Fig. 3 is an enlarged sectional view taken on line 3—3 of Fig. 2.

The engine 1 shown in the drawing includes the vertical crank shaft 2 which is supported near its upper end by the bearings 3 carried in the upper end of the crank case 4. The flywheel 5 is fixed to the upper end of crank shaft 2 above the engine. The circular flange member 6 formed integrally with crank case 4 at the upper end thereof carries the magneto stator plate 7 which includes the downwardly projecting rim 8 fitting the outer circumference of flange 6. Flange 6 is accurately formed with respect to the axis of crank shaft 2 and provides for the selective rotational adjustment of plate 7 on flange 6 respecting the axis of crank shaft 2.

The magneto mounted for rotational adjustment on plate 7 includes the stator 9 carried by plate 7 and the rotor 10 mounted on crankshaft 2. Rotor 10 includes a number of permanent magnets which provide a rotating magnetic field with rotation of crank shaft 2.

The opposite ends of core 11 of stator 9 are disposed adjacent to rotor 10 and within the magnetic field of the rotor whereby an electro-motive force is generated in the primary winding 12 of stator 9 shown diagrammatically in Fig. 2. The opposite ends of windings 12 are electrically connected to the fixed and movable contacts 13 and 14, respectively, which operate in timed relation to the rotation of rotor 10 and crankshaft 2. One end of primary winding 12 is grounded as at 15 to the adjustable plate 16 carrying fixed contact 13. Plate 16 is mounted on the bracket 17 which is fixed to the stator plate 7 of the magneto and forms a base for plate 16 and carries the pivot pin 18 adjacent to shaft 2. The movable contact member 14 is carried by one end of the non-metallic breaker lever 19 which is pivotally mounted on pin 18. The other end of breaker lever 19 projects over rotor 10 to engage the cam profile 20 of crank shaft 2. The breaker lever spring 21 is fixed at one end thereof in the dielectric post 22 carried by plate 16 and is connected at the other end to contact 14 and breaker lever 19 to bias the lever on pin 18 closing contact members 13 and 14. The opposite end of winding 12 is connected to the fixed end of spring 21 whereby winding 12 is normally shortcircuited by the closed contacts 13 and 14. The secondary winding 23 of stator 9 is groundeed as at 24 at one end and is connected to the spark plug 25.

As in the operation of the usual magneto, the most effective ignition by spark plug 25 is attained at the time of maximum flux in winding 12 as determined by the angular relation of the magnetic field of rotor 10 to stator 9. By opening of contacts 13 and 14 at such time, the energy in winding 12 is discharged through the secondary winding 23 with an increase in voltage which passes across spark plug 25 to provide the ignition required.

The timed relation of the spark discharge by the magneto and the rotation of engine crankshaft 2 is customarily adjusted by rotation of stator plate 7 on flange 6 which advances or retards stator 9 respecting rotor 10 and lever 19 respecting cam 20. The invention provides for the precise relative adjustment of lever 19 respecting rotor 10 so that opening of contacts 13 and 14 occurs at the precise moment of maximum or optimum flux in winding 12.

Plate 16 carries the normally fixed end of breaker lever spring 21 and the plate is pivotally adjustable on pin 18. The threaded lock screw 26 threaded in bracket 17 extends through the slot 27 in plate 16 and is adapted to be turned and tightened against the plate to secure the plate on the upper face of bracket 17. The positioning spring 28 between the upturned end of plate 16 and the abutment lug 29 carried by bracket 17 is disposed to urge plate 16 for pivotal movement on pin 18 in a direction which would separate contact members 13 and 14. Spring 28 is compressed to effect rotation of plate 16 and breaker lever 19 therewith on pin 18 upon release of lock screw 26 but is necessarily of insufficient force to open contact members 13 and 14 against the spring 21.

According to the invention, the release of plate 16 at any time by loosening lock screw 26 will automatically effect or allow the relative adjustment of lever 19 and plate 16 by either spring 21 or spring 28 so that with the resecurement of plate 16 the further rotation of crank shaft 2 in a given direction will immediately effect the opening of contact members 13 and 14.

The magneto cover 30, shown in the drawings, is secured and seated about the outer edge of stator plate 7 and extends over the magneto including the breaker mechanism and is provided with an opening immediately beneath flywheel 5 to accommodate the crank shaft 2 projecting therethrough. Lock screw 26 is provided with an upper stem 31 to extend upwardly through cover 30 whereby adjustment of the breaker mechanism may be made by turning stem 31 to loosen lock screw 26 and retighten the same without removal of cover 30. The opening 32 in flywheel 5 may be provided in predetermined relation to rotor 10 to provide access to stem 31

whereby adjustment of the breaker mechanism may be made without removal of cover 30 or flywheel 5.

Suitable index marks, not shown, on rotor 10 or flywheel 5 are required so that crankshaft 2 and rotor 10 may be turned relative to stator 9 or plate 7 to the position of optimum discharge. Upon such relative adjustment the invention provides for the automatic adjustment of the breaker mechanism by unturning lock screw 26 to release plate 17 momentarily and then resecuring the plate by retightening the screw.

Various embodiments of the invention may be employed within the scope of the following claims.

I claim:

1. A circuit breaker for a magneto mounted on a base and having a rotor mounted on a shaft for rotation therewith, comprising a fixed pivot pin spaced from and carried by said base parallel to said shaft, a plate pivotally mounted on said pin and having a contact spaced from said pin, said plate being adapted to be normally secured to said base, a movable lever member pivotally mounted on said pin and having a contact disposed to make and break an electrical connection with said first named contact, a cam carried by said shaft to rotate therewith and engageable with said lever to move the latter relative to said plate on said pin in a direction to separate said contacts, spring means carried by said base and connected to said plate to bias the latter on said pivot pin in a direction to separate said contacts, a spring carried by and connecting said lever and plate and biasing the same relatively on said pivot pin oppositely of each other to close said contacts, and manually operable clamping means for selectively securing said plate relative to said base for normal operation of the breaker and opening and reclosing of said contacts by said cam and last named spring, respectively, in predetermined relation to the rotation of said cam and rotor, said spring being effective against the biasing action of said spring means, and said manually operable clamping means being releasable to allow said plate to be moved relative to said lever by said spring to close said contacts and said lever and said plate with said contacts closed to be oscillated together on said pivot pin by said spring means and said cam with rotation of said crankshaft whereby said plate and contact associated therewith is precisely positioned for resecurement by said clamping means relative to said lever so that the further rotation of said cam moving said lever relative to said plate is immediately effective to separate said contacts.

2. The invention as defined in claim 1 wherein the magneto includes a cover enclosing the same and said clamping means extends through the cover for the adjustment of the bracket member without removal of said cover.

3. A circuit breaker for a magneto having a rotor mounted on a shaft, comprising a fixed pivot pin spaced from and parallel to said shaft, a plate member pivotally shiftable on said pin and having a contact element spaced from said pin, means normally securing said plate member in fixed position relative to the magneto, a movable breaker member pivotally mounted on said pin and including a second contact element carried and disposed to engage said first named contact element upon relative pivotal movement thereof respecting said pin, a cam carried by said shaft and rotatable with said rotor, a spring carried by said plate member and connected to said movable member to bias the latter against said cam whereby rotation of the shaft effects oscillation of said breaker member upon said pivot pin, and a spring biasing said plate member on said pivot pin for shifting in a direction separating said contact elements, said first named means being manually releasable to allow said plate member pivotal movement on said pin and the adjustment of said contact elements with respect to said cam by said springs.

4. In a circuit breaker for a magneto including separable contact members and cam and spring means disposed and operable to oscillate one of said members relatively to the other contact member; a movable plate supporting said other member and a spring biasing said plate in a direction to cooperate with said spring means and move said last named member to follow the oscillation of the other member and in contact therewith, and adjustment means for securing said plate against movement in a selected position whereupon the further operation of the cam effects the separation of the contact members.

5. The invention as defined in claim 4 wherein the magneto includes a cover and said adjustment means extends through the cover for the adjustment of the opening of the contact members without removal of the cover.

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