

REDUCED REACTION ROTARY ALTERNATING CURRENT GENERATOR

RELATED APPLICATION

[0001] This application claims the benefit of U.S. provisional patent application No. 61/960,752, filed Sep. 26, 2013, in the name of Paramahansa Tewari, the disclosure of which is incorporated herein by reference.

FIELD OF THE INVENTION

[0002] The present invention relates to a rotating alternating current generator whose structural characteristic provide for a reduction in the amount force running counter to the rotation of the machine as a reaction to the induced alternating current.

BACKGROUND OF THE INVENTION

[0003] Michael Faraday discovered the principles of electromagnetic induction and invented the rotating electrical generator in 1832. The generator was known as the Unipolar Generator, Acyclic Generator and Disk Generator. This generator operated on the principle that voltage is induced in a conductor in relative motion to an external magnetic field. Moreover, when the conductor is configured as a closed circuit and is in relative motion with an external magnetic field, a current will be induced to flow through that circuit. The induced current itself will generate an induced magnetic field surrounding the conductor. The direction of the induced current is determined by Fleming's right hand rule which states that the magnetic field produced by the current induced in the conductor will repel the external magnetic field which induced the current in the conductor. As such, the induced magnetic field surrounding the conductor and the external magnetic field repel each other so as to create a torque on the conductor which counters that conductor's movement relative to the external magnetic field. Faraday's generator and all subsequent generators have in common the production of this counter or back torque.

[0004] The efficiency of an electrical generator is governed by mechanical and electrical limitations. The mechanical limitations include windage and friction of the generator's rotor and bearings. The electrical limitations include electrical impedance within the windings of the generator as well as the above-described counter or back torque.

[0005] A prime mover is attached to a generator so as to cause the rotation of the generator's rotor resulting in the production of either a direct or an alternating current within the generator's conductor and a back torque which counters the rotation caused by the prime mover. The prime mover may be powered by steam, wind or water.

[0006] Therefore, the problem with standard generators is that their efficiency is limited due to back torque generated as a result of current induced within the generator's conductor windings.

DEFINITIONS

[0007] The following definitions are provided for convenience and are not to be taken as a limitation of the present invention.

[0008] Fleming's Left Hand Rule refers to the effect that when a current flows in a conductor and an external magnetic field is applied across that current flow, the conductor will experience a force perpendicular to both the external mag-

netic field and the direction of the current flow. The Left Hand Rule can be used to represent three mutually orthogonal axes using the thumb to represent a mechanical force, the first finger to represent a magnetic field and the middle finger to represent the current, each finger positioned at right angles to each other.

[0009] Synchronous generator refers to an electrical generator which turns at the same speed as the drive mechanism, also known as the synchronous speed. A synchronous generator produces an alternating current and voltage at a frequency proportional to the rotation speed and to the number of excitation poles internal to the generator.

[0010] Asynchronous generator refers to an alternating current generator that uses the principles of induction to produce power. Asynchronous generators operate by mechanically turning their rotor faster than the synchronous speed, giving negative slip.

[0011] Low carbon steel refers to steel containing less carbon than other steels. This steel is inherently easier to cold-form due to its soft and ductile nature.

[0012] Grain oriented electrical steel refers to sheet steel used for laminations in power transformers having a silicon level of 3% or less.

SUMMARY OF THE INVENTION

[0013] It is the primary purpose of the present invention to obviate the above problems by providing a reduced reaction rotating alternating current generator providing improvement in efficiency characteristics not currently available in standard alternating current generators.

[0014] To accomplish this objective, according to one embodiment of the present invention a reduced reaction alternating current generator is disclosed comprising a hollow stator core having an axis comprised of longitudinally positioned sheets laminated with a high permeability magnetic material, the laminated sheets including longitudinally embedded slots in which a conductor winding is laid parallel to the axis, a cylindrical rotor concentric with and positioned inside the hollow stator core comprised of a high permeability magnetic material and a shaft coupled to the rotor and driven by an external source so as to freely rotate the rotor relative to the hollow stator core. The generator furthermore comprising a first set of magnets in which the south pole of each magnet is coupled to the surface to the rotor and the north pole of each magnet is facing the inner surface of the hollow stator core, a second set of magnets in which the north pole of each magnet is coupled to the surface of the rotor and the south pole of each magnet is facing the inner surface of the hollow stator core and a set of silicon steel pieces coupled to the outer surface of the rotor comprised of individual silicon steel pieces positioned adjacent to and longitudinally in line with each individual magnet within the first set of magnets and each individual magnet within the second set of magnets.

[0015] In addition to the foregoing, other features, objects and advantages of the present invention will become apparent from the following description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] The following detailed description, given by way of example and not intended to limit the present invention solely thereto, will best be appreciated in conjunction with the accompanying drawings in which: