Door Based Power Generation

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***Abstract*— The aim of our concept is used to produce the electric current through the gate model of revolving gate with less mechanical effort, and it is known as the revolving gate power generation. Nowadays power demand is increased, so this project is used to generate the electrical power in order to compensate the electric power demand.**

INTRODUCTION

Man has needed and used energy at an increasing rate for his sustenance and well-being ever since he came on earth a few million years ago. Primitive man required energy primarily in the form of food. He derived this by eating plants or animals, which he hunted. Subsequently he discovered fire and his energy needs for cooking as well as for keeping himself warm. He added a new dimension to the use of energy by domesticating and training animals to work for him. Door based power generation unit is specially planned for utilizing the available non-conventional energy source. That is tremendously available energy in low intensity with ample quantity can be utilized. It converts reciprocating motion into rotary motion. The rotational power is stored in flywheel and flywheel rotate alternator that generate electricity. This invention relates to means for utilizing the surplus energy which is expanded by opening and closing the doors, by causing that surplus energy to be applied to the generation of power for employment in useful manner. This source of power can be used at the mall, hotels, colleges and most likely at the ATM machine rooms.

LITERATURE REVIEW

Shubham Nikam.R analysed the Design and Fabrication of Door based power generation**.** As the world move forward in various fields like research and development; conservation of energy is a major issue to be resolved. To meet load demand, renewable energy and some unconventional source of energy can provide the necessary amount of clean energy for atmosphere stabilization and scale down the consumption of fossil fuel. Due to shortage of power in the rural areas as well as developing cities saving of energy is a vital factor so we have to save the energy whenever as possible. In this paper, prospect and usefulness of "Power Generation by using Revolving Door" has been reviewed. The objectives of this paper is to designed fabricated of a miniature revolving door which can generate energy by amplifying the initial RPM of door shaft that harnesses human motion and change it as electricity.A need of saving conventional energy sources leads to use of a new energy sources. As the world is advance in various fields like research and development, conservation of energy is very important aspect. To conserve energy we have taken the step and introducing a new concept of electricity generation with the help of revolving doors. As the world facing hazardous challenges from global warming due to liberation of green house gases during power generation by conventional sources, the projects provides eco-friendly power generation by human force to push the door. Prototype of Power Generating Revolving Door is specially planned to design and fabricate for utilizing the available non-conventional energy source. So, objective of this project is to use human effort for generating electricity. By this arrangement, the minimum power output obtained is 0.024 watts at 1 Revolution per 5 seconds and maximum power obtained is 0.2 watts at 1 Revolution per 2 seconds. The maximum and minimum rotations of the door observed are 30 RPM and 12 RPM.In this concept conversion of mechanical energy from opening a door into electrical energy for backup power supply is studied. The green energy solution makes use of an everyday occurrence to protect against intermitted power loss. The energy you expend by pushing a revolving door you can convert into electrical energy that is usable.

For example at Hospitals, Banks, Post offices, Hotels or the use of door is frequent etc.

DESCRIPTION OF EQUIPMENT

Frame

The metal frame is generally made of mild steelbars for machining, suitable for lightly stressed components including studs, bolts, gears and shafts. It can be case-hardened to improve wear resistance. They are available in bright rounds, squares and flats, and hot rolled rounds Suitable machining allowances should therefore be added when ordering. It does not contain any additions for enhancing mechanical or machining properties. Bright drawn mild steel is an improved quality material, free of scale, and has been cold worked (drawn or rolled) to size. It is produced to close dimensional tolerances. Straightness and flatness are better than black steel. It is more suitable for repetition precision machining. Bright drawn steel has more consistent hardness, and increased tensile strength. Bright steel can also be obtained in precision turned or ground form if desired.

Spur Gear

Spur gears or straight-cut gears are the simplest type of gear. They consist of a cylinder or disk with teeth projecting radially. Though the teeth are not straight-sided (but usually of special form to achieve a constant drive ratio, mainly involute but less commonly cycloidal), the edge of each tooth is straight and aligned parallel to the axis of rotation. These gears mesh together correctly only if fitted to parallel shafts. No axial thrust is created by the tooth loads. Spur gears are excellent at moderate speeds but tend to be noisy at high speeds

Shaft

Shaft is a common and important machine element. It is a rotating member, in general, has a circular cross-section and is used to transmit power. The shaft may be hollow or solid. The shaft is supported on bearings and it rotates a set of gears or pulleys for the purpose of power transmission. The shaft is generally acted upon by bending moment, torsion and axial force. Design of shaft primarily involves in determining stresses at critical point in the shaft that is arising due to aforementioned loading. Other two similar forms of a shaft are axle and spindle. Axle is a non-rotating member used for supporting rotating wheels etc. and do not transmit any torque. Spindle is simply defined as a short shaft. 8.1.2 Standard sizes of Shafts Typical sizes of solid shaft that are available in the market are, Up to 25 mm 0.5 mm increments 25 to 50 mm 1.0 mm increments 50 to 100 mm 2.0 mm increments 100 to 200 mm 5.0 mm increments 8.1.3 Material for Shafts The ferrous, non-ferrous materials and non metals are used as shaft material depending on the application. Hot-rolled plain carbon steel. These materials are least expensive. Since it is hot rolled, scaling is always present on the surface and machining is required to make the surface smooth

LED light

A LED lamp or LED light is an electric light for use in light fixtures that produces light using light emitting diode (LED). LED lamps have a lifespan and electrical efficiency which are ten times greater than incandescent lamp, and are significantly more efficient than most fluorescent lamps with some LED chips able to emit up to 303 lumens per watt (as claimed by Cree and some other LED manufacturers). However, an LED lamp will never be as efficient as the LED chips it uses, due to losses from the LED driver that is required to use LEDs on mains voltage (or on the mains supply). The most efficient commercially LED lamps have efficiencies of 200 lumens per watt (lm/w). Commercially available LED chips have efficiencies of over 220 lm/w. The LED lamp market is projected to grow by more than twelve-fold over the next decade, from $2 billion in the beginning of 2014 to $25 billion in 2023, a compound annual growth rate (CAGR) of 25%. As of 2016, LEDs use only about 10% of the energy an incandescent lamp requires.

DC generator

A dc generator is an electrical machine which converts mechanical energy into direct current electricity. This energy conversion is based on the principle of production of dynamically induced emf. Although a far greater percentage of the electrical machines in service are a.c. machines, the d.c. machines are of considerable industrial importance. The principal advantage of the d.c machine, particularly the d.c. motor, is that it provides a fine control of speed. Such an advantage is not claimed by any a.c. motor. However, d.c. generators are not as common as they used to be, because direct current,

when required, is mainly obtained from an a.c. supply by the use of rectifiers. Nevertheless, an understanding of d.c. generator is important because it represents a logical introduction to the behavior of d.c. motors. Indeed many d.c. motors in industry actually operate as d.c. generators for a brief period. In this chapter, we shall deal with various aspects of d.c. generators.

WORKING PRINCIPLE

Revolving gate is used for power generation it is reliability and much more efficiency. Design is simplified because, No pointing mechanism is required to allow for shifting revolve direction and the gate is self starting. The rotation of the gate and the gear which is fixed on the gate shaft on the below, the gear rotation will transmit the rotation to the dynamo. When the dynamo is rotated it generates the electrical power supply.

The generated voltage is the alternate voltage. The AC voltage given to rectifier circuit to convert into DC voltage. Then the rectified voltage is given to filter circuit to remove the ripple voltage. After the filtration the pure DC voltage is given to battery through the charging circuit. The stored DC voltage is used to different application. Through this way electric energy is generated and compensated the electric demands.

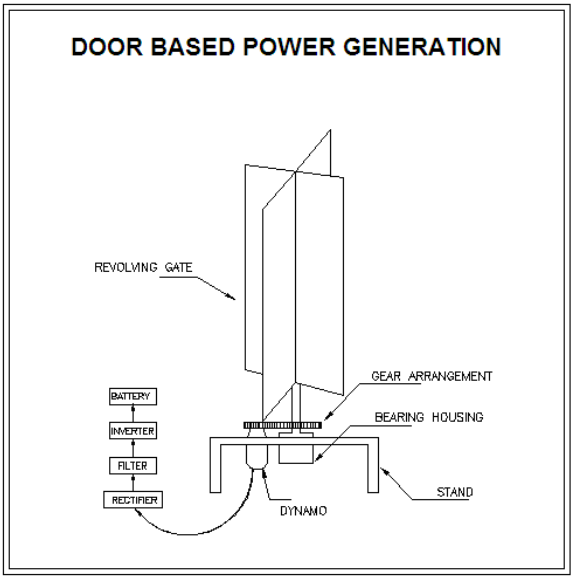

Fig 1.Working principle of Door based power generation.

MERITS & DEMERITS

MERITS

- Alternate power generating unit.
- Easy installation
- Maintenance cost is less
- Non polluting
- Occupying very little space

DEMERITS

- Technical persons required for construction
- Proper rectifiers required for charging Battery

CONCLUSION

The need of designing and manufacturing such a system, which will make the Door operation somewhat flexible, also the energy being absorbed by the generation system will be utilized to convert it in to electricity. We conclude that the energy which is going waste one or the other way can be utilized to generate power using simple mechanism. As today's world is completely dependent on different types of energies and these energies are going to disappear or exhaust one or the other day so we need to use free energy in order to run our basic appliances which require electricity for its working.

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