

POWER GENERATOR SET

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a kinetic power generation unit, and more particularly to the kinetic power generation unit capable of changing an interference effect (or a negative effect) on the counter electromotive force of an electric motor and the counter electromotive force of a power generator to a positive effect.

Description of the Related Art

Electric motor, also known as motor, is an electrical device capable of converting electrical energy into mechanical energy and then generating kinetic energy from the mechanical energy to drive other devices. Most electric motors are powered by a magnetic field and a winding current. On the other hand, power generator is an electrical device that converts the energy stored in various primary energy sources into mechanical energy by a prime mover, and then converts the mechanical energy into electrical energy, and finally transmits the electrical energy to different places requiring electricity through a transmission and distribution network, so that the power generator is a device for converting kinetic energy and/or other forms of energy into electrical energy. The principle of the electric motor is the same as that of the power generator, except that the directions of converting different forms of energies are opposite. However, the electric motor generates an induction potential in normal operations, and this potential is called counter electromotive force (cemf) which will block the moving direction of an induction potential conductor, so that the counter electromotive force has an interference effect on the electric motor. In the operation of the power generator, the counter-electromotive force will be produced, and such counter-electromotive force has a negative effect (or interference effect) on the power generator.

In view of the aforementioned drawbacks of the conventional electric motor and

power generator with an interference effect or a negative effect on the counter electromotive force of the electric motor and the counter-electromotive force of the power generator during normal operations, the inventor of the present invention provided a feasible solution and developed a kinetic power generation unit in
5 accordance with the present invention to overcome the drawbacks of the prior art.

SUMMARY OF THE INVENTION

Therefore, it is a primary objective of the present invention to provide a kinetic power generation unit capable of changing the interference effect on the counter electromotive force of the power generator and the counter-electromotive force of the
10 electric motor to a positive effect.

The present invention is characterized in that the magnetic field of the electric motor and the magnetic field of the power generator are improved by changing to the same magnetic field coupling and sharing the same rotor, so that the electric motor and the rotor of the power generator will be rotated in the same direction, and the phases of
15 an exciting winding of the electric motor and a field winding of the power generator will be changed and transmitted to a phase voltage sequentially by a DC brushless drive controller. Therefore, the interference effect on the counter electromotive force of the electric motor and the counter-electromotive force of the power generator is changed to a positive effect.

20 The present invention will become clearer in light of the following detailed description of an illustrative embodiment of this invention described in connection with the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic view of an electric motor and a power generator having an
25 exciting winding and a field winding of a same magnetic field in accordance with an embodiment of the present invention;

FIG. 2 is a block diagram of a kinetic power generation unit in accordance with an embodiment of the present invention;

FIG. 3 is a block diagram of a kinetic power generation unit having a plurality of kinetic power generator assemblies in accordance with an embodiment of the present invention;

FIG. 4 is a schematic view showing a three-phase winding of a kinetic power generation unit configured with a $\triangle$ connection in accordance with an embodiment of the present invention;

FIG. 5 is a schematic view showing a three-phase winding of a kinetic power generation unit configured with a Y connection in accordance with an embodiment of the present invention;

FIG. 6 is a schematic view showing a three-phase winding of a kinetic power generation unit configured with a combination of $\triangle$ &Y connections in accordance with an embodiment of the present invention; and

FIG. 7 is a schematic view of sequentially and electrically conducting coil windings of a DC brushless drive controller in accordance with an embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

With reference to FIG. 1 for a kinetic power generation unit 1 in accordance with an embodiment of the present invention, the kinetic power generation unit 1 has the functions of both electric motor 1a and power generator 1b. The kinetic power generation unit 1 comprises a stator 10, and a rotor 20 installed in the middle inside the stator 10, wherein the stator 10 is in a hollow form and has a plurality of wire slots 11 arranged circularly on an inner wall of the stator 10, wherein an exciting winding 12a of the electric motor 1a and a field winding 12b of the power generator 1b are installed alternately into the wire slots 11. For example, the exciting winding 12 of the electric

motor 1a is installed into an odd-numbered wire slot 11 and the field winding 12b of the power generator 1b is installed into an even-numbered wire slot 11.

In FIG. 2, the kinetic power generation unit 1 further comprises a storage battery 30, and the current outputted by the storage battery 30 in a phase voltage (that is, split-phase power-on and power-off as shown in FIG. 7) is supplied to the exciting winding 12a of the electric motor 1a and the field winding 12b of the power generator 1b through a DC brushless drive controller 40 in a sequential phase change and electrical conduction method. When the exciting winding 12a and the field winding 12b are electrically powered on, a magnetic field coupling will be generated inside the stator 10 to drive the rotor 20 to rotate. After the rotor 20 rotates, the kinetic energy is outputted and supplied. Since the rotor 20 is rotates in the middle surrounded by the exciting winding 12a of the electric motor 1a and the field winding 12b of the power generator 1b, and the exciting winding 12a of the electric motor 1a or the field winding 12b of the power generator 1b move to cut the magnetic lines of force when no electric power is supplied to the DC brushless drive controller 40, an induction potential is generated, and the generated electricity is led out from a terminal, and the electricity can be outputted as AC power for use after the voltage of the electricity is transformed by a voltage regulator (AVR) 50 and a transformer 60. On the other hand, the electricity can be outputted as DC power for charging the aforementioned storage battery 30 to increase the power of the storage battery 30 after the electricity is rectified by a rectifier 70.

Since the exciting winding 12a of the electric motor 1a and the field winding 12b of the power generator 1b are installed alternately in the wire slots 11 of the stator 10, and the DC brushless drive controller 40 changes their phases and electrically conducts both of them to supply current to the exciting winding 12a of the electric motor 1a and the field winding 12b of the power generator 1b, so that they have a same magnetic field coupling, and the rotor 20 is shared by the electric motor 1a and the power generator 1b, so that the rotational directions of the rotor 20 of the electric motor 1a and the rotor 20 of the power generator 1b is the same. According to Fleming left hand rule

(sometimes called motor rule) and Fleming right hand rule (sometimes called generator rule), the interference effect (or negative effect) of the counter electromotive force generated by the electric motor 1a after its power-on will be the positive effect of the power generator 1b; and the interference effect (or negative effect) of the counter electromotive force generated by the power generator 1b will be the positive effect of the electric motor 1a. Such positive effect improves the efficiency of both of the electric motor 1a and the power generator 1b.

In FIG. 3, there can be a plurality of kinetic power generation units 1, 2, 3 applied to the present invention, and the kinetic power generation units 1, 2, 3 are connected in series with each other and installed coaxially with the same rotor 20 to increase the output and electric power.

In an embodiment of the present invention, the kinetic power generation unit 1 uses a three-phase coil winding of a $\triangle$ connection as shown in FIG. 4. Wherein, a connection point a, b, c between phases of the coil winding is an output point of the three-phase alternating current; and a center point A, B, C of each coil winding is a voltage input point, so as to complete the configuration of the three-phase coil winding.

In an embodiment of the present invention, the kinetic power generation unit 1 uses a three-phase coil winding of a Y connection as shown in FIG. 5. Wherein an end point a, b, c in each phase of the coil winding is a power output point; a neutral point of the coil winding adopts a $\triangle$ connection, and a center point A, B, C of the $\triangle$ connection is a voltage input point, so as to complete the configuration of the three-phase coil winding.

In an embodiment of the present invention, the kinetic power generation unit 1 uses a three-phase coil winding of a combination of $\triangle$ &Y connections as shown in FIG. 6. The Y connection as shown in FIG. 5 is configured inside the $\triangle$ connection as shown in FIG. 4, and the end point in each phase of the Y connection is coupled to the

connection point a, b, c between phases of the $\triangle$ connection, and the connection point a, b, c between phases of the $\triangle$ connection is a three-phase alternating current output point, and the center point A, B, C of each coil winding of the $\triangle$ connection is a phase voltage input point, so as to achieve the same expected effect as described above.

5 The DC brushless drive controller 40 sequentially changes phases of the coil winding of the kinetic power generation unit 1 and sends the phase to the phase voltage. In an embodiment as shown in FIG. 7, the Y connection is adopted, and A~B, A~C, and B~C are electrically conducted sequentially, so as to achieve the effect of sequentially changing phases and electrically conducting the coil winding.

10 In summation, the present invention complies with the patent application requirements, and thus is duly filed for patent application. While the invention is described in some detail hereinbelow with reference to certain illustrated embodiments, it is to be understood that there is no intent to limit it to those embodiments. On the contrary, the aim is to cover all modifications, alternatives and equivalents falling within
15 the spirit and scope of the invention as defined by the appended claims.

REFERENCE NUMERALS IN DRAWING FIGURES

Kinetic power generation units 1, 2, 3

Electric motor 1a

Power generator 1b

20 Stator 10

Wire slot 11

Exciting winding 12a

Field winding 12b

Rotor 20

25 Storage battery 30

DC brushless drive controller 40

Voltage regulator (AVR) 50

Transformer 60

Rectifier 70

WHAT IS CLAIMED IS:

1. A kinetic power generation unit, comprising an exciting coil winding of an electric motor and a field winding of a power generator installed alternately into a wire slot of a stator to constitute a same magnetic field; a
5 rotor installed in the stator, shared by the electric motor and the power generator, and installed coaxially with respect to each other, so that the rotor of the electric motor and the rotor of the power generator rotate in the same direction, and the exciting winding and the field winding change phases and are electrically conducted by a DC brushless drive controller to
10 drive the rotor to operate.
2. The kinetic power generation unit as claimed in claim 1, wherein the DC brushless drive controller has an input terminal coupled to a storage battery; a power output terminal of the kinetic power generation unit is coupled to a rectifier, and further coupled to the storage battery for
15 charging the storage battery after an outputted alternating current is rectified, and an AC power passing through a voltage regulator and a transformer is outputted for use; and the after power is supplied for use after the rotor is rotated.
3. The kinetic power generation unit as claimed in claim 1 or 2, wherein the
20 kinetic power generation unit comes with a plurality quantity, and the kinetic power generation units are shared by the rotor and coaxially installed with respect to each other.
4. The kinetic power generation unit as claimed in claim 1 or 2, wherein the
25 kinetic power generation unit uses a $\triangle$ connection, and a connection point of the coil winding between phases is a three-phase alternating current output point; the center point of each coil winding is a phase voltage input point, so as to complete the configuration of a three-phase

coil winding.

5. The kinetic power generation unit as claimed in claim 1 or 2, wherein the kinetic power generation unit uses a Y connection, and an end point of the coil winding of each phase is a power output point; a neutral point of the
5 coil winding uses a $\triangle$ connection, and the center point of the $\triangle$ connection is a phase voltage input point, so as to complete the configuration of a three-phase coil winding.
6. The kinetic power generation unit as claimed in claim 1 or 2, wherein the kinetic power generation unit uses a combination of $\triangle$ &Y connections,
10 and an end point of the Y connection in each phase is coupled to connection point between phases of the $\triangle$ connection, and the connection point between phases of the $\triangle$ connection is a three-phase alternating current output point, and the center point of each coil winding of the $\triangle$ connection is a phase voltage input point.