Power Generation By Magnetic Pendulum

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Abstract- *The Power demand in India has been increasing day by day. There is also demand for alternate energy source which is cheap compared to other regular energy sources. Here the conversion of oscillatory motion to rotary motion is made by use of pendulum setup and the mechanical energy converted into electrical energy. The rotary effect of our machine is enhanced by using gear mechanism that is composed of shaft with a DC generator. Magnets are placed on both pendulum as well as supporting frame to get the repulsion force. This setup of system is efficient and eco-friendly.*

Keywords- Pendulum, Magnet, crank mechanism, battery, gears

I. INTRODUCTION

All around the world people are trying to generate new form of energy to satisfy their needs. Energy is the primary and most universal measure of all kinds of work by human beings and nature. Generally energy harvesting using natural resources like wind, water, solar etc. is entirely different from that of conventional source energy such as fossil fuels etc. Energy has been recognized as one of the important factor for economic growth and human needs. In recent years consumption of energy in India is increasing rapidly. Hence the man has been search of new form of energy from the renewable sources. In this paper we convert oscillatory motion to rotary motion by using slider offset crank mechanism. And the magnets has been placed on pendulum and as well as on supporting frame to get the repelling motion. The flywheel is attached with shaft which consists of gear mechanism and dynamo to generate electricity.to keep the process in continuous motion we make use of input source. The output obtained from the system will be of two outputs, one can be used like a feedback system which charges the input battery and the output source can used for further applications. And we also use flywheel for the further extra work like lifting weights.

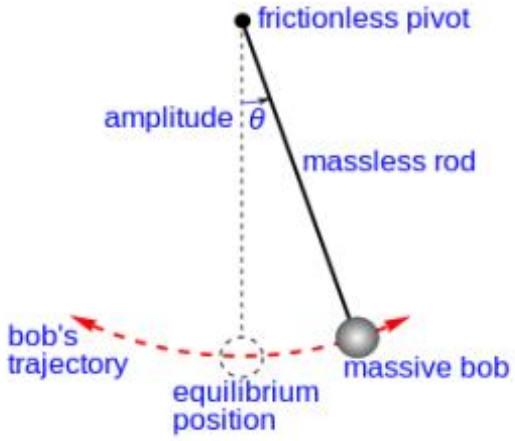
II. LITERATURE SURVEY

[1] In this paper an experiment has been carried out in order to convert oscillatory motion of the simple pendulum into rotatory motion.**[2]**In this paper the pendulum power generator is the machine which converts the motion of pendulum. Both sides of the supporting frame are attached by the fixed magnet of opposite poles & both side of the pendulum is attached by the magnet of opposite poles this alternative energy source offers benefits such as easy deploying, low installation cost and maintenance systems, and less operating cost. In terms of operational lifetime, installation cost and reliability, we use this concept so a Pendulum Power Generator is considered as a promising alternate for traditional power sources. **[3]** A magnetic pendulum motion based power generator operates its motion with low maintenance providing voltage output from oscillating mechanical structure. In this paper the reciprocating effect of our device is enhanced by using gear mechanism that is composed of shaft with a dynamo.

III. TERMINOLOGY OF MAGNETIC PENDULUM POWER GENERATOR

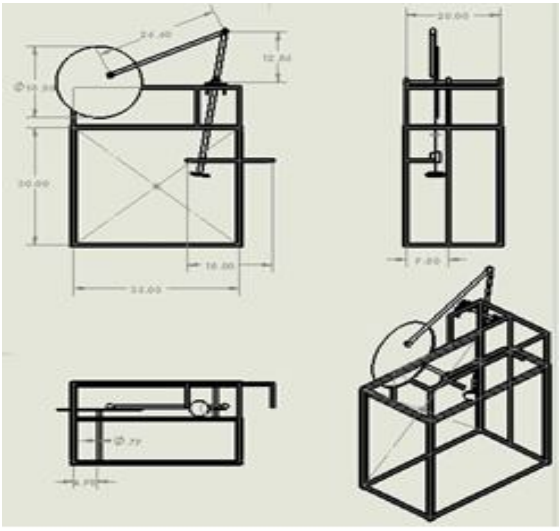
Newton 1st Law: An object at rest will remain at rest unless acted on by an unbalanced force. An object in motion continues in motion with the same speed and in the same direction unless acted upon by an unbalanced force. This law is also called as law of inertia.

Pendulum:
The weight suspended freely from a pivot so that it can swing freely is known as pendulum. When pendulum is moved from its resting position it will be subjected to restoring force due to the gravitational force acted upon it, so that the pendulum will be in oscillating motion. The time period of pendulum depends upon the width of pendulum swing, length of the pendulum and also to slight degree of the amplitude.



- Amplitude: - The amplitude of a simple pendulum is defined as the maximum angular deviation from the mean position of the bob.
- Oscillations: - when the pendulum moves from one extreme position to the other and back to the original position it is said to have performed one oscillation.
- Time Period: - The time period of the simple pendulum is defined as the time required by the pendulum to complete one oscillation.
- Frequency: - The frequency of the simple pendulum is defined as the number of oscillations performed per unit time.

IV. EXPERIMENTAL SETUP AND COMPONENTS USED



Conceptual design

1. Neodymium Magnets: these are the member of rare earth family and most powerful magnet in the world. This magnet produces a high magnetic field it consist of four magnets two fixed on the pendulum and other two placed on both left and right at equal distances from center these magnet have the high strength to repel pendulum bob.

2. Supporting frame: It is a non-magnetic material frame to support the circuit components of 2.5 feet height and 3 feet length to support the pendulum in motion. It is well fixed with nut and bolts to the base which is made up of MS square tube. At the focal point of the supporting casing, pendulum is connected such that, it will permit the constant movement of the pendulum with no impedance.

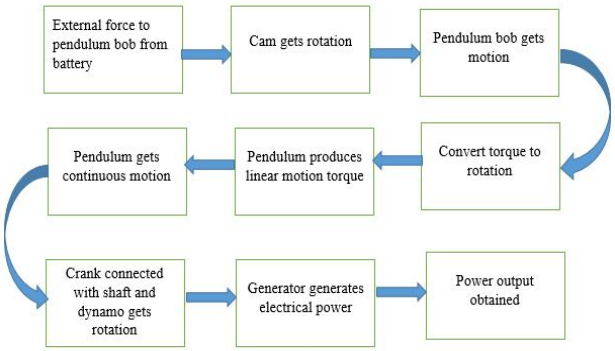
3. Flywheel disc: disc plate is utilized to change over round movement into responding movement it is comprised of gentle steel plate.

4. Spur gears: The spur gears, which are intended to transmit movement and power between parallel shafts, are the most temperate riggings in the power transmission industry. The disc shaft combined with the generator by utilizing gear adapt course of action with the rigging proportion over 3 so the generator creates maximum voltages.

5. DC generator: A DC generator is an electrical machine which changes over mechanical energy into electricity. This energy change depends on the guideline of generation of powerfully actuated EMF. 12v DC generator is brought which is fit for delivering the electricity.

Fabricated model

V. WORKING OPERATION

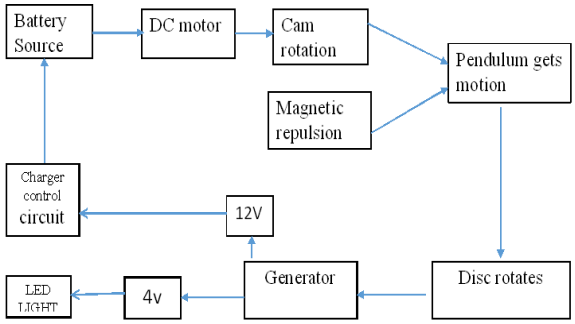


Proposed System

This model will be generating power from the real time dynamic movements. when the pendulum is disturbed from its initial position it swings back and forth. The anti-pendulum power generator is the machine which converts the motion of pendulum i.e. mechanical energy into electrical energy. In this model the pendulum which is joined on a level bar moves freely on the surface. The pendulum moves between the settled magnets with similar polarity. Both side of the pendulum are attached with the magnet. When pendulum starts moving the rod connected to the pendulum also starts rotating, the flywheel connected to pendulum with the help of slider Crank mechanism also starts to rotate. In this way the mechanical energy of pendulum is transferred to Flywheel. Flywheel is connected to the generator. The mechanical energy of flywheel is converted into electrical energy with the help of generator. To further keep the device in continuous motion we use external source battery connected to the cam which keeps pendulum in oscillatory motion. The electrical energy is stored in the battery with the help of capacitor circuit.

VI. RESULTS

In this working model one form of motion is converted into another form. The source of input is pendulum which is oscillatory motion that is converted to rotatory motion with the help of spur gear pulleys and generator .So finally rotatory motion is converted into electricity with the help of dc generator. Through generated electrical energy a 3W DC LED lamp can be lightened and is also used for different applications.



Line process of system

VII. ADVANTAGES

1. It required small area for installation of this setup.
2. It requires less maintenance work.
3. It is Environment friendly.
4. It can installed in any place quickly as compare to solar, wind and other type of plant.
5. It can be used in remote areas where power supply is not available.

VIII. APPLICATIONS

The conversion of oscillation to rotary motion can be applied:

1. Lightning garden.
2. Mobile charging.
3. Portable FM radio.

IX. CONCLUSIONS

Nowadays, demand of electricity in India is more than the supply as source of raw materials like,coal etc. are disappearing quickly. To solve this issue an investigation on working model of pendulum has been performed related to generation of electricity. There are various applications like it can be used in rural areas of India where electricity is not available in suitable amount, in cyclone prone areas, in urban areas by using them in place of tube-lights, bulbs which reduces the amount of power consumed. In future, best results can be obtained from this model by varying the dimensions and specifications.

X. SCOPE FOR FUTURE WORK

It is noted that this generator produces an extra 4 volts which can be even increased by following measures.

- Optimizing the frictional losses from the gears and crank mechanisms so as to give better efficiency.

- Structural fabrication should be more accurate in order to have proper functions of pendulum.
- By using large size magnets the oscillation of pendulum increases.

XI. ACKNOWLEDGEMENT

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