No. 697,963. Patented Apr. 22, 1902.

V. G. APPLE.

MAGNETO ELECTRIC GENERATOR.

(Application filed May 2, 1901.)

(No Model.)

Fig. 1.

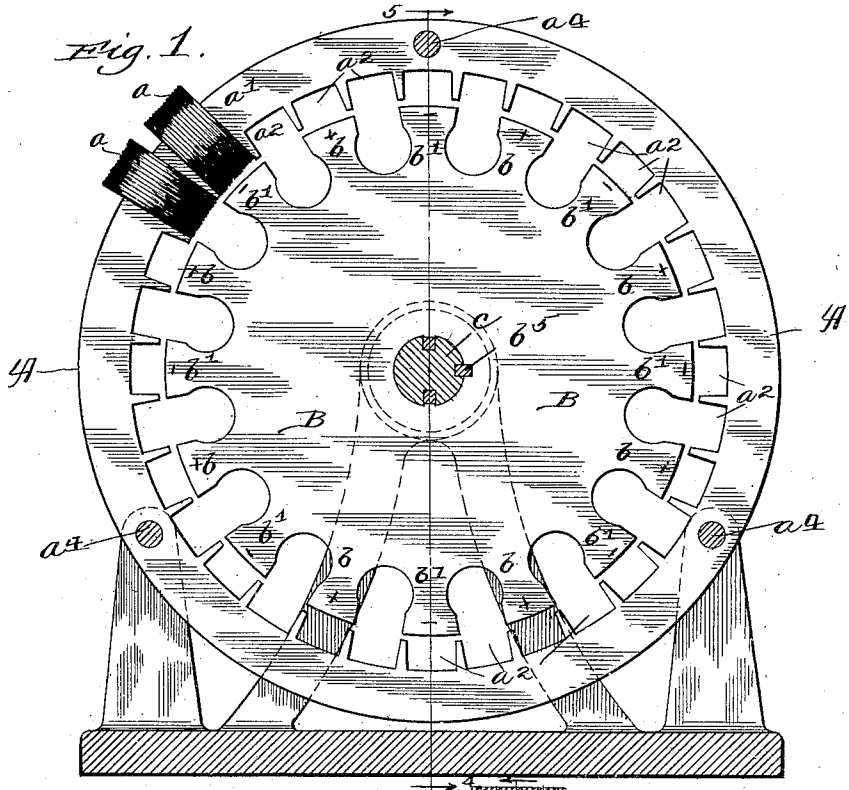
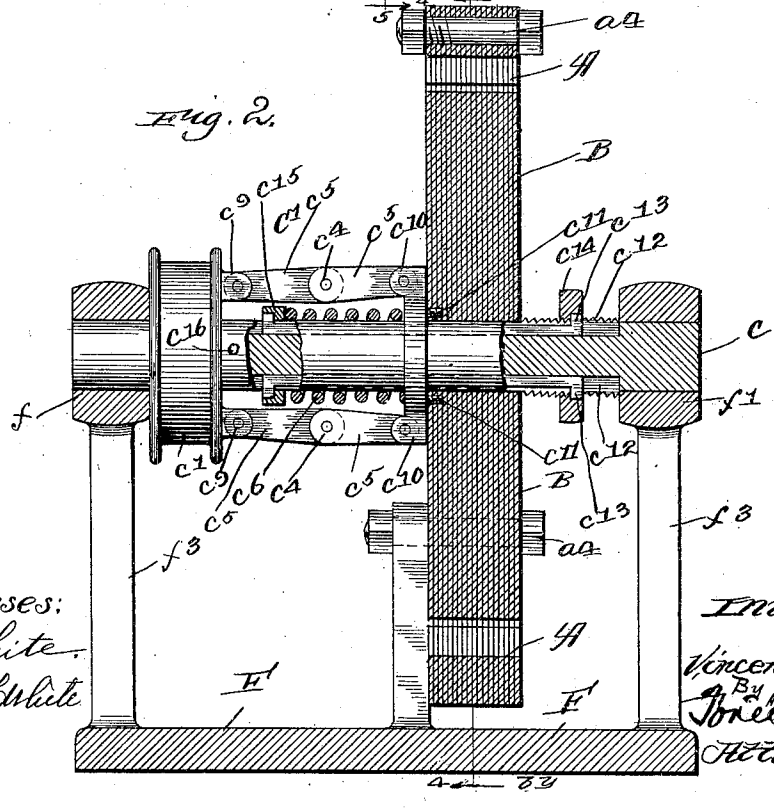


Fig. 2.



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UNITED STATES PATENT OFFICE.

VINCENT G. APPLE, OF DAYTON, OHIO.

MAGNETO-ELECTRIC GENERATOR.

SPECIFICATION forming part of Letters Patent No. 697,963, dated April 22, 1902.

Application filed May 2, 1901. Serial No. 58,496. (No model.)

To all whom it may concern:

Be it known that I, VINCENT G. APPLE, a citizen of the United States, residing at Dayton, county of Montgomery, and State of Ohio, have invented certain new and useful Improvements in Magneto-Electric Generators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable persons skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in magneto-electric generators.

The object of my invention is to provide a durable, efficient, and simple electric generator, one which is not liable to get out of order or to become disarranged when in operation.

My invention is more especially adapted to the construction of small machines for producing current for commercial use, such as are designed to be used for producing the spark or flash for igniting the charge in the cylinder of gas-engines. For such work it is very essential that the integrity of operation should be preserved, even at the expense of efficiency or other qualities, and my machine having no wires upon the revolving parts for that reason is not liable to become defective and inoperative and is especially adapted for this service. When the function of operation is reversed in the construction which I shall describe and claim and which is the embodiment of my invention, it affords as valuable a motor as when such device is used as a magneto-electric generator.

In the drawings, Figure 1 is a view, part in section, through lines 4 4 of Fig. 2. Fig. 2 is a section through lines 5 5 of Fig. 1.

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

A is a stationary armature, and B is a revoluble field, the two inductive elements of my magneto generator or motor.

C′ is the means which I employ for governing the generating capacity of the machine, which is independent of the speed at which the pulley associated with the machine is revolved.

In Figs. 1 and 2 the interior revolving field-magnet is made of a series of steel magnet-plates provided with projecting teeth. Every alternate tooth is of opposing polarity, as shown in the drawings. The magnet-field is built up of a series of disks or plates that have been previously magnetized and are held together by any convenient means.

I have shown a feather b^5, for guiding the field as a whole on the shaft. The surrounding armature is made up of a series of rings placed together and held by bolts a^4. These rings are preferably composed of soft sheet-iron. The coils a are to be wound in the spaces a^2 provided for that purpose.

In Fig. 2 the regulating means, by which the dynamo will produce a definite electromotive force independent of the speed by which the pulley c' is driven, is shown. The shaft c in this case is to be revolved and is fastened to the pulley c' by a pin c^{16} or other convenient means. The pulley c' is provided with laterally-extending projections c^9, to which the arms c^5, providing a knuckle, are pivotally attached.

c^4 represents centrifugal weights formed at the junction of the two arms c^5, placed on either side of the shaft. The arms c^5 are also pivotally attached to a washer c^{10} or to the side of the field-magnet B which surrounds the shaft c. The arms are pivoted to projections from the internally-revolving field B, or when a washer is used it is secured to the field by means of screws c^{11}.

c^{12} c^{12} are parallel grooves made in the opposite sides of the shaft c, which extend from the pulley c' to the support f' of the shaft c. Two bars c^{13} c^{13} having outwardly-extending ends are adapted to lie loosely in the said grooves c^{12}. A counterbored washer c^{14} surrounds the threaded end of the shaft c and is adapted to receive the outwardly-extending ends of the bars c^{13}. These bars are reciprocated in one direction by the washer c^{14} and in the other direction by the spring c^6. c^{15} is another washer which surrounds the shaft and against which the outwardly-projecting ends of the bars c^{13} are maintained in contact by means of the spring c^6. The spring c^6 abuts against the washer c^{10} or the field-magnet B.

The object of the regulating construction which I have just described is to produce a current of a constant value independent of the speed of the driving power, so that there

will be no danger of burning out the windings on the generator when the machine is being operated at an excessive speed.

The revolving element or field-magnet being constructed of steel and carrying no wires, it is susceptible of a very high velocity without danger of disruption or disturbance.

The regulating mechanism operates to reduce the lines of force that are cut by the armature as the speed of the revolving field is increased, and by this means a current of a constant value is maintained independent of the speed at which the revolving element is operated. It is performed in this way: When the speed of the revolving element reaches a predetermined point, the centrifugal weights c^4 begin to recede from the shaft by the effect of centrifugal motion, and the arms c^5, to which the said weights are attached, draw the field-magnet B nearer to the pulley c' or out of the stationary armature A, and thereby reduce inductive influence on the armature. As the magnetic field is withdrawn from the armature less lines of force will be cut and less current will be generated in the coils a. The proportion of the parts may be such that the field or the magnetic inducing part may be entirely removed from the other part of the generator, when the speed has assumed a velocity much higher than that at which the machine is designed to be operated with the best and most efficient results. The regulating-washer c^{14} is designed to increase the tension of the spring c^6, so that the inducing part of the machine, in this case the field, will not be drawn from the armature until a higher speed is attained. This is accomplished when the nut c^{14} is moved nearer the bearings f' to compress the spring c^6, and the opposite results are attained when the nut c^{14} is moved along the threaded path c to a position nearer the field B through the operation of the sliding and connecting bars c^{13} in a manner readily understood from the drawings.

Both armature and field magnet may be made of permanently-magnetized material and the coils may be wound upon either or both, and either field or armature or both may be moved with reference to the other by any convenient means whereby an oscillating or rotary motion may be imparted.

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

1. In a magneto-electric machine the combination of a revolving, multipolar, field-magnet with a stationary ring-armature within which it revolves, said armature consisting of an annular core having internal projections, coils wound between said projections, said field-magnet consisting of one or more plates of permanently-magnetized steel having outwardly-projecting poles of alternating polarity, and a means for laterally moving said field-magnet with reference to the armature, for the purpose of regulation, substantially as set forth.

2. In a magneto-electric machine the combination of a revolving, multipolar, field-magnet with a stationary, ring-armature within which it rotates, said armature consisting of an annular core made up of a series of thin laminæ, having internally-projecting poles, coils wound between said projections, said field-magnets consisting of a series of disks, or plates, of permanently-magnetized steel, outwardly-projecting poles of alternate polarity, of short length, with reference to the diameter of the disk, a centrifugal governing device for separating the field-magnet from the armature, and a spring for returning said field-magnet to its normal position, substantially as set forth.

In testimony whereof I have signed this specification, in the presence of two subscribing witnesses, this 25th day of April, A. D. 1901.

VINCENT G. APPLE.

Witnesses:
L. M. ARNOLD,
C. E. TAYLOR.