A. F. PAYNE.

MAGNETO IGNITION DEVICE FOR INTERNAL COMBUSTION ENGINES.

APPLICATION FILED JAN. 5, 1916.

1,194,313.

Patented Aug. 8, 1916

2 SHEETS—SHEET 1.

Fig. 1.

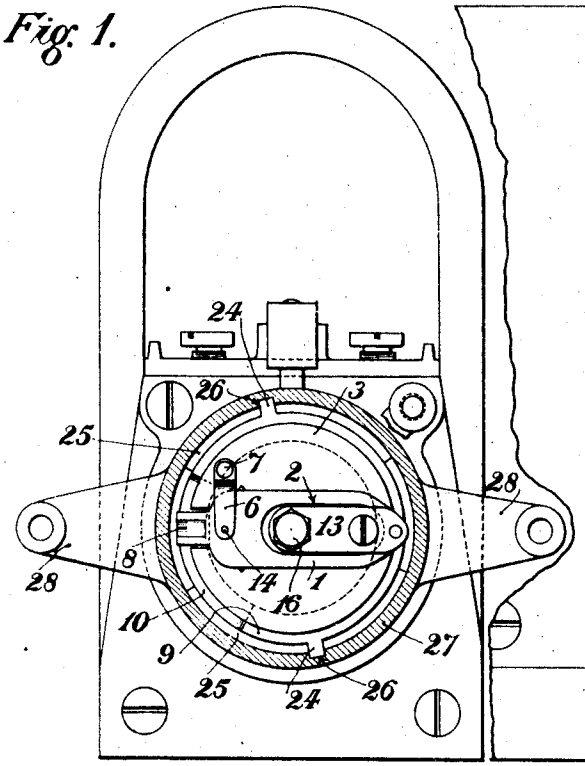


Fig. 2.

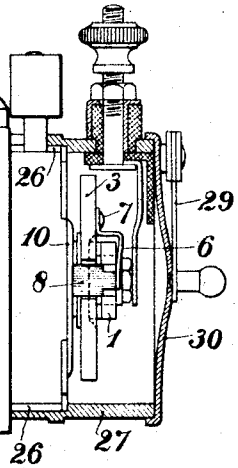


Fig. 4.

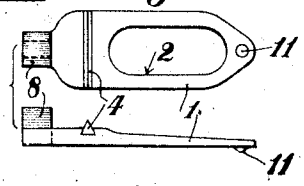


Fig. 3.

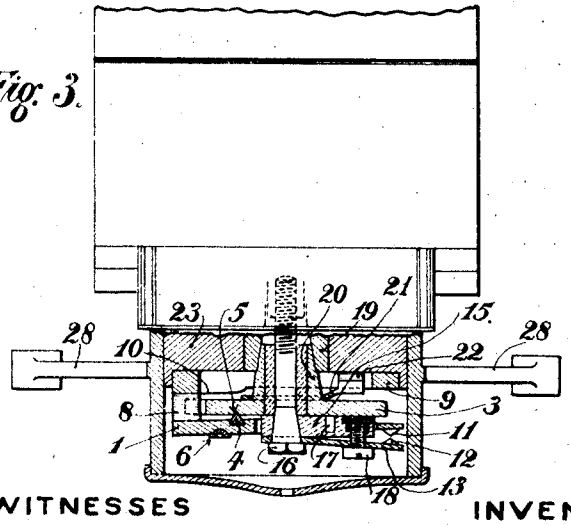
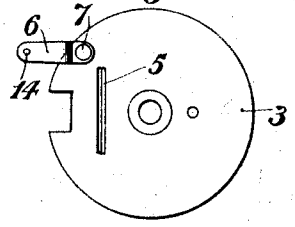


Fig. 5



WITNESSES

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2 SHEETS—SHEET 2.

Fig. 7A.

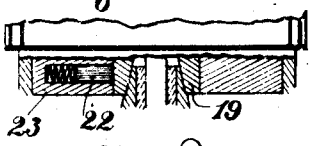


Fig. 7.

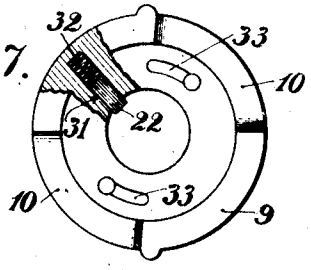


Fig. 6.

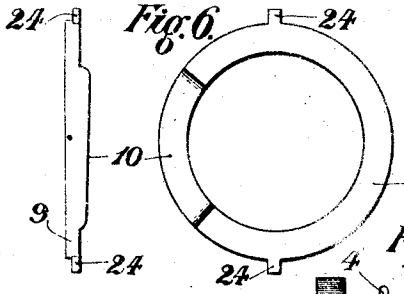


Fig. 6A.

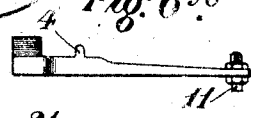


Fig. 8.

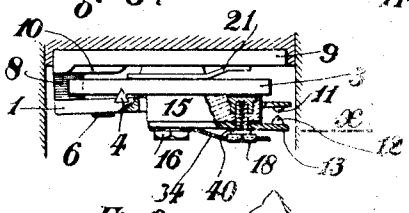


Fig. 10.

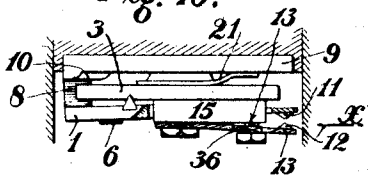


Fig. 14.

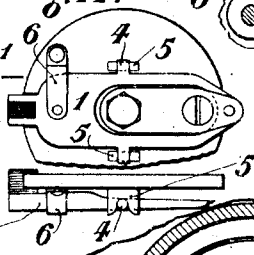


Fig. 9.

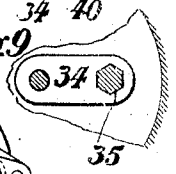


Fig. 11.

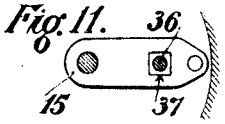


Fig. 15.

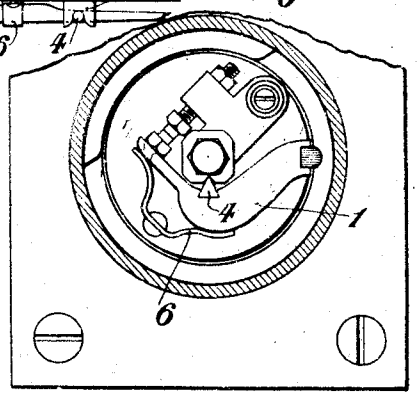


Fig. 12.

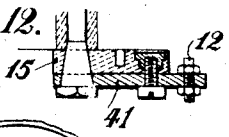
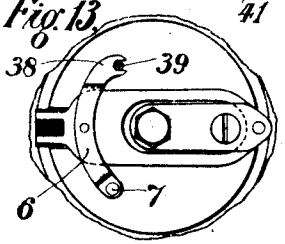


Fig. 13.



WITNESSES

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ALEXANDER FLEXMAN PAYNE, OF HARBORNE, BIRMINGHAM, ENGLAND.

MAGNETO IGNITION DEVICE FOR INTERNAL-COMBUSTION ENGINES.

1,194,313. Specification of Letters Patent. Patented Aug. 8, 1916.

Application filed January 5, 1916. Serial No. 70,497.

To all whom it may concern:

Be it known that I, ALEXANDER FLEXMAN PAYNE, subject of the King of Great Britain, residing at Harborne, Birmingham, England, have invented certain new and useful Improvements in Magneto Ignition Devices for Internal-Combustion Engines, of which the following is a specification.

This invention relates to the contact breaker mechanism of magneto-electric ignition apparatus, and has for its principal object to simplify the construction of such mechanism, and to render the rocking contact arm readily detachable for cleaning, adjustment or examination, while further objects are to reduce the friction of the said rocking arm, to facilitate adjustment of the points, to insure a quick break and to prevent "hammering" or sudden dosing of the contact points.

According to the said invention the rocker arm or lever is fulcrumed upon the contact-breaker carrier plate by means of a knife edge or the equivalent, and is retained in position by means of a spring which may also be utilized normally to close the contact points together until the lever is acted upon by the cam or cams to separate the points. The cams are preferably so shaped as to cause the points to separate suddenly but to close slowly.

Figure 1 of the accompanying drawings represents a transverse section through the casing of the contact-breaker, showing the latter in elevation. Fig. 2 is a vertical longitudinal section through the casing showing the rocker arm or lever in end elevation. Fig. 3 represents a horizontal section through the contact breaker, showing the points separated. Fig. 4 shows underside and edge views of the rocker arm detached. Fig. 5 shows the carrier plate, and Fig. 6 represents, in front and side elevation, the cam ring detached from the magneto. Fig. 6A represents another form of rocker arm having a slightly modified form of fulcrum and an adjustable contact point. Fig. 7 illustrates another form of cam ring which may carry a brush for insuring an efficient earth return. Fig. 7A shows another arrangement for the earth return. Fig. 8 is a sectional plan and Fig. 9 is a section on line x, Fig. 8, showing a device for locking the adjusting screw for the contact points. Fig. 10 is a sectional plan and Fig. 11 a section on line x^1, Fig. 10, showing another method of locking the adjusting screw. Fig. 12 represents an alternative form of carrier arm for the stationary contact. Fig. 13 illustrates a modified form of spring for holding the rocker arm in position. Fig. 14 shows in plan and side elevation, another method of mounting the rocker arm. Fig. 15 shows the invention applied to a contact breaker of the type in which the rocker arm moves in a plane transverse to the axis of the armature.

Referring to Figs. 1 to 6, the rocker arm consists of a flat plate 1 formed with an opening 2 and mounted upon a carrier plate 3 by means of a knife-edge fulcrum 4 upon its inner face engaging with a groove 5 cut in the face of the said plate 3. The knife-edge 4 is retained in engagement with the groove by means of a spring 6 bearing upon the outer face of the arm 1, said spring having one end cranked and pivoted at 7 to the plate 3 so that it can be turned upon the side (as in Fig. 5) clear of the rocker arm in order to allow of the latter being detached. The spring 6 has a small indent or projection 14 which engages with a hole in the rocker 1 to prevent lateral displacement of the latter.

The knife edge 4 is preferably situated toward one end of the lever 1, the shorter arm of which carries a rearwardly projecting fiber block 8 which, when the armature revolves, wipes over the stationary cam-ring 9 carrying the face cam 10. The longer arm of the rocking lever carries the contact point 11 which coöperates with the adjustable contact point 12 carried by a flat spring 13 fixed upon a block of insulating material 15 by means of the central screw 16 which conveys the low-tension current from the primary winding of the armature to the said spring 13. The screw 16 also serves to secure the block 15 to the face of the plate 3, which latter has a small peg or screw 17 for engaging a hole in the said block. The spring 13 tends to separate the contact points, the amount of separation being adjusted by means of a screw 18. The carrier plate 3 is keyed within the armature shaft 19 by its boss 20, being held therein by the screw 16, and to insure an efficient earth return for the current, the plate 3 is provided with a spring arm 21 carrying a metallic contact piece or brush 22 which presses constantly against the bearing plate 23 as the armature revolves.

The cam 10 rises abruptly at the end which the fiber block first engages, so that the contacts are quickly opened, the quickness of the break being enhanced by the fact of the knife-edge 4 being situated near the one end of the rocker, but the cam is so sloped and shaped that the contacts are closed slowly thus minimizing "hammering" of the points. The closing is effected by the spring 6, assisted by the natural effect of the centrifugal force when the armature is revolving.

For the timing of the ignition the cam ring 9 is rotatably mounted within a recess in the face of the bearing plate 23, and is provided with two or more radial keys 24 which extend preferably through gaps 25 in the recessed part of the bearing plate 23 and detachably engage with grooves or keyways 26 in the contact-breaker casing or cover 27 which is rotatably mounted upon the bearing plate 23 and is adapted to be rocked more or less by means of the timing levers 28, thus turning the cam ring 9 to retard or advance the spark as desired. The casing or cover 27 may be removed from the machine without disturbing the cam ring 9, so that the working of the magneto can be properly inspected and any desired adjustments readily made. The casing 27 is normally maintained in place by a spring arm 29 bearing on the end plate 30.

Preferably one or more sight-holes are provided in the cover 27, being so situated that the sparking at the contact-points can be observed without removing the cover.

If desired the rocker arm 1 may have a fulcrum of the kind shown at 4 Fig. 6A, same consisting of a parallel-sided transverse rib engaging in a groove in the carrier plate. The contact point 11 may be mounted upon the end of a screw adjustably carried by the end of the rocker and fitted with a lock nut.

Fig. 7 shows an alternative form of brush for insuring the efficient earth return of the low-tension current, said spring-loaded brush 22 being housed in a recess 31 in the cam ring 9 and being forced radially inward by means of a spring 32 so as to bear upon the armature shaft. The cam ring may carry two cams 10 as shown in Fig. 7, and its angular movement may be limited by pins engaging in slots 33 in the middle part of the ring. Or, as in Fig. 7A, to obtain an efficient earth return a spring-loaded carbon brush 22 may be located in a recess in the bearing plate 23 so as to bear on the armature shaft 19.

In order to lock the contact adjustment screw 18 against inadvertent rotation, the device illustrated in Figs. 8 and 9 may be adopted. Situated over the spring arm 13 is a second spring 34 having a hexagonal hole 35 engaging with the head of the screw 18. When a spanner is applied to the latter the spring 34 is depressed out of engagement with the hexagonal part of the head opposite to a plain circular part 40, so that the screw can be rotated, but said spring again moves into engagement with the hexagonal part of the head on the latter being brought into register with the head and the spanner being removed.

In the alternative form of the locking device illustrated in Figs. 10 and 11, the head of the screw 18 is made square upon its underside at 36 and the spring arm 13 carrying the contact 12 has a square hole 37 which springs into engagement with the squared part 36 but which can be disengaged by depressing the spring to allow of adjustment of the screw.

Instead of the stationary contact point 12 being carried by a spring, as in the above-described arrangements, it may, as shown in Fig. 12, be carried by a rigid arm 41 suitably attached to the insulator 15.

Fig. 13 represents a modified form of spring for retaining the rocker arm in position, said spring 6 being pivoted at one end at 7, and having its opposite end forked at 38 to engage a screw 39 carried by the plate 3. To detach the rocker arm the screw 39 is slackened and the spring swung clear.

Instead of the rocker arm being mounted upon a knife-edge it may be provided with any equivalent or suitable form of fulcrum engaging within a recess or open bearing and maintained therein by a spring or the like, so that the rocker can be lifted away from the carrier plate in the plane in which the said rocker moves. Thus, in Fig. 14, the rocker lever 1 is provided with lateral pivots or trunnions 4, 4, maintained in engagement within open-topped bearings 5, 5, by means of the spring 6, which can be turned aside to admit of the removal of the rocker.

The rocker arm may, if desired, be arranged to turn in a plane at right angles to the axis of the armature, as shown in Fig. 15, where the rocker 1 is removably mounted upon a knife-edge 4 and is retained in position by a spring 6.

Having fully described my invention, what I desire to claim and secure by Letters Patent is:—

1. In a magneto-electric ignition apparatus; a detachable contact-breaker rocker arm which is mounted upon a fulcrum, which is maintained in removable engagement with an open bearing by means of a spring.

2. In a magneto-electric ignition apparatus; a detachable contact-breaker rocker arm which is mounted upon a fulcrum which is maintained in removable engagement with an open bearing recess by means of a spring which tends to close the contact points.

3. In a magneto-electric ignition apparatus; a detachable contact breaker rocker arm mounted upon a fulcrum which is situated nearer that end of the arm which is acted upon by the cam, said fulcrum being maintained in position by means of a spring.

4. In a magneto-electric ignition apparatus; the combination with the contact breaker carrier plate, of a detachable rocker arm mounted thereon by means of a knife-edge fulcrum engaging an open groove, a contact point on the rocker arm, a cam, a striker block carried by the rocker for engagement by the cam, an insulating block fixed to the carrier plate, an arm mounted thereon in electrical connection with the primary winding of the armature, and a contact point, said arm coöperating with the contact point on the rocker arm.

5. In a magneto-electric ignition apparatus; the combination with the contact-breaker carrier plate, of a detachable rocker arm mounted thereon, a contact point on the rocker arm, a cam, a striker block carried by the rocker for engagement by the cam, an insulating block fixed on the carrier plate, a spring arm mounted thereon in electrical connection with the primary winding of the armature, a contact point on said spring arm, an adjusting screw acting on said arm, and a spring locking device engaging with the head of the screw.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ALEXANDER FLEXMAN PAYNE.

Witnesses:
WILLIAM STAITES SKERRETT,
RICHARD GITTINGS.