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Generation of Electricity from Fans

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***Abstract*—Fans are the most used items in India despite the widespread availability of Cooler's and air conditioners. Since the initial capital cost of solar systems is still quite high , when it comes to generate power for a domestic use and energy saving and energy generating is a major issue for mankind .This paper presents method of generating power by a ceiling fan . The generated power can be either used or can be stored in a battery for powering some other devices.**

***Keywords*—Alternator; dynamo; Electromagnetism.**

I. INTRODUCTION

World is a storehouse of energy. We all know that energy can neither be created nor be destroyed but can be transformed from one form to another. But we are wasting resources that can produce energy as if they are limitless. If we can renew and Reuse the energy we waste, it would help in some way to the problem of scarcity of energy, which is the major threat of present world. By using the concept of wind turbines Wind-generated electricity can be used for battery charging and for connection with the power grid. Beside every fan there is a tube light by a mechanism inside the fans motor or a belt that rotates and light up the bulb or store the energy in a battery which could be used to power up other machines.

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II. ELECTRICITY GENERATION

A motor converts electrical energy into mechanical energy of rotation. Some motors can be operated as generators to convert mechanical energy into electrical energy.

1. Dynamo - A device that makes direct current electric power using electromagnetism. It is also known as a generator; however the term generator normally refers to an "alternator" which creates AC (Alternative Current) power.

2. Generator - normally this term is used to describe an *alternator* which creates AC power using electromagnetism.

3. Stator - Fluctuating polarity creates a rotating magnetic field in the stator. The field crosses a 0.3.mm gap to induce a current in laminations in the rotor, which spins around the stationary stator.

4. Rotor -The angle at which the stator faces the rotor, the physical distance between the two, and the geometry of slots carved into each set of laminations combine to create two out-of-phase magnetic fields. The rotor spins because it repels the rotating magnetic field induced by the stator. Generators, Dynamos, and Batteries are the three tools necessary to create/store substantial amounts of electricity for human use.

III. ACTUAL CONCEPT

Wind turbine motor is used to generate electricity. Permanent magnet motor can be used as a generator for battery charging. The spinning shaft turns the electromagnets that are surrounded by heavy coils of copper wire inside generators. This creates a magnetic field, which causes the electrons in the copper wire to move from atom to atom, creating electricity. The voltage produced by a generator depends upon the number of turns in its coils, the strength of the magnet, and the rate at which the magnet turns. The more turns in the coils, the more voltage is produced.

AC dynamo which is used to generate current as shown in the Fig. II, it will be interconnected with a ceiling fan through a mechanism in which the rotating ceiling fan motor will rotate dynamo's shaft. It will be connected in such a way that as the number of rotations of ceiling fan increases the rotation of the shaft of AC dynamo increases, by the mean time the voltage is also generated. The voltage generated will be given to the charging circuit which will be converted to dc .Then it will be given to the 1 volt battery and by using an inverter circuit and a step up transformer this 1 volt may be converted to around 250 volts and used for other external purpose.

IV. CHARGING CIRCUIT

The Fig I show's a dynamo attached to a fan's motor for power generation [1]. The dynamo is attached to the fan's motor in such a way that it results in the rotational motion of the dynamo's shaft. This motion causes the dynamo to produce electrical energy. The dynamo output is given to the rectifier circuit and then to the voltage regulator and hence the dc regulated output is used for charging *3yNiMH (nickel metal hydride) Battery.

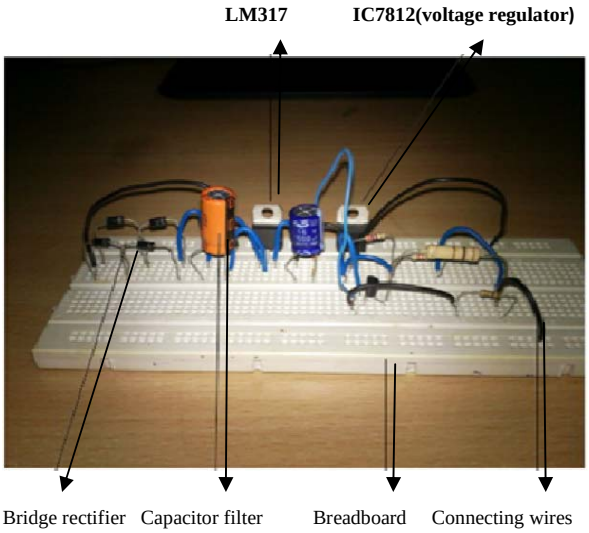

Fig. I Charging circuit

V. WHY DYNAMO ?

The Dynamo can be used to convert mechanical energy to electrical energy. Alternating current can be produced normally using the dynamo [3]. This current can be used to charge AC/DC devices directly instead of storing it in a battery and use the same. If suppose the devices are not in use, then the power generated can be stored in a battery. The amount of power generated from a dynamo is sufficient to power the devices, which require low power. Most of the electronic gadgets including mobile phones, iPods can be powered using this.

VI. DETAILED DESCRIPTION

A ceiling fan motor with a generator winding that mainly consists of a motor axle, a stator, and a rotor [1]. The stator is fixed on the motor axle. In this embodiment, the stator is formed by stacking a predetermined number of metal plates. The stator is surrounded with a plurality of first magnetizing coils, each of which is winded with a second magnetizing coil with a generator winding. The second magnetic coil detects the received EMF around it. The stator has a predetermined number of equally spaced coil arms in the perpendicular direction toward the motor axle. Each of the coil arms has a concave section for the corresponding first magnetizing coil to Wind around. The second magnetizing coil further Winds around the corresponding first magnetizing coil. In particular, each of the first magnetizing coils is electrically connected with an energy-saving driver controlling circuit. The energy-saving driver controlling circuit receives an input voltage and controls the electrical current phases of the first magnetizing coils. The second magnetizing coil is electrically connected with a power distribution controlling circuit for converting the back EMF detected and received by the second magnetizing coil into electrical power for output. The rotor is pivotally mounted on the motor axle through a bearing .In this embodiment, the rotor has several magnetic objects around the stator. The magnetic objects can be permanent magnets. The rotor is surrounded with several connecting parts for fixing a blade frame. The blade frame has several blades. The bottom of the blade frame is pivotally installed with an illuminating unit. In practice, each of the first magnetizing coils is driven by the input voltage to produce an induced magnetic field. The rotor is thus driven to rotate with respect to the stator and build up inertia. When the rotor rotates with respect to the stator, the rotor rotates and cuts through the magnetic lines. A back EMF is thus generated in the induced magnetic field. In this case, the second magnetizing coil on the stator detects the received EMF. The received EMF is converted by the power distribution controlling circuit into electrical power for output. In this embodiment, the power distribution controlling circuit is electrically connected with the illuminating unit at the bottom of the blade frame. The electrical power output from the power distribution controlling circuit can drive the illuminating unit at the bottom of the blade frame.

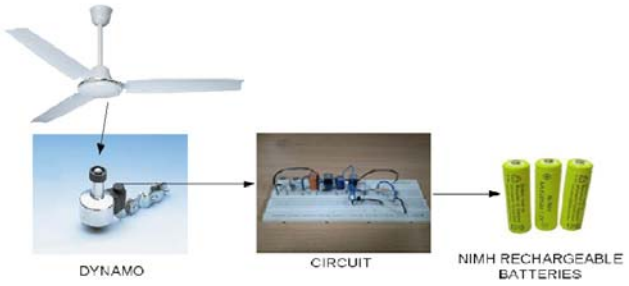

Fig. II Charging NiMH batteries using Dynamo

Therefore, the illuminating unit can produce light without additional electrical power. However, it should be mentioned that the energy saving driver con rolling circuit can convert external AC power into DC power, and eliminate the power supply noise interference. When the circuit is operating the energy-saving driver controlling circuit can detect the position of the rotor in rotation, and therefore determine the electrical current phases of individual first magnetizing coils. In this embodiment, the energy-saving driver controlling circuit has a predetermined number of Hall elements. Each of the Hall elements can detect the polarity of the rotator in rotation. The energy-saving driver controlling circuit can thus determine and control the electrical current phases of the first magnetizing coils for them to build up the inertia. The rotor can thus continue its rotation With respect to the stator. Moreover, the energy-saving driver controlling circuit provides an energy-saving control means, which uses the input voltage in an intermittent Way to start the energy saving driver controlling circuit. When the energy-saving driver

controlling circuit receives the input voltage, it controls the ON time of the first magnetizing coils. The rotor is driven to rotate With respect to the stator and maintain its inertia. When the energy-saving driver control ling circuit does not receive the input voltage, the rotor continues to rotate With respect to the stator due to inertia. In this case, the rotor still cuts through the magnetic lines and produces a back EMF. Therefore, even when the energy-saving driver controlling circuit does not receive the input voltage, the power distribution controlling circuit still uses the back EMF detected and received by the second magnetic coil to generate electrical power. This can effectively increase the power generating efficiency. In the above mentioned energy-saving control means, the power distribution circuit and the energy-saving driver controlling circuit have to cooperate closely in their signals. It differs from the previous embodiment in that the power distribution controlling circuit is electrically connected with a chargeable battery. The electrical power output from the power distribution controlling circuit charges the chargeable battery. The chargeable battery is further electrically connected with the energy-saving driver controlling circuit. When the external power supply stops supplying power, the chargeable battery can still supply power to the energy-saving driver controlling circuit. The power distribution controlling circuit is further electrically connected with an illuminating unit and a chargeable battery. The chargeable battery is electrically connected with the energy-saving driver controlling circuit. Therefore, the electrical power output from the power distribution controlling circuit can be used to drive the illuminating unit at the bottom of the blade frame and produce light. When the electrical power produced by the power distribution controlling circuit is greater than the power consumed by the illuminating unit, the excess power can be used to charge the chargeable battery. When the external power supply stops supplying power, the energy-saving driver controlling circuit can still operate normally under the power supply of the chargeable battery. The invention as disclosed above has the following advantages: The first magnetizing coil of the stator in the invention is directly Winded with a second magnetizing coil with a generator Winding. Therefore, it Achieves the effect of generating power without increasing too much of the motor load. According to the invention, the volume and cost of the invention can be greatly reduced. The first magnetizing coil and the second magnetizing coil share the magnetic objects on the rotor. Therefore, the production cost of the invention can be reduced. The invention uses the second magnetizing coil to detect and receive the back EMF produced because the rotor rotates and cuts through the magnetic lines. The back EMF is used by the power distribution controlling circuit to generate electrical power. Therefore, without additional power supply, the invention can light up an illuminating unit or charge a chargeable battery. Therefore, the invention can save energy and reduce the utility cost. The invention further uses an energy-saving means on the energy-saving driver controlling circuit to supply the input voltage in an intermittent Way to the energy-saving driver controlling circuit. This helps reducing the electrical power. When the energy-saving driver con trolling circuit does not receive the input voltage, the rotor still rotates With respect to the stator due to inertia and produces a back EMF. In this case, the power distribution controlling circuit can still use the back EMF detected and received by the second magnetizing coil to generate electrical power. This effectively increases the power generating efficiency of the invention.

VII. MODIFICATION

Various modifications of the disclosed embodiments, as well as alternative embodiments, will be apparent to people skilled in the art. Therefore, it is contemplated that the appended claims will cover all modifications that fall within the true scope of the invention. What is claimed is:

1. A ceiling fan motor with a generator winding comprising a stator and a rotor[4], wherein the stator is fixed on a motor axle and surrounded with a plurality of first magnetizing coils, each of which is winded with a second magnetizing coil With a generator winding; the rotor is pivotally mounted on the motor axle and has a plurality of magnetic objects around the stator; each of the first magnetizing coils is driven by an input voltage to generate an induced magnetic field for the rotor to rotate with respect to the stator; and the second magnetizing coil of the stator detects and receives a back electromotive force (EMF) produced as the rotor rotates and cuts through the magnetic lines and generates electrical power. The ceiling fan motor with a generator winding of claim 1, wherein the stator is formed with a predetermined number of equally spaced coil arms in the perpendicular direction to Ward the rotor axle, each of the coil arms has a concave section, and each of the first magnetizing coils.
2. Winds around the corresponding concave section of the coil arm.
3. The ceiling fan motor with a generator winding of claim further comprising an energy-saving driver controlling circuit and a power distribution controlling circuit, wherein the energy-saving driver controlling circuit is electrically connected with the first magnetizing coils and receives the input voltage to control the electrical current phases of the first magnetizing coils, driving the rotor to rotate with respect to the stator and build up an inertia, the power distribution controlling circuit is electrically connected with the second magnetizing coils for converting the back EMF detected and received by the second magnetizing coils into electrical power for output.
4. The ceiling fan motor with a generator winding of claim 3, wherein the energy- saving driver controlling circuit detects the position of the rotor in rotation and thereby determines and controls the electrical current phase of each of the magnetizing coils.
5. The ceiling fan motor with a generator winding of claim 3, where in the electrical power output from the power distribution controlling circuit drives an illuminating unit.
6. The ceiling fan motor with a generator winding of claim 3 Wherein the electrical power output from the power

distribution controlling circuit charges a chargeable battery that is electrically connected with the energy-saving driver controlling circuit.

7.The ceiling fan motor with a generator winding , wherein the electrical power output from the power distribution controlling circuit drives an illuminating unit and charges a chargeable battery[4], the chargeable battery being electrically connected with the energy-saving driver controlling circuit and the illuminating unit.

8. The ceiling fan motor with a generator winding of claim, wherein the energy-saving driver controlling circuit has an energy saving control means that uses the input voltage to inter- mediately start the energy-saving driver controlling circuit; the energy- saving driver controlling circuit controls the ON time of the first magnetizing coils when receiving the input voltage, driving the rotor to rotate with respect to the stator and maintain its inertia; and the rotor continues to rotate With respect to the stator due to inertia when the energy-saving driver controlling circuit does not receive the input voltage, and the rotor still cuts through magnetic lines and produces a back EMF so that the power distribution controlling circuit uses the back EMF detected and received by the second magnetizing coil to generate electrical power.

VIII. APPLICATIONS

1) Colleges, hospitals, hostels are equipped with at least 50 fans where this energy generating mechanism may be used to light up the tube lights or charge a battery and power up other devices like computers ,laptops etc.

2) In order to charge cell phone we need a mobile charging circuit which would give the appropriate voltage and current required for charging the mobile and will be helpful to middle class people to save energy and money.

IX. MERITS AND DEMERITS

MERITS

1) Low initial cost: - The initial cost of an electric motor is considerably lower than solar photovoltaic (PV) panels with the same Output.

2) No emissions of carbon dioxide (Co_2), mercury(Ag), nitrogen oxide (N_2), sulphur dioxide (Sio_2) or particulate matter into the air, water or soil and helps preserve and protect the environment for future generations.

3) Minimum maintenance cost once generators are constructed, they can operate efficiently without any problems for long period of time. Additionally, one need not have to check them on a regular basis and extra cost of generator maintenance can be avoided.

4) Reduces the cost to transmit electricity along power lines.

DEMERITS

1) The incorporation of dynamo's mechanism may reduce speed of the fan.

2) The electricity generated by the mechanism will be lesser than the electricity consumed by fan.

3) Energy loss is too high.

X. CONCLUSION

At a time when there is crisis casting its shadows all over the world one has to look into alternate renewable sources. One such alternate way to generate power is presented in this paper .The rotational energy of the dynamo, can be used to operate several small powered devices. Both dynamo and alternator can be used. The various applications where this power can be used are charging of laptops, cell phones etc.

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