F. B. HAYS & J. M. DINKINS.

DISTRIBUTER FOR MAGNETOS.

APPLICATION FILED AUG. 9, 1910.

990,811.

Patented Apr. 25, 1911.

Fig. 2.

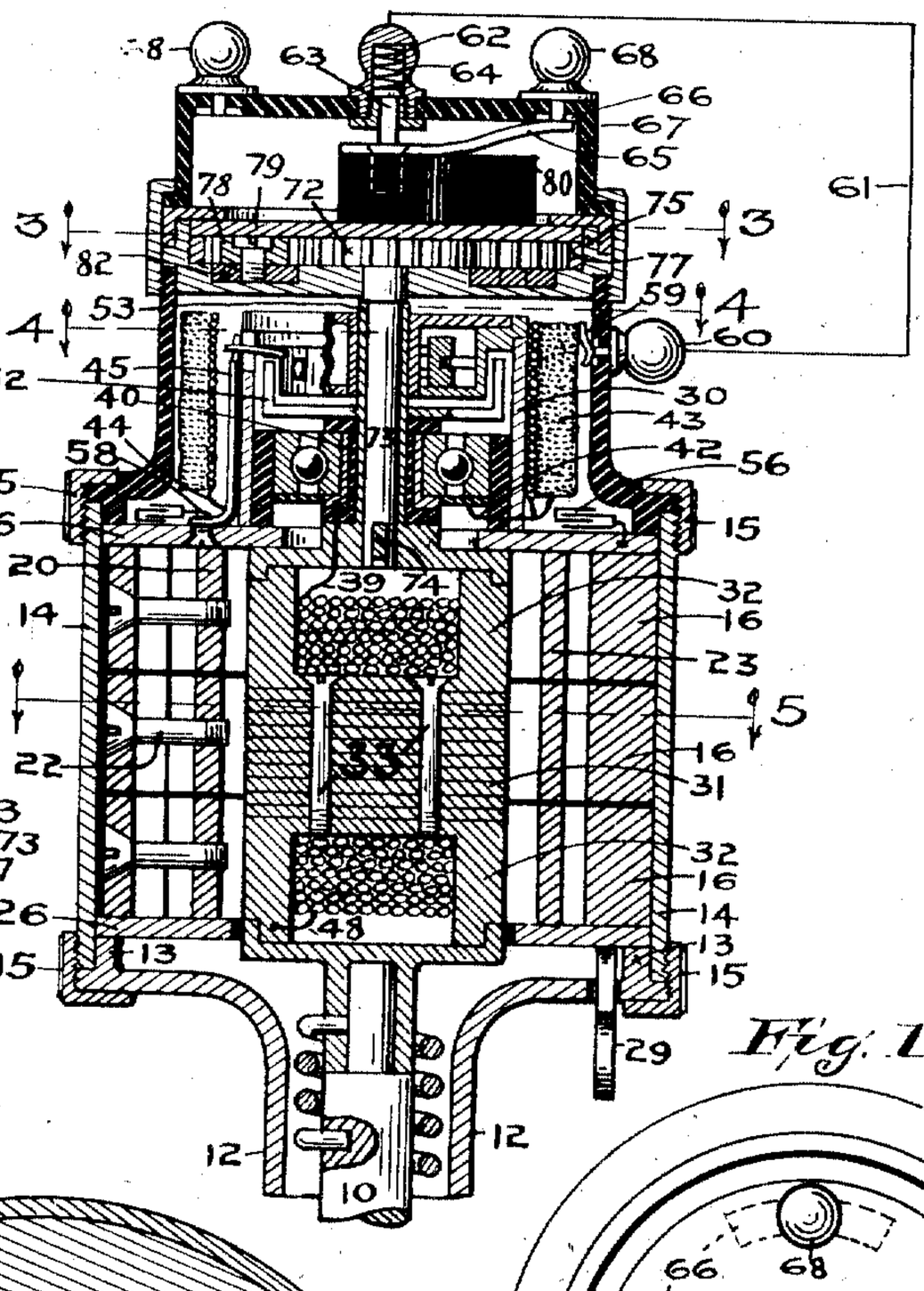


Fig. 4.

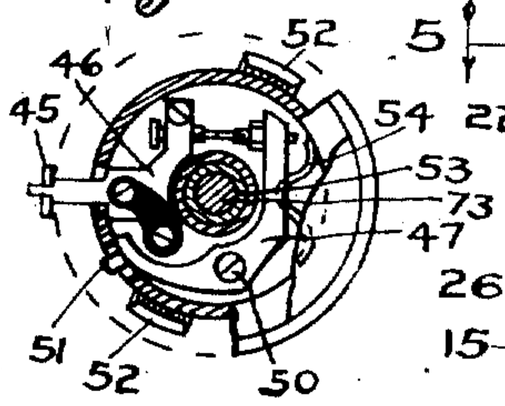
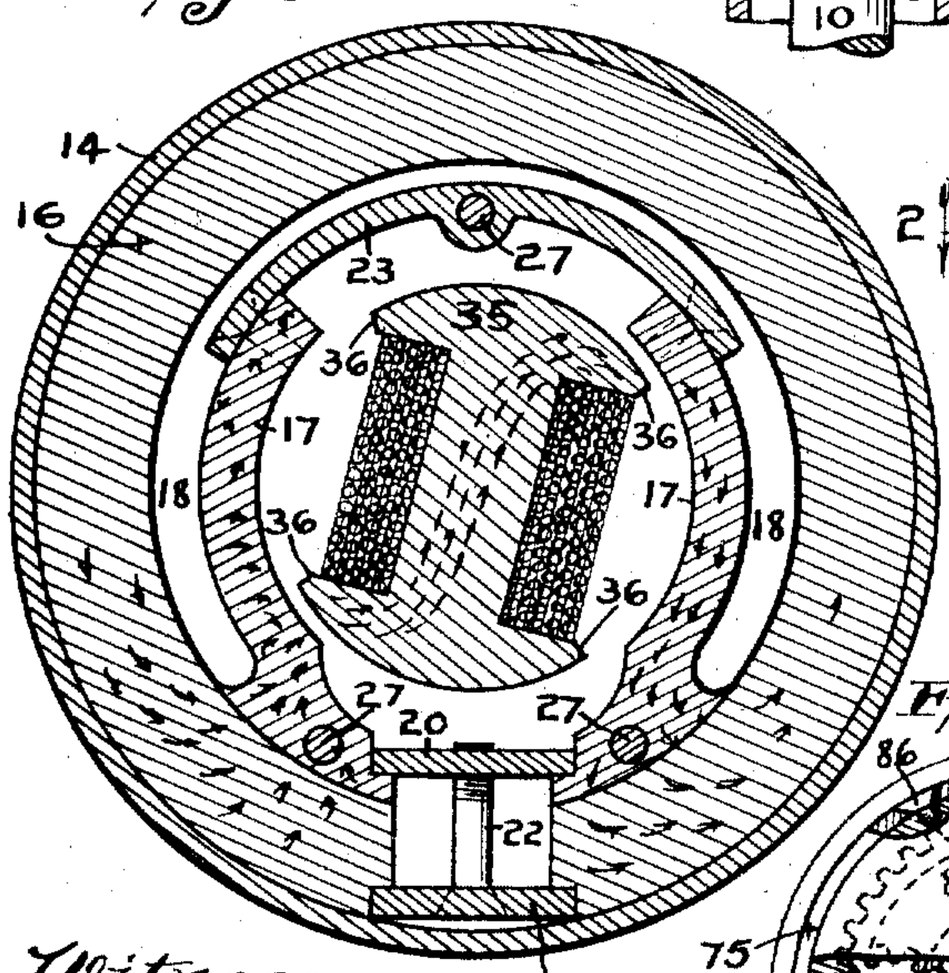


Fig. 1.

Fig. 5.



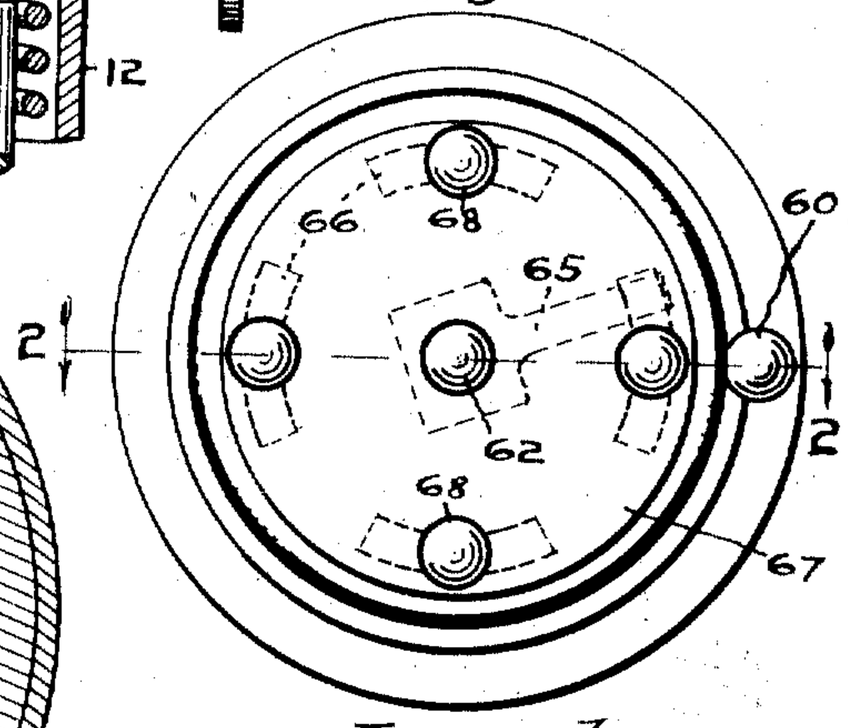
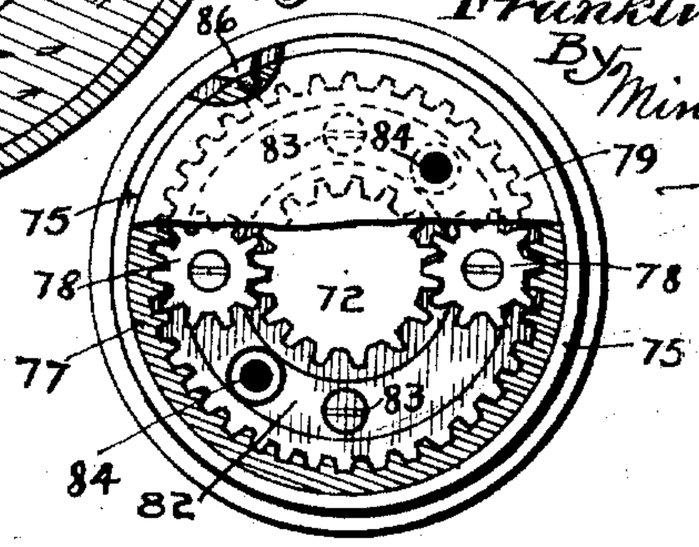


Fig. 3.



Witnesses;
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UNITED STATES PATENT OFFICE.

FRANKLIN B. HAYS AND JOHN M. DINKINS, OF INDIANAPOLIS, INDIANA, ASSIGNORS OF FIFTY-THREE ONE-HUNDREDTHS TO WILLIAM L. TAYLOR, OF INDIANAPOLIS, INDIANA.

DISTRIBUTER FOR MAGNETOS.

990,811. Specification of Letters Patent. Patented Apr. 25, 1911.

Original application filed November 4, 1909, Serial No. 526,271. Divided and this application filed August 9, 1910. Serial No. 576,410.

To all whom it may concern:

Be it known that we, FRANKLIN B. HAYS and JOHN M. DINKINS, citizens of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Distributers for Magnetos, of which the following is a specification.

This invention relates to improvements in magneto generators for developing an electric current for explosive engines, and is a division of our application for improvements in magnetos filed in the United States Patent Office November 4, 1909, Serial No. 526,271.

The object of this invention is to provide means whereby the mechanism for distributing the electric spark to a four-cylinder engine may be made to supply the necessary ignition for a six-cylinder engine synchronously with the explosive periods of the respective cylinders, and to provide means whereby the device may be adjusted at will to distribute to a four or a six-cylinder engine.

We accomplish the objects of our invention by the mechanism illustrated in the accompanying drawing, in which—

Figure 1 is a top plan view of our improved magneto. Fig. 2 is a vertical section on the line 2—2 of Fig. 1. Fig. 3 is a horizontal section on the line 3—3 of Fig. 2 with the parts of largest diameter not shown. Fig. 4 is a horizontal section on the line 4—4 of Fig. 2 with the parts of largest diameter not shown, and Fig. 5 is a like section on the line 5—5 of Fig. 2, the lines of force being represented by the arrows.

Like characters of reference indicate like parts throughout the several views of the drawing.

10 is the armature shaft which is mounted within a cylindrical housing 12, the upper end of which housing is expanded and provided with an upper annular flange 13, upon which the cylindrical walls 14 of the magneto casing are telescopically mounted in the manner clearly shown in Fig. 2. The cylinder 14 is externally screw threaded at its upper and lower ends to receive the internally screw threaded coupling rings 15. The coupling rings 15 have inturned annular flanges to engage and hold the adjacent parts to be attached to the cylinder walls 14. Within the cylinder walls 14 the magnets and armature of our magneto are mounted. These magnets are in three sections 16; in the form of open or split rings which are suitably separated at the resulting ends and which terminate with soft iron pole-pieces 17. The inner walls of the pole-pieces cover an arc of ninety degrees and are mounted within the magnets, diametrically opposite each other, as shown in Fig. 5. Plates 26, preferably of brass, are placed against the upper and lower magnets, and are there retained by screws 27, as shown in section in Fig. 5. The lower plate is provided with a handle-extension 29, which passes out through a slot in the expanded top of the housing 12, and is manually accessible from without for rotarily adjusting the magnets to vary the time of the spark in the cylinders of the engine.

The upper plate 26 is provided with an annular drum-like flange 30, which forms a housing for parts to be hereinafter described. Mounted within the drum 30 are the race and balls of a ball-bearing which retains the upper end of the armature in proper operative position.

Our armature preferably is comprised of soft iron plates 31 assembled between larger soft iron members 32 held together by screw-bolts 33, and, as a whole, being of the usual shuttle type, except that the members are blunted as shown at 36 to allow a greater magnetic flux to flow through the core of the armature at the reversal of polarity to generate a wave of greater intensity but shorter duration. This wave is varied as to time by shifting the magnets through the medium of the handle 29.

The low tension current from the armature winding passes through a conductor 39 to a sleeve 40 of metal electrically connected with the ball race for the balls which support the upper end of the armature. This ball race and the sleeve 40 are insulated from the body of the machine as clearly shown in Fig. 2, but they are electrically connected with a metal plate which plate is connected by a wire conductor 42 with one terminal of a primary and one terminal of a secondary winding of an induction coil or transformer 43. The other terminal of the primary winding of the transformer 43 is in connection with the circuit-

breaker through the conductor 44, spring bar 45, (see Fig. 4), and insulated terminal 46 of the circuit-breaker. This terminal 46 has a platinum contact with a like contact point on the other member 47, which member 47 is grounded with the body of the machine. The circuit is completed through the body 32 of the armature which is connected at 48, (see Fig. 2), with the other terminal of the armature winding.

The member 47 of the circuit-breaker is here shown as a lever pivoted at 50, and having a lug 51, which extends through the casing in which the mechanism of the circuit breaker is mounted, and into the path of the bent ends 52, of a rotary and diametrically mounted arm on the sleeve extension 53 of the armature, whereby the circuit is broken twice at each revolution of the armature at the maximum point of intensity of the electrical impulses which are being generated. The lever 47 is held normally in contact by means of a spring 54. A condenser 56, (see Fig. 2), is bridged across the terminals of the circuit breaker, one of its terminals being grounded to the machine, and the other terminal being connected at 58 with the spring bar 45. The purpose of this condenser is to intensify the inductive influence in the secondary winding, and to reduce sparking between the platinum contacts of the circuit-breaker. Wound upon the soft iron core 30 is the primary winding of the transformer 43, and outside of this primary winding is the secondary or high tension winding of smaller wire, one terminal of which is connected by the conductor 42 with the upper journal-bearing of the armature, as previously described, and the other terminal of the secondary winding is connected with a spring conductor 59, which is electrically connected with the binding post 60.

The binding post 60 is connected by a conductor 61 with a binding post 62 of the distributer mounted in the cap of our machine. This binding post has a stem 63 which is pressed by spring 64 into constant contact with a spring plate 65, the outer end of which plate 65 is made to sweep the segments 66 mounted on the inner side of the cap 67. The cap 67 is a non-conductor while the segments are conductors, the area of which are shown by dotted lines in Fig. 1. These segments are electrically connected with the binding post 68, from which the current is conducted to the engine cylinders in the usual manner.

It will be understood from what has been said that the circuit is broken twice on each revolution of the armature, so that for each complete sweep or circuit of travel of the spring-plate 65 against the four segments 66 in circuit with the four engine cylinders, the armature must have made two complete revolutions. To accomplish this mechanically we provide a spur-gear wheel 72, which is here shown as having its arbor 73 revolubly inserted within the hollow sleeve 53 of the armature where its notched lower end is locked by engagement with a cross bar 74 to cause the gear wheel 72 to rotate with said armature. The wheel 72 is mounted within a gear case 75 having circular walls, and also mounted in said gear case is a ring 77 with internal cogs. This cogged or toothed ring 77 is just twice the diameter of the wheel 72, and the latter is drivingly connected with said annular gear by the intermediate pinions 78. It is thus obvious that the ring 77 will rotate once for each two revolutions of the spur-gear wheel 72. Mounted in a fixed, but removable manner on the toothed ring 77 is a plate 79, and upon this plate a block of insulation 80 is mounted and upon the block is a spring-bar 65. By the above arrangement the spring-bar 65 will make one complete revolution or sweep at each two revolutions of the wheel 72 and its armature. Now, by mounting the two intermediate pinions 78 on a ring 82, which may be released by removing the holding screws 83, said ring, being mounted in a suitable groove in the bottom of the gear case, and by locking the toothed ring 77 to the side of the gear case by inserting a screw in the hole 86, (see Fig. 3), and also by releasing the plate 79 from said toothed ring 77 and securing the plate to the lugs 84 of the ring 82, the intermediate pinions 78, when rotated by the gear wheel 72, will roll back on the toothed ring 77 to a certain extent, so that the resulting forward travel of the plate 79 will amount to one complete revolution to each three revolutions of the armature. Six electrical impulses or sparks will be developed under this last adjustment, at each revolution of the plate 79, and will be conducted through the wire 61, to the spring plate 65, carried by the plate 79. These impulses will be evenly distributed to six segments, if same are provided in the insulated cap 67, and will be conducted thence to the respective cylinders of a six-cylinder engine. The drawing shows a cap with binding posts and segments for a four-cylinder engine, and for a six-cylinder engine this cap will have to be replaced by one having six segments and a corresponding number of binding posts.

The relation of one-half diameter between the wheel 72 and internally toothed ring 77 will cause the plate 79, carried by the ring 77, and its spring-bar 65, to make one complete revolution for every two revolutions of the wheel 72, when the plate 79 is fastened to the ring 77 and the latter is free to move independently of the case in which it is mounted; but when the ring 77 is held against rotation by being fastened to its

case, and the plate 79 is released from the ring 77 but is fastened to the ring 82 on which the intermediate pinions 78 are mounted, there will be a loss in the advance movement of the plate 79 which will require the wheel 72, (and the armature to which it is attached), to make three complete revolutions for each single revolution of the plate 79. Consequently, with our magneto, six electric impulses will be developed during each revolution of the plate 79, and by providing a cap with six segments, and six binding posts, six cylinders may be connected and sparked with the same efficiency as four would be under the conditions herein first described.

While we have shown the preferred embodiment of our invention as now known to us, we do not desire to be limited to this exact construction and arrangement of parts, but

What we claim as new and wish to secure by Letters Patent, is—

1. The combination, with an electric current producing apparatus, of a distributer comprising a plurality of insulated annularly arranged segment-conductors, a traveling conductor adapted to sweep all of said segments at each circuit of its travel, a driving shaft, and means between the driving shaft and traveling conductor for varying the relative travel of said shaft and conductor.

2. The combination with an electric current producing apparatus, of a driving-shaft, a distributer comprising a plurality of insulated annularly arranged segment-conductors, a traveling conductor adapted to sweep all of said segments at each circuit of its travel, a planetary system of gears transmitting rotary travel from the driving-shaft to said traveling conductor, and means cooperating with said gears for varying the relative travel of said driving-shaft and conductor.

3. The combination with an electric spark producing apparatus, of a driving shaft, a distributer comprising a plurality of insulated annularly arranged segment-conductors, a traveling conductor adapted to sweep all of said segments at each circuit of its travel, a plate on which the traveling conductor is mounted, a spur-gear mounted on the driving shaft, an annular internal gear concentric with and of twice the diameter of the spur-gear, intermediate gears drivingly connecting said annular internal gear with said spur-gear, an annular plate on which said intermediate gears are mounted, means for locking immovable and releasing for movement said internal gears and said annular gear carrying plate, and means at the time said annular gear carrying plate is locked and said internal gear is released of securing the plate on which the traveling conductor is mounted to said annular internal gear whereby they will both be free to travel, and means for locking the traveling conductor carrying plate and said annular gear carrying plate together when said internal gear is locked and said annular gear carrying plate is released, whereby, by the above changes in fastenings the traveling conductor will make one complete circuit for at least two revolutions of the driving shaft or for each three revolutions of the driving shaft, respectively.

4. In an electric spark producing apparatus, a distributer comprising a plurality of insulated segment-conductors arranged in an annular series, a traveling conductor adapted to sweep all of said segments at each circuit of its travel, a plate on which the traveling conductor is mounted, a rotating armature shaft, a spur-gear mounted on the armature shaft, an annular internal gear twice the diameter of said spur-gear mounted concentric therewith, intermediate gears drivingly connecting said annular internal gear with said spur-gear, an annular plate on which said intermediate gears are mounted, a casing to contain the above gears, means for detachably securing the annular gear-carrying plate and also the internal gear to the casing, and means for detachably securing said traveling conductor plate to the annular internal gear or to the annular gear carrying plate.

In witness whereof, I, FRANKLIN B. HAYS have hereunto set my hand and seal at Indianapolis, Indiana, this 25th day of July, A. D. one thousand nine hundred and ten.

FRANKLIN B. HAYS. [L. S.]

Witnesses to signature of Franklin B. Hays:

J. A. MINTURN,
F. W. WOERNER.

In witness whereof, I, JOHN M. DINKINS, have hereunto set my hand and seal at Long Branch, N. J., this 23rd day of July, A. D. one thousand nine hundred and ten.

JOHN M. DINKINS. [L. S.]

Witnesses as to John M. Dinkins:

ARTHUR C. MORRIS,
N. T. WOOLLEY.