July 7, 1925. 1,545,458

C. E. PEARSON

IGNITION GENERATOR

Filed Dec. 15, 1922 2 Sheets-Sheet 1

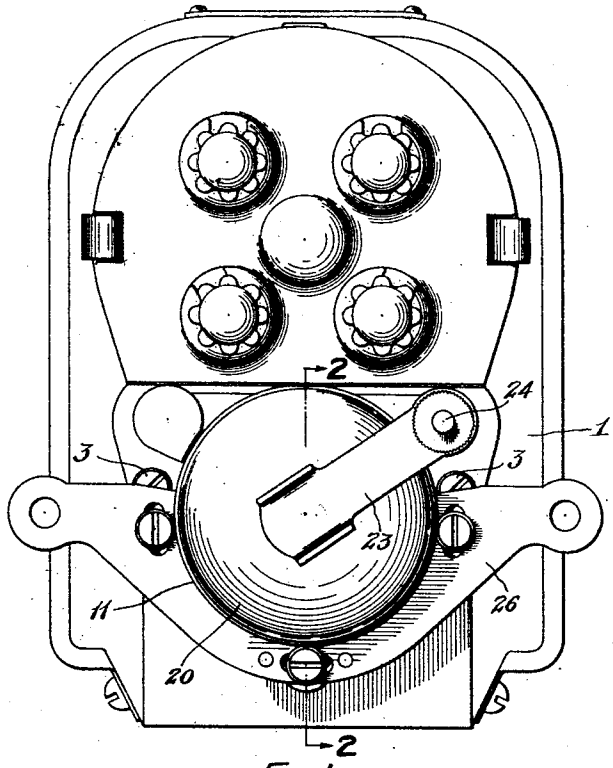


FIG. 1.

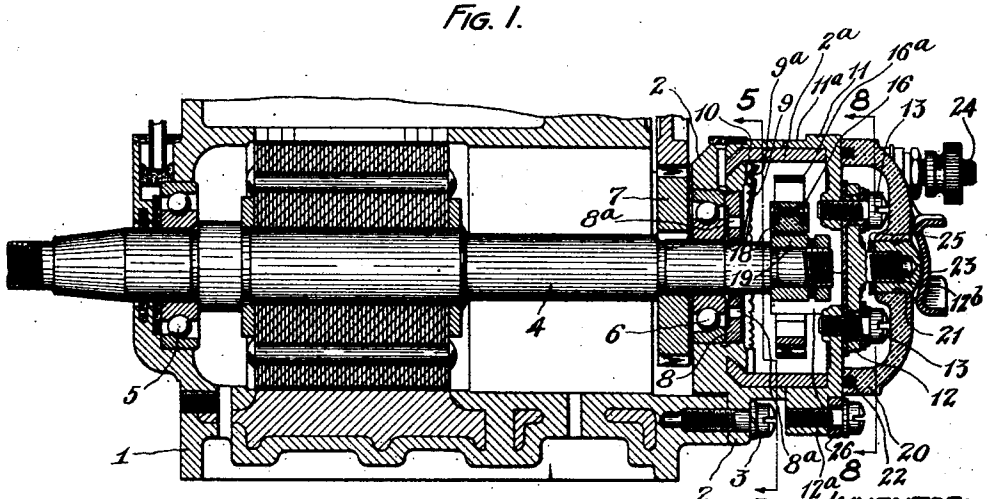


FIG. 2.

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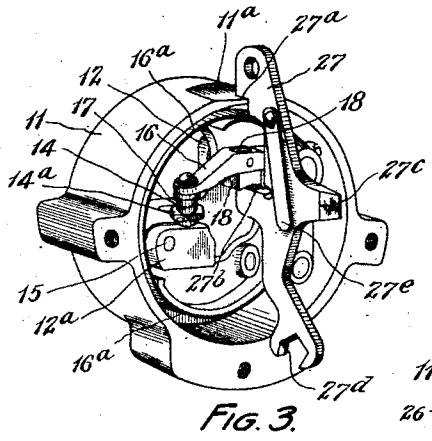


FIG. 3.

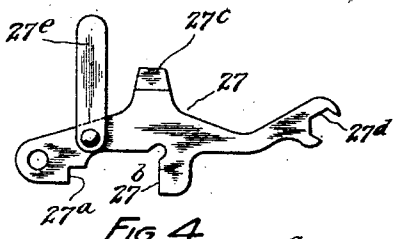


FIG. 4.

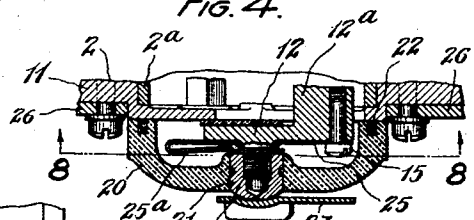


FIG. 9.

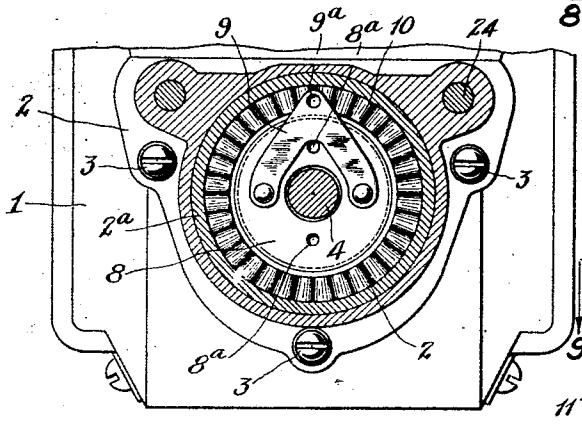


FIG. 5.

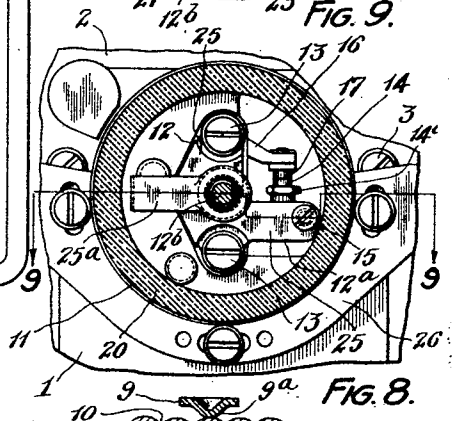


FIG. 8.

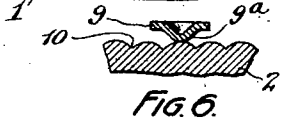


FIG. 6.

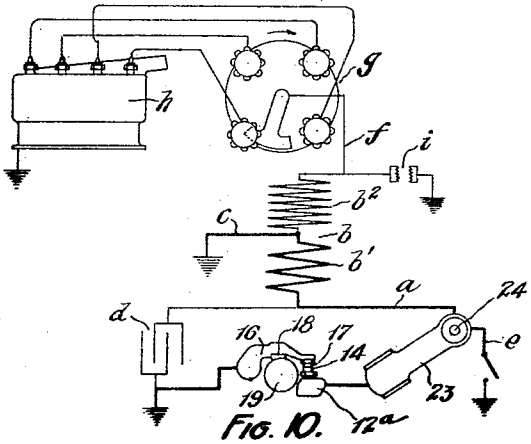


FIG. 10.

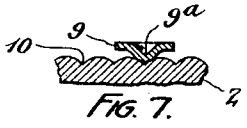


FIG. 7.

INVENTOR:
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Patented July 7, 1925. 1,545,458

UNITED STATES PATENT OFFICE.

CARL E. PEARSON, OF CLEVELAND, OHIO, ASSIGNOR TO THE TEAGLE COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

IGNITION GENERATOR.

Application filed December 15, 1922. Serial No. 607,071.

To all whom it may concern:

Be it known that I, CARL E. PEARSON, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in and Relating to Ignition Generators, of which the following is a specification, reference being made therein to the accompanying drawings.

The invention relates to ignition generators of the magneto type and particularly to the construction and arrangement of the breaker mechanism and its related parts.

One object of the invention is the provision of improved means for effecting the adjustment of the breaker points or electrodes.

Another object is the provision, in a fixed coil variable spark generator, of improved electrical connections between the generating coil and the breaker and of an improved housing for the breaker.

Another object is the provision of an adjustable bearing which, by reason of its compactness, is adapted to be mounted in the breaker housing without material encroachment upon the limited space ordinarily available for the breaker mechanism.

Other objects, more or less incidental to the foregoing, will appear in the following description of the construction illustrated in the accompanying drawing showing a preferred embodiment of my improvements.

In the drawing, Fig. 1 is an end elevation of a magneto ignition generator embodying my improvements.

Fig. 2 is a sectional view of the distributor and related parts, the section being taken on the line 2—2, Fig. 1.

Fig. 3 is a perspective view of the inner side of the breaker frame and parts, detached from the breaker housing and main frame of the machine and with my improved gauge applied to effect adjustment of the breaker points.

Fig. 4 is a side view of the gauge.

Fig. 5 is a section on the line 5—5, Fig. 2.

Figs. 6 and 7 are enlarged fragmentary sections illustrating the operation of the spring bearing lock.

Fig. 8 is a section on the line 8—8, Fig. 2.

Fig. 9 is a section on the line 9—9, Fig. 8.

Fig. 10 is a diagram of the electrical connections of the generator.

The magneto generator illustrated has a die cast main frame structure comprising a main casting 1 which forms the base, end plates and other parts of the frame structure, and a supplemental casting 2 which is secured by screws 3 to the breaker and distributor end of the main casting 1. 4 is the rotor shaft of the generator and it is mounted at the drive end in a ball bearing 5 mounted in one end plate of the main frame casting, said bearing being adapted to take the outward end thrust of the rotor. The other end of the rotor shaft is mounted in a ball bearing 6 mounted in the frame casting 2. The outer race of bearing 5 bears axially against the end plate of the main frame casting 1 while the inner race of said bearing bears against a shoulder on shaft 4. The inner race of bearing 6 bears against the distributor pinion 7 which in turn bears against a shoulder on shaft 4. 8 is an adjusting ring threaded in the bearing opening of the casting 2 and arranged to press inward against the outer race of the bearing 6. A V-shaped spring 9 has its ends riveted at diametrically opposite points to the ring 8 with its angle extending radially outside the ring where it is formed with a lug 9^a adapted to engage any one of an annular series of notches 10 formed in the casting 2 around the ring 8. By retracting the outer end of the spring 9 it is freed from the notches so that the ring 8 can be turned to adjust the bearings, whereupon the spring 9 snaps back into engagement with the notches and holds the ring in the adjusted position. The ring is preferably provided with a pair of apertures 8^a to be engaged by an adjusting wrench or tool.

The frame casting 2 carries a hollow cylindrical extension 2^a which may be an integral part of the casting 2, but I prefer to form it of a section of tubing which is embedded in the casting 2 when the latter is formed. On the cylindrical extension 2^a is mounted the angularly adjustable breaker box or frame 11, both the extension and the breaker box being concentric with the rotor axis. A fixed electrode bracket or carrier 12 is secured to the outer end of the frame 11 by screws 13, the carrier 12 being electrically insulated from the frame 11. The bracket 12 has an inward extension 12^a which projects through an opening in the outer end of the frame 11 and in the said extension is adjustably threaded the fixed

electrode 14 of the breaker, the extension 12^a being split and provided with the usual clamping screw 15, while the electrode 14 is provided with the usual hexagonal head 14^a by which it can be turned and adjusted.

On the inner side of the outer end wall of the frame 11 is mounted the lever arm 16 which carries the movable electrode 17 of the breaker. The arm 16 is fitted with the usual fibre block 18, the face of which engages the breaker-operating cam 19 on the rotor shaft. The breaker arm 16 at its pivotal end is electrically connected, through spring 16^a, with the frame part 11.

To effect the complete enclosure of the breaker mechanism, a cap 20 is provided. This is formed of insulating material such as bakelite and has a metallic hub 21 rigidly embedded in its centre when the cap is molded. This hub extends entirely through the cap and is formed on its outer face with a frustro-conical surface. On its inner side the hub is formed with a recess drilled out and tapped to engage a threaded stud 12^b formed on the bracket 12. On its inner surface near the periphery the cap is fitted with a felt packing ring 22 to engage the flat face of the breaker box 11 and the cap is peripherally knurled so that it can readily be screwed on to the stub 12^b, thus tightly enclosing the breaker parts. 23 is a spring conductor arm mounted on a stud or bolt 24 which is electrically insulated from the frame of the machine but electrically connected to the primary of the generating coil of the machine. At its free end the arm 23 is formed with a rounded depression on its inner side to engage the outer end of the hub of the breaker cap. A conductor plate 25, having one end bent over to form the spring extension 25^a, is apertured to pass over stud 12^b and to receive the clamping screw 15 and is by said screw secured to the carrier 12. With the parts assembled, as shown in Fig. 9, the spring extension 25^a bears against the inner end of hub 21. The breaker box or frame 11 is fitted with an operating lever 26 by which the frame can be turned on its cylindrical support 2^a through a certain angular range to advance and retard the spark.

During the angular adjustment referred to, a turning, frictional engagement is maintained between the spring arm 23 and the outer end of hub 21 and the breaker cap and between the inner end of said hub and the conductor plate 25. This relative movement of the parts maintains the contact between the hub and the spring arm 23 and spring plate 25 in good condition to conduct the current and a very effective electrical connection is maintained between the fixed stud 24 and the fixed electrode of the breaker, notwithstanding angular adjustment of the latter. At the same time by simply swinging the arm 23 aside and unscrewing the cap 20, the breaker points are exposed for inspection.

The relation of the electrical connections between the stud 24 and the breaker carrier 12 to the other parts of the electrical circuits of the magneto is shown by the wiring diagram in Fig. 10. It will be seen that the stud 24 is connected by a conductor a to one end of the primary b' of the usual high tension generating coil b, the other end of the primary winding being connected by conductor c to ground. Through the arm 23, hub 21 and spring 25, the stud 24 is connected to the breaker carrier 12 and thence through the breaker points and breaker arm 16 to ground. The condenser d is connected across the breaker in the usual manner, and by switch controlled conductor e, the stud 24 can be connected to ground when it is desired to stop the engine in connection with which the magneto is used. f is a high tension conductor leading from the secondary b^2 of the coil b to the distributor g which in turn is connected with the spark plugs of the engine h. i is the usual safety spark gap.

On an inspection of the breaker points, if it is found that they are not in proper adjustment, such adjustment is very readily effected by the special means which I provide for that purpose. With the arm 23 swung aside and the cap 20 removed, the breaker frame or box 11 is readily removed from its cylindrical support 2^a, whereupon it can conveniently be held in one's hand with its inner side up and all parts freely exposed. On the outer surface of the cylindrical wall of the box 11, I form a flat gauge surface 11^a which preferably extends approximately at right angles to a radial line through the common axis of said cylindrical wall, the rotor shaft and the breaker cam or, in other words, the magneto axis of rotation. The gauge surface 11^a is, therefore, approximately parallel to the inner surface of the fibre shoe or block 18 carried by the breaker arm 16. 27 is a gauge having oppositely facing shoulders 27^a and 27^b, adapted to engage, respectively, the gauge surface 11^a, and the inner surface of the fibre block 18, which, for this purpose, may also be treated as a gauge surface. The distance between the shoulders 27^a and 27^b is such that when the gauge is applied as in Fig. 3, the movable electrode 17 is held in its proper closed position. Hence by thus applying the gauge and adjusting the fixed electrode 14 so that it just engages with the movable electrode, it will be found on replacing the breaker that the cam will effect the proper opening of the breaker points, preferably .015″. To facilitate the adjustment of the fixed electrode, I form the gauge 27 with a screw driver edge 27^c by means of which the clamping screw 15 can be loosened. I also form the gauge with a wrench end 27^d by

which the fixed electrode can be loosened in case it is not readily turned after the clamping screw is loosened. In addition the gauge is fitted with a .015″ feeling gauge 27ᵉ which when used can be swung to a convenient position to check the opening of the breaker points.

As is well understood, magneto generators are often so mounted on engines that it is difficult to make inspections and adjustment of the breaker parts, but with my improved construction, the adjustable parts of the breaker are readily detached as a unit and thereupon the parts can not only be readily inspected, but the adjustment of the parts can easily be effected in the manner described.

The advantages incident to my improved bearing construction will readily be appreciated by those familiar with the space restrictions incident to the necessity of mounting the breaker parts adjacent the end plate of the generator and of keeping the breaker mechanism within limited bounds radially in order to provide space for the adjacent distributor mechanism. The space occupied by the spring arm which holds the bearing-adjusting ring in position is almost negligible. At the same time said spring arm is entirely effective, permits nice adjustment of the bearing, and with a detachable breaker assembly such as that illustrated, the bearing is very readily exposed for adjustment.

While the forms of construction illustrated in the drawings and above described are the ones preferred by me in carrying out my invention, it is to be understood that various modifications can be made without departing from the invention as defined in the appended claims.

What I claim is:

1. In an ignition generator, the combination with a breaker mechanism comprising a rigid structure and a cam which are mounted for relative rotation and separable from each other, an adjustable fixed electrode on said structure, and a lever arm carrying a movable electrode mounted on said structure, the rigid structure and the lever arm having gauge surfaces correlated with each other and the axis of rotation to cooperate with a suitable gauge device to support the lever arm with the movable electrode in its proper closed position, for the purpose set forth.

2. In an ignition generator, the combination with a main frame, a rotor shaft mounted therein, a breaker cam on said shaft, a rigid breaker frame separable from the main frame, a fixed electrode adjustably mounted on the breaker frame, a lever arm carrying a movable electrode and mounted on the breaker frame in position to engage said cam, the breaker frame and lever arm having gauge surfaces correlated with each other and the cam axis to cooperate with a suitable gauge device to support the lever arm with the movable electrode in its proper closed position, for the purpose set forth.

3. In an ignition generator, the combination of a main frame structure, a breaker frame angularly adjustable on the main frame, a movable electrode lever arm mounted on the breaker frame, a fixed electrode carrier mounted on but electrically insulated from the breaker frame, the said carrier having an axially arranged threaded stud, a dust cap for the breaker frame formed of insulating material with an embedded metallic hub extending through its center and formed on its inner side with a threaded socket to engage the said threaded stud, and a current-conducting resilient arm mounted on the main frame in position to swing over the dust cap and form electrical contact with its hub without interfering with the angular adjustment of the breaker frame.

4. In an ignition generator, the combination of a main frame structure, a breaker frame angularly adjustable on the main frame, a movable electrode lever arm mounted on the breaker frame, a fixed electrode carrier mounted on but electrically insulated from the breaker frame, the said carrier having an axially arranged threaded stud, a dust cap for the breaker frame formed of insulating material with an embedded metallic hub extending through its center and formed on its inner side with a threaded socket to engage the said threaded stud, a resilient current conductor interposed between said carrier and said hub and slidably engaging the inner end of the hub, and a current-conducting resilient arm mounted on the main frame in position to swing over the dust cap and form electrical contact with its hub without interfering with the angular adjustment of the breaker frame.

5. In an ignition generator, the combination of a main frame, a rotor shaft, means for rotatably supporting said shaft comprising an anti-friction bearing mounted in the main frame, a removable breaker frame mounted on the main frame adjacent the said bearing, breaker mechanism including fixed and movable electrodes mounted on said breaker frame, a bearing-adjusting ring threaded into the main frame against the outer side of the said bearing, the main frame being formed with an annular series of notches, and a spring arm secured to the outer side of said ring with its free end disposed to yieldingly engage one of the said notches and hold the ring against turning.

6. In an ignition generator, the combination of a main frame, a rotor shaft, an anti-friction bearing mounted in the frame at the drive end of the rotor shaft so as to

take the outward thrust of the shaft on the frame, an anti-friction bearing mounted in the frame at the other end of the shaft, a removable breaker frame mounted on the main frame adjacent the last named bearing, breaker mechanism including fixed and movable electrodes mounted on said breaker frame, a bearing-adjusting ring threaded into the main frame against the outer side of the last named bearing, the main frame being formed with an annular series of notches, and a spring arm secured to the outer side of said ring with its free end disposed to yieldingly engage one of the said notches and hold the ring against turning.

7. In an ignition generator, the combination of a main frame, a rotor shaft, means for rotatably supporting said shaft comprising an anti-friction bearing mounted in the main frame, a removable breaker frame mounted on the main frame adjacent the said bearing, breaker mechanism including fixed and movable electrodes mounted on said breaker frame, a bearing-adjusting ring threaded into the main frame against the outer side of the said bearing, one of said main frame and ring parts being formed with an annular series of notches, and a spring arm secured to the outer side of the other of said parts with its free end disposed to yieldingly engage one of the said notches and hold the ring against turning.

In testimony whereof, I hereunto affix my signature.

CARL E. PEARSON.