

Fabrication of Pendulum Machine for Generation of Electricity through Oscillation Motion

Dhawal Bodhankar¹, Ankit Chauvhan², Santosh Rahangadale³, Gaurav Uprikar⁴, Sangram Deshmukh⁵, Prof. Swapnil Choudhary⁶

¹⁻⁵Author, Student, Wainganga College of Engineering & Management, Nagpur, India

⁶Author, Assistant Professor, Wainganga College of Engineering & Management, Nagpur, India

Abstract – Energy requirement of the world is increasing day by day for the reason that of utilization of energy at a generously proportioned size with the population enlargement. This paper is about generating power by using a move backwards and forwards in such a way that when it swings the mechanical energy is generated and it is converted into electrical energy by pendulum and is stored in a battery.

The manufacture is such a way that, the swinging action makes the horizontal beam rotating through an angle. This paper explains the effect of creating the free energy in the device made of:

- Oscillating pendulum-lever system.
- System for initiating and maintaining the oscillation of the pendulum
- System which uses the energy of the device by damping the oscillation of the lever.

Serbian inventor has invented, patented and developed series of such machines based on two-stage oscillator for producing energy. The operation of the machine is based on forced oscillation of the pendulum, since the axis of the pendulum affects one of the arms of the two-armed lever by a force which varies periodically.

Part of the total oscillation energy of the pendulum-lever system can be changed into work for operating a pump, a press, rotor of an electric generator or some other user system. The effect of creating the free energy is defined in this study as the difference between the energy which is the machine transfers to the user system by the lever and the energy which is input from the environment in order to maintain the oscillation of the pendulum. Appearance of the free energy is not in accordance with the energy conservation law.

Key Words: pendulum, pendulum-lever, oscillation energy, battery, etc

1. INTRODUCTION

The patented two-stage mechanical oscillator technology invented by Veljko Milkovic, It can be used today as a mechanical amplifier for clean energy applications. Current applications are limited include a mechanical

hammer, press, water pump, transmission and electric generation. The two-Stage mechanical oscillator process is like no other and is a proven demonstration to show a higher efficient transformation of a smaller force in to a bigger forced rotation. Currently there is no known mechanical water pump method that is more efficient than the Milkovic two stage oscillator's process. As per the syllabus of Final Year Mechanical Engineering project is mandatory. We get knowledge about various manufacturing processes such As casting, forging, welding, extrusion, rolling etc. All types of machines, their designs, metrology, metallurgy, theory of machines, tool Engg. In addition we have gone through one month vocational training in which we got knowledge about actual manufacturing practices and procedures in industries. While selecting the project we had two alternatives, first one was theoretical project and second one was manufacturing projector a working model. We have chosen the manufacturing type of project because we had to understand the difficulties in design and manufacturing. At first we try for doing a sponsored project from a company from our Mahalaxmi Fabricators Manish Nagar, Nagpur. Which consisted of design and manufacturing for energy generation by two stage mechanical oscillators. But we are failed to get sponsorship. So, finally we decided the project at 'uttam tools' as these members are familiar with us also they have guided us for this project.

2. DESIGN

A) Pendulum Bar:

A pendulum is a weight suspended from a pivot so that it can swing freely. When a pendulum is displaced sideways from its resting equilibrium position, it is subject to a restoring force due to gravity that will accelerate it back toward the equilibrium position. When released, the restoring force combined with the pendulum's mass causes it to oscillate about the equilibrium position.

Specification:

L = 410 mm

W = 2.5 kg

A = 12100 mm²

t = 20 mm

B) Upper Arm:

Pendulum bar is attached to the upper horizontal bar. This is made from mild steel, its horizontal hollow rectangular bar balanced to the hinge plate with help of hinge pin.

Specification:

L = 1000 mm
b = 45 mm

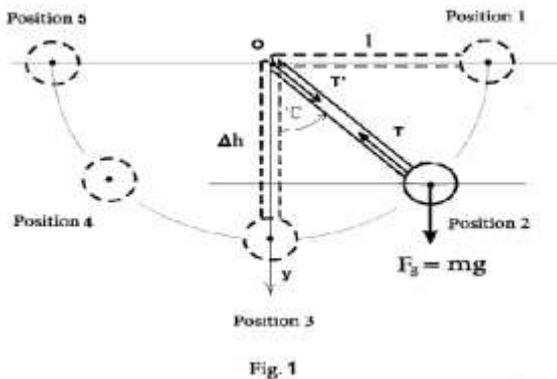


Fig.2.1 Pendulum Design

C) Antifriction Bearing:

A machine element that permits free motion between moving and fixed parts Antifriction bearings are essential to mechanized equipment; they hold or guide moving machine parts and minimize friction and wear.

Specification:

Bearing Diameter:
OD = 50 mm
ID = 20 mm

D) Rack & Pinion:

A rack and pinion is a type of linear actuator that comprises a pair of gears which convert rotational motion into linear motion.

Specification:

L = 110 mm
No. of Teeth on Rack = 37
b = 25 mm
No. of Teeth on Pinion = 18
t = 11 mm

E) Spur Gear:

A gear or cogwheel is a rotating machine part having cut teeth, or cogs, which mesh with another toothed part in order to transmit torque, in most cases with teeth on the one gear being of identical shape, and often also with that shape on the other gear. Two or more gears working in tandem are called a transmission and can produce a mechanical advantage through a gear ratio and thus may be considered a simple machine. Geared devices can

change the speed, torque, and direction of a power. The most common situation is for a gear to mesh with another gear; however, a gear can also mesh with a non-rotating toothed part, called a rack, thereby producing translation instead of rotation.

The gears in a transmission are analogous to the

Specification:

No. Of Teeth on Spur = 96
Outer Dia of Spur = 130
Inner Dia of Spur = 110

F) Dynamometer:

A dynamometer consists of an absorption (or absorber/driver) unit, and usually includes a means for measuring torque and rotational speed. An absorption unit consists of some type of rotor in housing. The rotor is coupled to the engine or other equipment under test and is free to rotate at whatever speed is required for the test.

G) LED (Light- Emitting Diode):

A light-emitting diode (LED) is a two-lead semiconductor light source that resembles a basic pn-junction diode, except that an LED also emits light. When an LED's anode lead has a voltage that is more positive than its cathode lead by at least the LED's forward voltage drop, current flows. Electrons are able to recombine with holes within the device, releasing energy in the form of photons. This effect is called electroluminescence, and the color of the light (corresponding to the energy of the photon) is determined by the energy band of the semiconductor.

3. CONSTRUCTION:

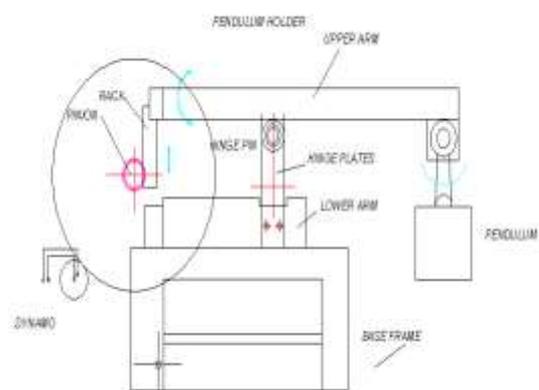


Fig.3.1 Construction

Above fig shows Fabrication of Pendulum Machine for Generation of Electricity Through Oscillation Motion consists of number of parts. Overall components mounted on base frame, hinge plate connected between upper arm and lower arm. The lower arm mounted on base frame. The upper arm of one end is connected to the pendulum through nut & bolt and bearing arrangement. The upper arm having horizontal frame, the other end of the upper

arm, rack and pinion arrangement provided. At the same shaft of pinion gear mounted and this gear connected to the dynamometer shaft.

4. WORKING:



Fig 4.1 Experimental Set Up

Electricity generated through oscillatory motion. Initially manually force applied on pendulum bar which is connected on one end of the upper arm. The pendulum bar moves left to right or right to left in an oscillatory motion. When pendulum moves towards left side the upper arm moves downward direction with the help of hinge pin, which is provided between upper arm and lower arm. But when upper arm moves in downward direction the other end of upper arm rack and pinion arrangement provided. The rack moves in downward direction on pinion. The rack and pinion shaft connected to the worn gear which is mounted on same shaft. The rack and pinion gives the motion to worn gear and the worn gear mesh with dynamometer shaft and electricity generated.

In this project kinetic energy of pendulum converted into mechanical energy through rack and pinion arrangement and mechanical energy converted into electrical energy through dynamometer.

5. ADVANTAGES:

a. Eco-friendly:

This project do not produced any type of pollution such as, water, air noise.

b. Less Energy Consumption:

It's no need to apply continuous force on a pendulum bar. We can apply force at specific time interval.

c. Greater Efficiency:

Less moving parts due to less energy loss, therefore more efficiency

d. Initial and Maintenance Cost Is Low:

Because simple in design in design and less part used due to maintenance cost is low.

e. Renewable Energy Sources:

Because it does not depend on non renewable energy source

6. APPLICATION:

The electric energy required for industrial work, It also uses in house work, day life working and domestic applications. For example, electricity used for lightening purpose, for domestic appliances like Refrigeration, AC, Industrial purposes.

7. CONCLUSION:

In addition to renewable technologies, using this energy generation method it is efficient also an important part of moving to a clean energy future. Efficiency is the cheapest and easiest way to reduce electricity use and facilitate the transition to renewable technologies. We conclude that by the oscillatory pendulum motion can generate the electricity which is pollution free, which can be easily available at very low cost. If produced at large level we further improved the efficiency of model by making further modification. The efficiency of the model is also increases by further modification.

REFERENCES

- [1] Mr. Jayawant Goykar1 Mr. Sagar Vibhute Mr. Suryakant Alvekar Mr. Ranjit Rendalkar Mr. Rohit Patil , "An Overview of Electrical Energy Generation by using Swing" International Journal for Scientific Research & Development (March-2017)
- [2] Mithun Gajbhiye1, Mayuri Boke, Akshay Kelwadkar, Prof. Sandeep Mude, "An Overview of) Electrical Energy Harvesting By Using Pendulum Power Generator" International Research Journal of Engineering and Technology (Feb-2016)
- [3] Rajat, Sonu and S.K.Mude, Electrical Energy Generation by using Pendulum Motion, International Journal of Advance Research, Ideas and Innovations in Technology, 8 (262), 2012, 300-392.
- [4] Manjunath K and Suresh P, Swing Electricity Generation System, International journal of specific progress and research, 444 (462), 2015, 385-450.
- [5] Shastri and Bharath, The Power of Swing, International journal published under the patent corporation treaty, 4645(292), 2009, 1-24.
- [6] Gokul and Cyril John Tellis, Design and Fabrication of Human Power Swing for Electricity Generation, Recent Innovation in Science and Engineering, 3(92), 2016, 624-710.
- [7] S. Pandian, A Human Power Conversion System Based on Children's Play, Technology and Society of journal ISTAS, 66 (566), 2004, 50-122.
- [8] T. Starner, Human-Powered Wearable Computing, IBM Systems Journal, 35 (323) 1996, 618-629.