Dec. 22, 1931. A. T. MURRAY ET AL 1,837,231

MAGNETO

Filed Sept. 15, 1930 2 Sheets-Sheet 1

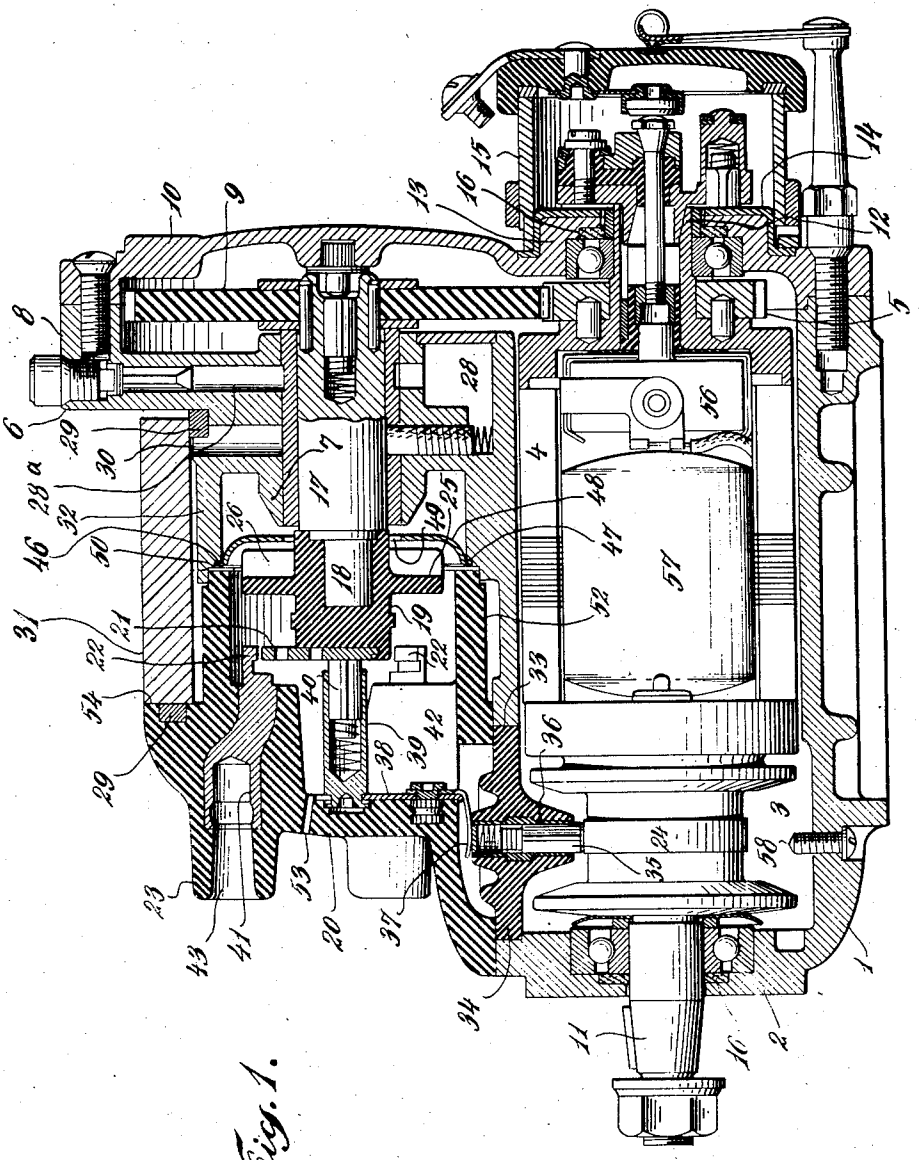


Fig. 1.

INVENTORS
Arthur T. Murray
& John F. Martin
BY
Dan A. Greenthal
ATTORNEY

Dec. 22, 1931. A. T. MURRAY ET AL 1,837,231

MAGNETO

Filed Sept. 15, 1930 2 Sheets-Sheet 2

Fig. 3.

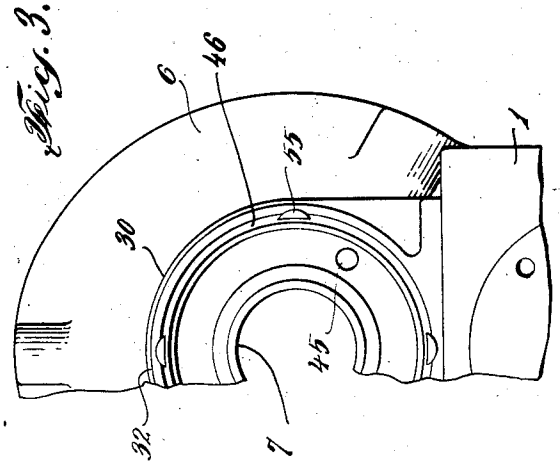


Fig. 4.

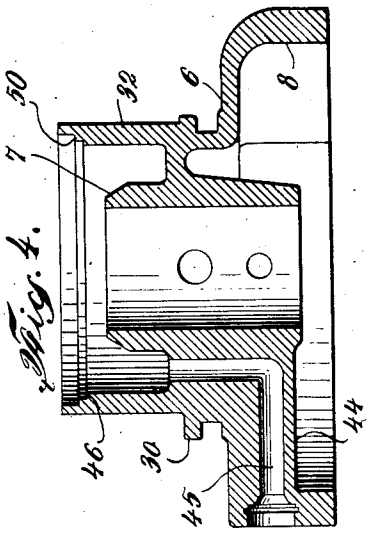
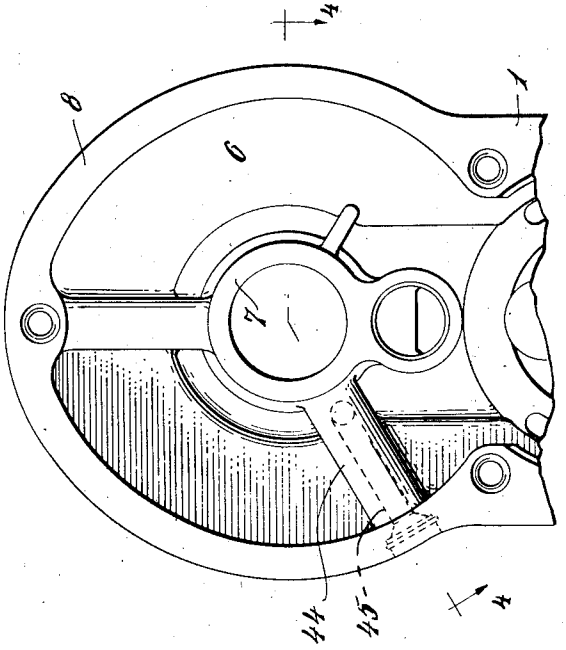


Fig. 2.



Arthur T. Murray INVENTORS
& John F. Martin
BY
Dan A. Rumbel
ATTORNEY

Patented Dec. 22, 1931 1,837,231

UNITED STATES PATENT OFFICE

ARTHUR T. MURRAY AND JOHN F. MARTIN, OF SPRINGFIELD, MASSACHUSETTS, ASSIGNORS TO AMERICAN BOSCH MAGNETO CORPORATION, OF SPRINGFIELD, MASSACHUSETTS, A CORPORATION OF NEW YORK

MAGNETO

Application filed September 15, 1930. Serial No. 482,203.

This invention relates to improvements in ignition apparatus, namely a magneto to furnish electric ignition current to the power chambers of internal combustion engines.

It is an object of the invention to provide a magneto of the high tension type with a jump-spark distributor and suitable means for ventilating the space containing the distributor.

Another object of the invention is to provide a magneto having an armature and a chamber therefor so constructed that the chamber can be effectually sealed to prevent the entrance of dust, moisture and injurious gases to the armature and its bearings.

A further object of the invention is to provide a high tension magneto with a compartment for the distributor separate from the remainder of the framework or housing of the magneto and having no communication with any other space within the magneto.

The nature and scope of the invention will appear in the following description, and the novel features of the device will be concisely pointed out in the appended claims hereto; and, while a preferred form is illustrated, the right is reserved to make changes in structure as fully as is consistent with the principle of the invention and the spirit of the terms in which the claims are set forth.

On the drawings,

Fig. 1 is a vertical longitudinal sectional view showing a magneto according to this invention; Fig. 2 is a front elevation showing the casing for the gear of the distributor with an inlet for ventilation of the space containing the distributor; Fig. 3 is a similar view seen from the rear; and Fig. 4 is a section on the line 4—4 of Fig. 2.

The same numerals identify the same parts throughout.

The numeral 1 indicates the housing of the magneto, which may be made as by casting in one piece, and is closed at one end 2. It is also closed at the bottom, sides and top to provide an inside chamber 3 to receive the rotatable armature 4. The housing or framework at the opposite end is open and the armature 4 may terminate flush with this open end and carry thereat a gear 5, attached rigidly to the body of the armature 4 to rotate therewith. This armature may be of well known construction, having opposite curved polar faces connected by a core upon which high tension and low tension windings are placed. The top of housing 1 adjacent the open end carries an integral vertical extension reaching across the housing from side to side and shaped to form a gear casing 6; which has a central bearing 7 and a peripheral rim 8. Inside of the casing 6 is the distributor gear 9 which meshes with the gear 5 and rotates on a spindle in the bearing 7. The end plate 10 of the magneto engages the rim 8 of the gear casing 6 and the front of the housing adjacent the gear 5, thus completely covering the adjacent end of the armature 4 and the gears 5 and 9.

Affixed to the armature 4 at one extremity is an operating shaft or spindle 11 which projects through a suitable opening in the end 2 of the housing 1. The spindle 11 is to be connected to the shaft which drives the armature, and at the opposite end the armature has a hollow spindle 12, and the plate 10 an external cylindrical projection 13 through which the spindle 12 extends. The spindle 11 is engaged by a suitable antifriction bearing inside of the magneto and supported by the end 2, and spindle 12 carries a similar bearing within the projection or boss 13. Over the boss 13 is placed a cap 14 of suitable material and this boss and cap support the timer or interrupter casing 15. The construction of the timer and casing and the connections of the contact points thereof with the windings on the armature are well known and need not be further described. Generally speaking, the hollow spindle 12 contains an insulated metal stem which is united to the low tension winding on the armature and projects through the front thereof, and surrounding this stem and revolving with the spindle 12 in the casing 15, is the metallic interrupter plate which carries a lever to engage and disengage a contact mounted on the interrupter plate and rigid therewith but insulated therefrom. The breaker lever is not insulated and the lever and timer plate are always connected to ground by way of a carbon brush in

interrupter plate running upon the metallic cap 14. Cam projections are also provided within the casing 15 to actuate the breaker lever and separate the contact parts of the timer whenever the instant of ignition arrives in the operation of the engine which drives the magneto.

To receive the antifriction bearing, the inside of the boss 13 is hollowed out to provide a cavity, and the bottom of this cavity is recessed to provide a circular space in which is placed a washer 16 which surrounds the spindle 12. The washer 16 prevents the lubricant from passing through the boss 13 into the timer casing, and may either engage the spindle 12 directly or a bushing or jacket mounted on the end of the spindle 12. Thus the spindle 12 is effectively lubricated but no leakage to the outside of the magneto housing can occur. The bearing surrounding the spindle 11 is also provided with a washer 16. These washers exclude dust, moisture and other foreign substances from the chamber 3.

The distributor gear 9 is affixed to one end of spindle 17, having a projection 18 upon which is mounted to revolve with the shaft 17 the distributor rotor 19 which is of suitable insulation. The distributor stator is indicated by the numeral 20. The rotor carries a metallic arm 21 to operate successively with the metal plates 22 mounted in the distributor stator or shell 20. The exterior of the plate 20 has integral hollow sleeves or bosses 23 to receive the leads to the sparkplugs, and enable these leads to make connection with the terminals 22.

The high tension current is led out from the high tension armature windings to a slip ring 24 mounted as usual upon a suitable insulating member adjacent the end 2 and this current is conducted to the arm 21 in a manner which will be set forth later herein to pass to the plates 22 in succession as the arm 21 rotates.

The distributor gear 9 is fixed to the spindle 18. One end of this spindle is reduced to provide a shoulder and gear 9 is secured upon the reduced end, which passes through a central opening in the gear, between two washers, suitable pins in the gear and spindle acting as keys so that the spindle and gear can rotate together. The extremity of the reduced end of the spindle is expanded to hold the washers and gear tightly in place. The cover plate 10 has an inside projection which carries a removable stud and the adjacent end of the spindle has a central bore containing a spring and a brush, the latter engaging the stud. Further description of this feature is unnecessary.

The rotor 19 has an enlarged peripheral flange 25, carrying blades or vanes 26. These blades are for the purpose of ventilating the space between the casing for the gear 9 and the distributor shell 20 as will be explained presently.

As is disclosed in copending case, Serial No. 475,652, filed by Gustave J. Lang and John F. Martin for patent on magnetos, August 16, 1930, the lower part of the extension providing casing 6 has a recess 28 between the top of the housing and the bearing 7. An oil duct 28*a* is drilled from the top of casing 6 down to the inside of bearing 7, and within this bearing surrounding the spindle 18 is a lining or jacket with a circular groove in its outside in line with the duct, which passes through to the chamber 28, so that oil can flow through said duct 28*a* into this chamber by passing around the lining. By a suitable wick oil is transferred from the chamber 28 to the shaft 17 as required.

At 29 is a packing in a groove formed in a shoulder 30 on the back of gear casing 6. This shoulder projects beneath the top of the horseshoe-shaped permanent magnet 31. The packing and the groove containing it extend from the top of the magnet down both sides to the top of the armature chamber 3, so that dirt, moisture and all other foreign substances cannot here enter the space between the top of the chamber 3 and the magnet 31. Surrounding the bearing 7 is a circular flange or projection 32 pointing towards the distributor stator 20.

Adjacent the slip ring 24 the top of the chamber 3 has an opening 33 which is closed by an insulating plug 34, mounting a contact brush 35. The brush is disposed in a metal sock 36 in plug 34. One end of the socket is closed but exposed through the top of the plug to be engaged by a contact spring 37. The spring is affixed to the inside of the distributor plate or shell 20 and is fastened to a connection strip 38 fixed on the inside of the plate 20 carrying a metallic socket 39 which bears a contact brush 40. The contact brush 40 engages the metallic arm 21 at the front of the rotor 19. The socket 39 contains a spring which presses the brush 40 against the rotor. The spring in the socket 39 and the spring in the opposite end of shaft 17 are designed to keep all the parts in their proper operating positions, with the arm 21 in the plane of the terminals 22.

These terminals 22 are integral with metal plugs 41, embedded in projections 42, inside the shell 20, substantially in line with the bosses 23. The bores 43 of the bosses 23 are extended into the adjacent ends of the plugs 41, to receive the ends of the high tension leads to the sparkplugs and connect the plugs to the terminals 22.

From inspection of Fig. 1, it will be seen that the arm 21 does not make actual contact with the terminals 22, but is always separated by a short distance therefrom as it passes them. At each instant of ignition a jump-spark is therefore produced between the arm

21 and one of the terminals 22. The effect of the high tension jump-sparks on the surrounding air is to form ozone, which, if not controlled, would have a detrimental effect on the bearings and other parts of the magneto. The tight insulation plug 34 prevents ozone from entering the armature chamber 3 at one end, and the extension 6 partitions the space containing the distributor from the other end of the armature chamber. Also, as the ozone is generated in the compartment enclosing the terminals 22 and the arm 21, it is prevented from oxidizing and otherwise injuring the electrically conducting elements of the distributor, by the fan blades 26, which expel the ozone and keep a constant stream of air flowing through the distributor compartment, from one end to the other. This air carries away all of the ozone to the outside of the magneto.

For this purpose the bottom of the gear casing has a rib 44 through which passes an air intake duct 45. This duct has its inlet in the rim 8, and it delivers within the circular flange or projection 32, at one side of the bearing 7. This flange has an inside shoulder 46 against which abuts the outturned rim of a cup-shaped disk 48. This disk has a central opening 49, receiving one end of the rotor 19, and is in front of the vanes 26. It serves as a cover for the adjacent end of the distributor compartment. The projection 32 is enlarged at 50 beyond the shoulder 46 to receive a circular flange or projection 52 on the distributor stator 20. The stator 20 has an air outlet 53. Thus the fan blades draw air in through the passage 45, transmit it through the opening 49, and expel it with ozone through the discharge aperture 53; and all risk of damage in course of time by the action of ozone on the magneto is obviated because the ozone is quickly removed from the magneto.

The distributor stator has a shoulder 54 around the flange 52, and in a groove formed in this shoulder is a packing 29. The space within the magnet at the top is thus sealed on the other side of the magnet 31. Hence the fixed and rotating members of the distributor are protected against dirt and maintained in the best operative condition. If two magnets are employed, similar packing should close up the crevice between them.

The inside of the flange 32 is peened over, as at 55, Figs. 1 and 3, to hold disk 48 in position. A suitable screen or dust filter may be put inside the entrance to the passage 45 in the rim 8.

The distributor plate 20 rests upon the housing 1, adjacent end 2 and is secured in any suitable manner. The armature 4 bears the usual condenser 56 and the windings are indicated at 57. The cover plate is of course fastened to the gear casing 6 by any kind of fastening means such as screws, and the bottom of the housing 1 may carry a screw 58 to provide a safety spark gap.

Having described our invention, what we claim is:

1. A magneto comprising a framework formed to provide an armature chamber and a distributor compartment sealed with respect to said chamber, the magneto having means in said compartment for ventilating same.

2. A magneto comprising a framework and having means for forming an isolated distributor compartment, and means for ventilating said compartment.

3. A magneto comprising a framework and having parts cooperating with said framework to provide an isolated distributor compartment, terminals in said compartment, a rotatable conductor in said compartment, said conductor cooperating with the said terminals without making a contact therewith, and means for ventilating said compartment.

4. A magneto comprising a framework formed to provide an armature chamber and an extension on the top of said chamber, a distributor in line with said extension, said distributor and said extension being shaped to enclose an isolated compartment, fixed terminals and movable conductor arm in said compartment, said distributor and said extension having ventilating openings, and means for causing air to flow through said openings into and out of said compartment.

5. A magneto comprising a housing with an extension thereon, a circular flange projecting from one face of said extension, a distributor shell having a circular flange abutting the first circular flange and thereby forming with the extension a closed compartment, fixed terminals in said compartment, a rotor in said compartment cooperating with said terminals, without making contact therewith, the extension and the distributor having openings, and a fan in said compartment on said rotor to cause said compartment to be ventilated through said openings.

6. A magneto comprising a framework including a gear casing, said casing having a circular projection at the back, and being provided with a passage extending through the rim thereof and an opening within said projection.

7. A magneto comprising a framework having an armature chamber and a distributor comprising a shell-shaped stator resting upon said framework and a rotor within the stator, said stator having a ventilating opening, and fixed insulated conducting means leading from the armature chamber through the stator to the rotor therein.

8. A magneto comprising a framework, a distributor including a shell-shaped stator mounted on said framework, said stator hav-

ing bosses extending therethrough, each of said bosses having a metallic plug therein projecting from the inner ends of said bosses to form terminals, said plugs being hollowed within said bosses to receive the ends of high tension conductors, said stator having a flange surrounding said terminals.

9. A magneto comprising a framework and a hollow stator member on said framework, terminals within said stator member, a rotor having a conducting arm to cooperate with said terminals without making contact with the latter, a fan on said rotor and a cover plate for the end of the stator, said plate having a central opening to enable the rotor to be connected to a driving member.

10. A magneto comprising a framework, the framework including an extension having a circular projection, a distributor comprising a hollow stator with a circular projection abutting the first projection to form a compartment, a perforated plate having its rim gripped between said projections, said extension having a bearing on one side of said plate, a shaft in said bearing, a rotor connected to said shaft and carrying a fan on the opposite side of said plate, a conducting arm on the rotor, a series of terminals on the stator mounted in proximity to said arm out of position to make contact therewith, said stator and said extension having ventilating openings, the bottom of the stator having an opening for conducting current therethrough to said conducting arm, and means for preventing communication between said distributor compartment and the armature chamber.

11. A magneto comprising a housing with an extension thereon, a circular flange projecting from one face of said extension, a distributor shell having a circular flange abutting the first circular flange and forming with the extension a closed compartment, fixed terminals in said compartment, a rotor in said compartment cooperating with said terminals, the extension and the distributor having openings, and a fan in said compartment operated by the rotor to cause said compartment to be ventilated through said openings.

12. A magneto comprising a framework including an extension having a circular projection, a distributor comprising a hollow stator with a circular projection abutting the first projection to form a compartment, a perforated plate having its rim gripped between said projections, said extension having a bearing on one side of said plate, a shaft in said bearing, rotor and a fan operated by said shaft on the opposite side of said plate, a conducting arm on the rotor, terminals on the stator to cooperate with said rotor, said stator and said extension having ventilating openings, the bottom of the stator having an opening for conducting current therethrough to said conducting arm and means for closing said opening.

In testimony whereof, we affix our signatures hereto.

ARTHUR T. MURRAY.
JOHN F. MARTIN.