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Power Generation by Revolving Door

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***Abstract:** 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.*

I. INTRODUCTION

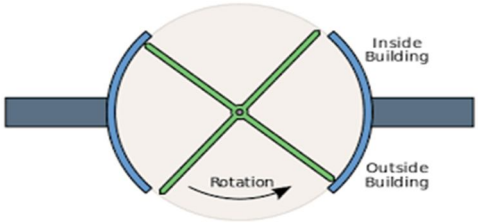
Energy is vital for the progress of a nation and it has to be conserved in a most proficient manner. Not only the technologies should be developed to produce energy in almost environmentfriendly manner but we have to obtain from all varieties of fuels and also utmost should be given to conserve the energy resources in the most efficient way. Energy is the ultimate factor responsible for both industrial and agricultural development. The renewable Energy technology to meet the energy demands have been steadily increasing for the past few years, however, the important drawbacks associated with renewable. Energy systems are their inability to guarantee reliability and their lean nature. In today's world meeting means for producing energy by conventional methods are declining day by day. Door based power generation unit is specially planned to design and fabricate the conversion unit for utilizing the available non-conventional energy source. That is tremendously available energy in low intensity with ample quantity can be utilized. This machine converts reciprocating motion in to rotary motion. The rotational power is stored in flywheel & flywheel rotate alternator that generate electricity. The men coming on the path apply the impact force or thrust on the projected mechanism. This impact pressure energy can be utilized to operate the rack and pinion gearing and through the train of pulleys can operate the fly wheel, which stores the energy and utilizes it for continuous rotation of the generator operating pulley and belt transmission system. This source of power can be used at the malls, colleges or hotels and most likely by the hospitals door operating systems. Also by accumulating this low intensity electricity in batteries, it can be supplied to the big villages or in towns where scarcity of electric supply. This invention relates to means for utilizing the surplus energy which is expended by persons using revolving doors, turnstiles and the like, by causing that surplus energy to be applied to the generation of power for employment in useful manner. From observation in large buildings equipped with revolving doors, as also at railway stations, ferry houses, amusement parks and other places whose entrances are guarded by turnstiles, a considerable amount of man power, in excess of that required, is communicated in the form of impulses to these devices for their rotation, and that some of this surplus force be put into useful effect. Therefore the invention consists of mounting a power wheel co-axially with relation to a revolving element, such as a revolving door or turnstile and providing a pawl on said power wheel for engagement by said revolving element to communicate to the power wheel, the impulses received by the revolving element in the manual operation of the latter. Energy thus imparted to the power wheel is to be transmitted there from by suitable means Power Generation By Using Revolving Door Sanjay Ghodawat Polytechnic, Atigre either for the generation of electricity or otherwise for work purpose man has needed and used energy at an increasing rate for his sustenance and well being ever since he came on the 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 increased as he started to make use of wood and other bio mass to supply the energy needs for cooking as well as for keeping himself warm. With the passage of time, man started to cultivate land for agriculture. He added a new dimension to the use of energy by domesticating and training animals to work for him. With further demand for energy, man began to use the wind for sailing ships and for driving windmills, and the force of falling water to turn water for sailing ships and for driving windmills, and the force of falling water to turn water wheels. Till this time, it would not be wrong to say that the sun was supplying all the energy needs of man either directly or indirectly and that man was using only renewable sources of energy.Now a day's interest in shopping malls is widely increasing among people. In the present shopping malls, customers find various difficulties. Those difficulties are mentioned below. One third of major shoppers buys groceries on a budget. Most of the times, it is only at the end of purchase shoppers come to know that the overall purchase total is greater than their budget. Then they spend much time in searching for

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II. SYSTEM DISCRIPTION

The revolving gate is constructed for extracting power through gear, pinion and motor arrangement. And this system is divided into two parts; First part is revolving door part which is above the ground level and the second part which is energy generating and storage part which is below the ground level. The advantage of the second part to stay below the ground level is reduces the noise. Fig.1. displays the top view of the revolving door.



The material of the outer frame and the material for the revolving door are chosen to bimetal plates with thickness of 3mm. The main purpose behind the material selection is to enhance the capability of the rotating door, and the other reason for the material selection is the availability of the material itself. The compartment under the revolving doors designed as housing for the gear mesh and the dc generator. The rechargeable batteries are connected with dc generator to store the power. This generated power is been utilized for lamps to light up and many more things.

A. Battery



The AC supply is applied to 12V step down transformer. The transformer output is the 12V AC which is rectified using a diode bridge. The output of Diode Bridge of 5V DC is filtered by capacitors.

B. Genrator Motor



III. PRINCIPAL OF OPERATION

Diagram of a simple alternator with a rotating magnetic core (rotor) and stationary wire (stator) also showing the current induced in the stator by the rotating magnetic field of the rotor. A conductor moving relative to a magnetic field develops an electromotive force (EMF) in it (Faraday's Law). This EMF reverses its polarity when it moves under magnetic poles of opposite polarity. Typically, a rotating magnet, called the rotor turns within a stationary set of conductors wound in coils on an iron core, called the stator. The field cuts across the conductors, generating an induced EMF (electromotive force), as the mechanical input causes the rotor to turn. The rotating magnetic field induces an AC voltage in the stator windings. Since the currents in the stator windings vary in step with the position of the rotor, an alternator is a synchronous generator. The rotor's magnetic field may be produced by permanent magnets, or by a field coil electromagnet.

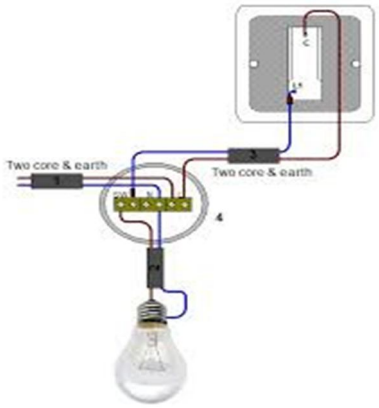
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Automotive alternators use a rotor winding which allows control of the alternator's generated voltage by varying the current in the rotor field winding. Permanent magnet machines avoid the loss due to magnetizing current in the rotor, but are restricted in size, due to the cost of the magnet material.

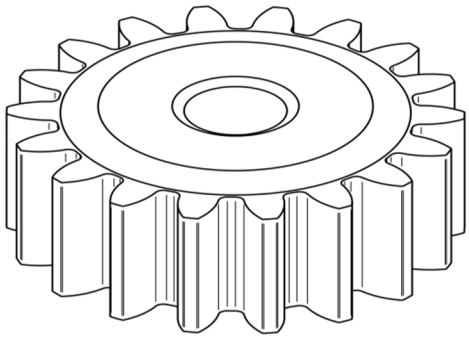
Since the permanent magnet field is constant, the terminal voltage varies directly with the speed of the generator. Brushless AC generators are usually larger than those used in automotive applications. An automatic voltage control device controls the field current to keep output voltage constant. If the output voltage from the stationary armature coils drops due to an increase in demand, more current is fed into the rotating field coils through the voltage regulator (VR). This increases the magnetic field around the field coils which induces a greater voltage in the armature coils. Thus, the output voltage is brought back up to its original value. Alternators used in central power stations also control the field current to regulate reactive power and to help stabilize the power system against the effects of momentary faults. Often there are three sets of stator windings, physically offset so that the rotating magnetic field produces a three phase current, displaced by one-third of a period with respect to each other.

A. One Way Circuit



A one way lighting circuit is a simple circuit that enables one circuit to be turned on or off with one switch. The single circuit may have one or more lights in it. This type of circuit uses a one way switch. A wiring diagram is shown to the right, and a circuit diagram below.

B. Spur Gear

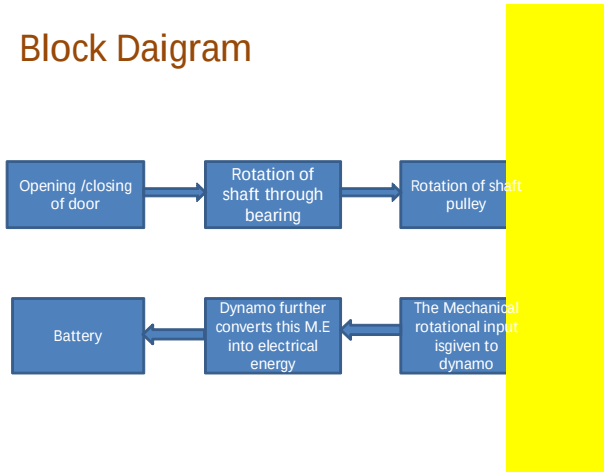


They consist of a cylinder or disk with teeth projecting radially. Though the teeth are not straight-sided but usually of special form to achieve a constant drive ratio, mainly involute but less commonly cycloidal, the edge of each tooth is straight and aligned parallel to the axis of rotation. These 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.

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IV. CONSTRUCTION AND WORKING



The revolving door produces power by harnessing energy that dissipated when human walked through the door. When any person will push the gate either direction the electricity will be produced through the generator attached with the gear base mechanism. As people use the door, the integrated gears connected to the central axis of door revolve. Due to the gear ratio the rotation given to the door has increased about 92 times, which is applied to the motor shaft. The electricity generated from the mechanism will be stored in the rechargeable battery and it will be used for supplying the electricity to the electrical appliances that is the lights and many other appliances. A DC motor coupled with the integrated gears produce electricity. In that case the dc generator attached with the door covert the mechanical power into the electrical power. The gear arrangement is to be used with the generator to increase the rpm of generator so that the maximum amount of power we will have as an output. This generated power is stored in the number of batteries.



A. Application

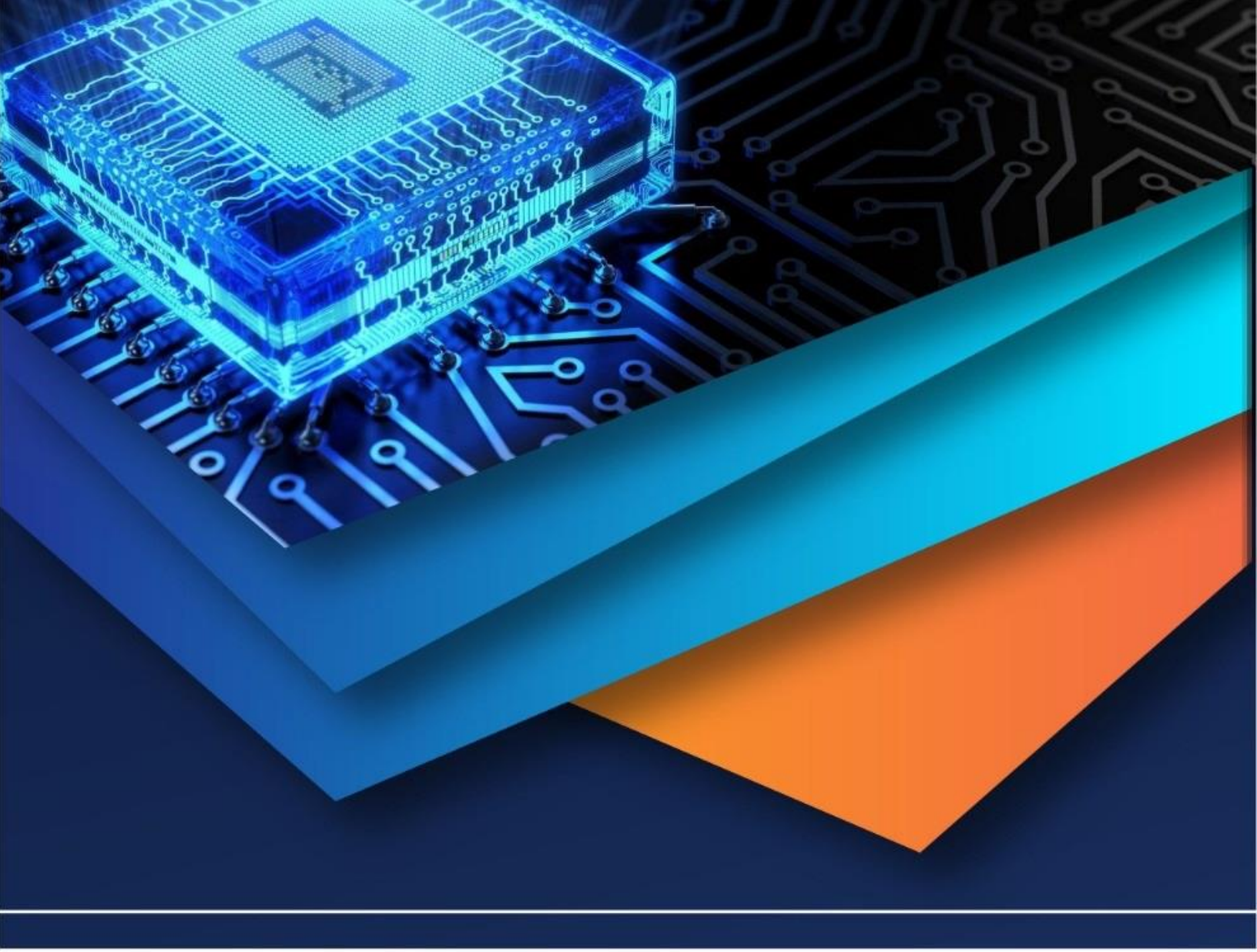
1) Colleges
2) Schools
3) Cinema theaters
4) Shopping complex
5) Railway station
6) Airports
7) Societies, etc

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REFERENCES

[1] https://kupdf.com/download/electrical-power-generation-from- revolving-door-in-park-place_598b536edc0d60a05b300d1c_pdf
[2] Bisoyi B., Das B., Adapting Green Technology for Optimal Deployment of Renewable Energy Resources and to Generate Power for Future Sustainability, Indian Journal of Science and Technology 8(28) (2015).
[3] Jacobson M.Z., Delucchi M.A., Providing all global energy with wind, water, and solar power, Part I: Technologies, energy resources, quantities and areas of infrastructure, and materials, Energy Policy 39(3) (2011), 1154–1569.
[4] Fridleifsson I.B., Status of geothermal energy amongst the world's energy sources, Geothermic 32(4) (2003), 379–388.
[5] Reddy K.P., Rao M.V.G., Modeling and simulation of hybrid wind solar energy system using MPPT, Indian Journal of Science and Technology 8(23) (2015), 71–77.
[6] Prawesh Meshram, Akshay Kasurkar, Pullawar P.V., Development in Energy Harvesting System Using Escalator & Four Way Door Mechanism, International Journal of Advanced Research in Science, Engineering and Technology 4(4) (2017).
[7] Ahamed R., Rashid M.M., Islam J., Javed A., Yusof H.M., Energy Generation from Revolving Door, Indian Journal of Science and Technology 9(19) (2016).
[8] Edam B., Boon Edam introduces the world's first energy generating revolving door (2008).
[9] http: // www.ijrtsm.com© International Journal of Recent Technology Science & Management

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