No. 719,167. PATENTED JAN. 27, 1903.

J. M. WILSON.

MAGNETO ELECTRIC MACHINE.

APPLICATION FILED APR. 14, 1902.

NO MODEL.

Fig. 1.

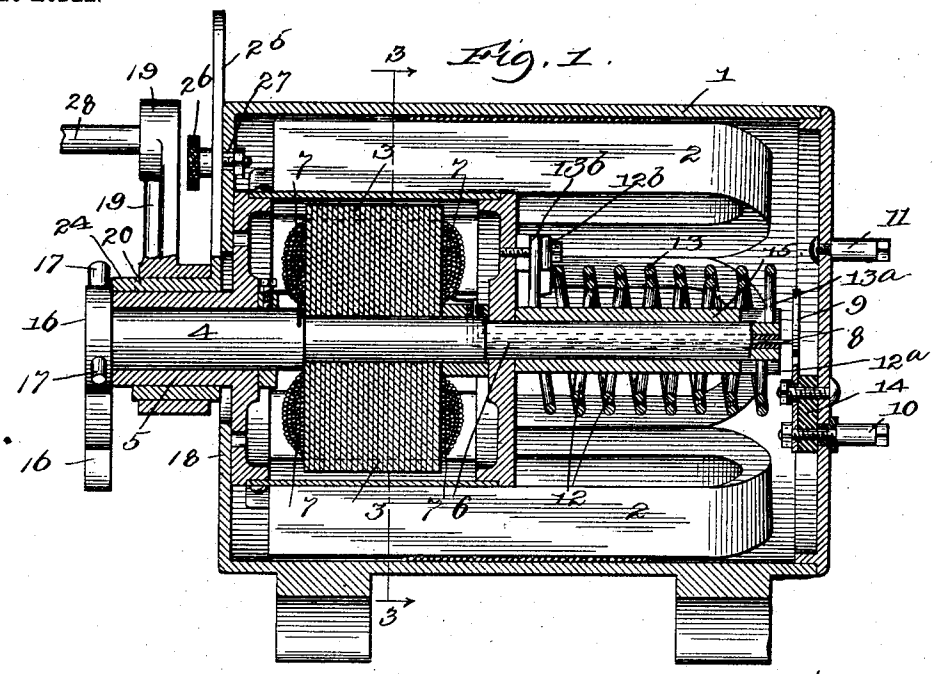


Fig. 2.

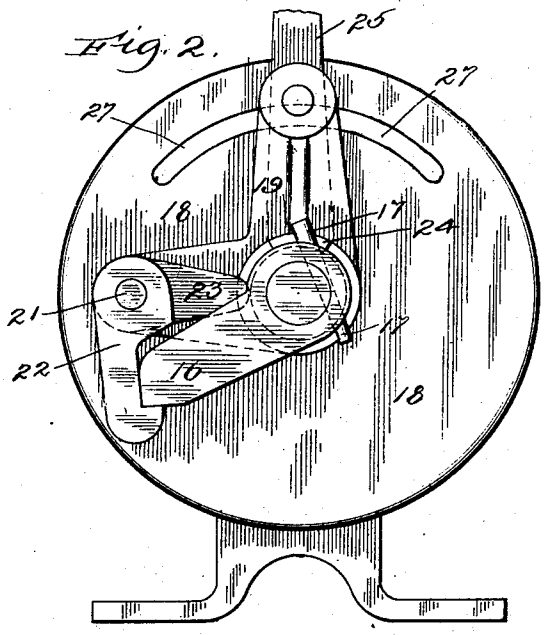
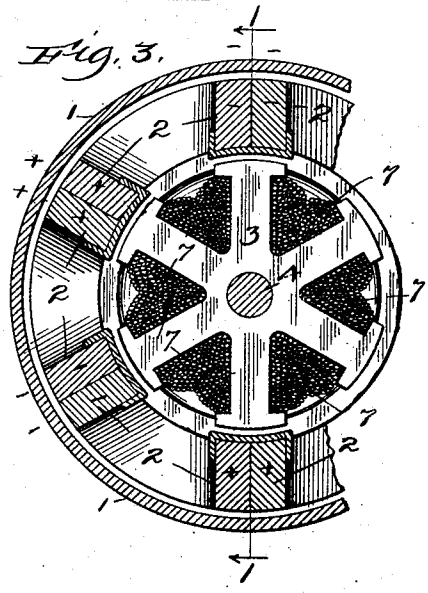


Fig. 3.



Witnesses:
Ray White.
Harry B. White.

Inventor:
James M. Wilson:
By Forrest Bain Attorney:

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JAMES M. WILSON, OF BATTLECREEK, MICHIGAN.

MAGNETO-ELECTRIC MACHINE.

SPECIFICATION forming part of Letters Patent No. 719,167, dated January 27, 1903.

Application filed April 14, 1902. Serial No. 102,757. (No model.)

To all whom it may concern:

Be it known that I, JAMES M. WILSON, of Battlecreek, in the county of Calhoun and State of Michigan, have invented certain new and useful Improvements in Magneto-Electric Machines; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to improvements in magneto-electric machines, and especially to that class of machines in which an impulse of electricity is generated in response to a physical oscillating impulse of the rotating member of the said machine.

One of the prime objects of my invention is to produce a magneto-electric machine which will generate an impulse of electricity for the purpose of exploding a charge of fuel within the cylinder of an internal-combustion engine.

Another object of my invention is to provide a machine in which the generating impulse is produced as a result of a high velocity of the inducting member, which is greater than that at which it travels prior to the time when the inducing impulse is made—as, for instance, when placing the said inductive member in the proper rotative position for the purpose of producing the impulse.

Another object of my invention is to produce a single impulse by the oscillation of the inductive member of a magneto-electric machine in synchronism with the movement of the piston of the engine, so as to produce the impulse during the time when the electric circuit within the cylinder of the engine in which the electric-current impulse travels is opened, at which opening the electric spark or arc is made.

Another object of my invention is to provide a means whereby the time at which the impulse is produced may be regulated to a determined and absolute degree with reference to the time at which the circuit within the cylinder of the gas-engine is opened and with reference to the position which the piston of the engine within the cylinder occupies when the impulse is made.

With these and other objects which may hereinafter appear my invention consists in the arrangement and combination of parts, as will be hereinafter described, and more specifically set out in the appended claims.

In the drawings, Figure 1 is a side elevation of my magneto-electric machine in section, taken on line 1 1 of Fig. 3. Fig. 2 is an end view of the same. Fig. 3 is a transverse section on line 3 3 of Fig. 1.

In all of the views the same numerals of reference indicate similar parts.

The case in which the magneto-electric machine is inclosed is represented by 1.

2 2 are the permanent field-magnets, arranged around the axis of the machine.

3 is an armature fixed to the oscillating shaft 4. This shaft moves freely in the bearings 5 and 6. The coils which surround each of the poles of the armature are connected in series, and the terminals of the series are connected, respectively, to the shaft 4 and to an insulated wire 8, which passes through the hollow shaft, the end of which is brought into frictional contact with the spiral spring-plate 9. This plate is connected to the insulated binding-post 10.

The binding-post 11 is fixed directly to the case and is in electrical contact with the terminal of the coil, which is connected to the shaft through the metallic structure of the machine.

The open helical spring 12 surrounds the extended end of the shaft 4 and is connected to a sleeve 15, which is fixed to said shaft at the point 12^a. The other end 12^b of the spring 12 is connected under the head of a set-screw let into a stationary part of the frame. A similar but larger helical spring, the convolutions of which are turned in the opposite direction to those of spring 12, is connected at the end 13^a to the sleeve 15. The remaining end 13^b is connected under the same set-screw which retains the spring 12 in place. An arm 16 is fixed to the shaft 4 by means of the pin 17. A lever provided with radial arms 18 and 19, located at right angles to each other, is arranged to be oscillated upon the sleeve 20. The arm 18 carries a wrist-pin 21, upon which the angular trip-dog 22 is adapted to freely move. An inward radially-extending arm 23 of the said lever converges toward the sleeve 20. The sleeve 20 carries a shiftable trip 24, which is adapted to engage the

lower end of the trip-lever 23. An arm 25 extends radially from and is a part of the sleeve 20 and is adapted to be held in a given position by means of a thumb-screw 26, which is connected within the crescent-shaped slot 27 of the case 1, whereby the position of the trip 24 may be varied and secured by means of the screw and the slot. The arm 18 19 may be oscillated by means of an arm or rod that may connect any oscillating part of the engine to the wrist-pin 28.

The operation of my device is as follows: When the arm 19 is drawn back by an oscillating mechanism that may be attached thereto just prior to the time of making the electric impulse, the arm 18, which carries the trip-dog 22, is moved in a consonant degree therewith. The trip-dog 22 is at that time engaging the end of the arm 16, and thereby rotates the shaft 4, to which it is connected, until the end 23 of the trip-lever engages the trip 24, at which time the trip-dog will be disengaged from the arm 16, when the shaft carrying the armature will be thereby free to be revolved to its normal position. During the time when the shaft is being rotated in the manner described the spring 13 is wound up and the spring 12 is unwound. The shaft being liberated after the end of trip-lever 23 comes into engagement with the trip 24, the spring 13 will oscillate or rotate the armature for a part of a revolution at a high velocity, thus causing the armature to generate a single impulse of high electromotive force by virtue of the high velocity at which the armature cuts the lines of force. The spring 12 will cushion the effect of the spring 13 at the end of the oscillation, and the armature will be held in a state of equilibrium by the opposing springs at a given point, and a vibration of a definite duration may be effected by this arrangement. When it is desired to produce the generating oscillation of the armature at a time earlier, the trip 24 may be set forward by moving the lever 25 and securing it in position by means of the thumb-screw 26. In like manner the impulse may be made at a later period of time by moving the lever 25 backward or in the opposite direction and securing it in position. By this means the trip 24, which is fixed to the sleeve of which the lever 25 is a structural part, will be moved backward in the same proportionate distance. When an impulse of electricity is produced, the current will circulate through the armature-coils through the insulated wire 8, which passes through the center of the shaft, to the contact-plate 9, to the insulated binding-post 10, through the exterior circuit to the binding-post 11, which is connected to the frame, and back, through the metallic structure, to the shaft 4, thus completing the electric circuit.

The tension of the respective springs 12 and 13 will to a large extent govern the velocity at which the armature will travel at the time when the generating oscillation is produced, and as a result the electromotive force will depend to some extent upon this velocity; but in every case it will be sufficient to produce a spark of greater value than could be produced by the initial movement of the armature, during which time the velocity is not so great.

Having described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a magneto-electric machine the combination with an armature adapted to be rotatably oscillated, of a spring adapted to rotate said armature in a given direction, a counteracting-spring adapted to rotate said armature in the opposite direction, and a means for oscillating said armature.

2. In a magneto-electric machine the combination with an armature adapted to be rotatably oscillated, of a spring adapted to rotate said armature in a given direction, a counteracting-spring adapted to rotate said armature in the opposite direction, a means for oscillating said armature in a given direction, and a trip for releasing said armature.

3. In a magneto-electric machine the combination with an armature adapted to be rotatably oscillated, of two opposing springs adapted to rotate said armature in opposite directions, an arm 16 fixed to the armature-shaft, an arm 19 adapted to be oscillated, a dog 22 moved by said arm, a trip 24 for tripping said dog and for releasing the armature, and a lever 25 for adjusting the position of the said trip.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

JAMES M. WILSON.

In presence of—
FORÉE BAIN,
MARY F. ALLEN.