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EFFECTIVE POWER GENERATION FROM SWING

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ABSTRACT

Energy need of the world is growing day by day because of consumption of energy at a larger extent with the population growth. This paper is about generating power by using a swing in such a way that when it swings he mechanical energy is generated and it is converted into electrical energy by commutator. The constructions is such a way that ,the swinging action makes the horizontal beam rotating through an angle. Shaft is connected to dynamo for transfer motion which rotate proportionally with respect to angle of motion of swing. The angular movement is converted into a complete rotation with help of chain drive connecting both small pulley and big pulley. The big pulley is connected to shaft which in turn rotates dynamo arrangement to generate electricity.

I. INTRODUCTION

So, this is our small step to improve this situation by our project without electricity. For reduction of carbon dioxide emission, renewable energies are considered as proper alternative energy (Selvaraj, R. S and ivamadhavi. V. 2010). Renewable energies mainly refer to the wind, solar, biomass and marine currents which are less harmful to environment, attracting a wide attention of researchers in design and development of renewable energy conversion systems. Although improvement of renewable energy converters is in a fast rate, the systems to extract the wasted energy in conventional energy conversion systems are not developed as much as its technologies. In many systems and processes, dissipation of energy is inevitable whatever renewable or conventional energy was used.

Energy is the ability to do work. It is a driving force of modern societies and generation and utilization of energy are essential for the socio economic development. Per capita consumption of energy levels are often considered a good measure of economic development. In recent years, energy scarcity has become a serious problem due to depletion of non-renewable energy sources, increasing population, globalization of energy intensive economic development, environmental pollution, and global warming. In this paper, it is proposed to harness the human muscle power of children playing in public spaces such as school playgrounds, on equipment such as teeter totters, swings, and merry-go-rounds. Such an energy conversion is playful and hence does not require deliberate effort.

For human power conversion systems to be useful in the context of developing countries, several constraints need to be considered like low cost, low-resource and limited-skills requirements, low-maintenance, safety and comfort to humans, and environment-friendliness. Human power conversion is easily achieved from children's play under conditions where the children are static relative to the moving playground mechanism, such as seesaw, swing, and merry-go-round. Where the children are in a dynamic state relative to a static mechanism (e.g., swing) it will be difficult to employ cost-effective human power conversion techniques due to considerations of safety and simplicity. A variety of mechanisms are used for conversion of human power to usable electrical or mechanical energy like springs, hydraulic components, electric generators, piezoelectric, compressed air systems, flywheels, and so on. The factors affecting the choice of the most suitable conversion mechanism are similar to those for the general energy conversion problem. Human power was perhaps the earliest source of energy known to mankind. Its first uses were in tool-making, rowing boat, and so on. Mechanized uses of human power were achieved in the form of hand cranking by the Romans. However, pedaling which is a simpler and less tiresome means of human power conversion did not come about until the 19th century with the invention of the bicycle.

OBJECTIVES

1) Taking safety as prime consideration: This device is safer in all respects.



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- 2) To make a complete mechanical device: The idea is to make a device which does not uses any electrical power so that it is wholly independent of its own.
- 3) To make a device which can be used where the current is not present and hill stations.
- 4) To utilization the force or the energy which is use less or unknown.
- 5) To reduce the human effort.
- 6) To develop a device this can make work simple.
- 7) To develop a device which can run cost efficient

II. LITERATURE SURVEY

1. Electrical Energy Harvesting By Using Pendulum Power Generator Mithun Gajbhiye, Mayuri Boke, Akshay Kelwadkar, Prof. Sandeep Mude Volume: 03 Issue: 02 | Feb-2016

Abstract: -

The more power demand has been occurring now a day in India. The main reason of the power demand is due to the lack of improper energy utilization and conservation. The pendulum generator deals with the power generation from the mechanical energy that has been wasted in many day today real time applications. The pendulum setup has been made, that is whenever it has been kicked off the kinetic energy of ball makes the pendulum to oscillate, generates the electrical energy. We can implement the pendulum based power generation system in real time application wherever the vibration produced. We can implement a pendulum based power generator is most efficient & eco friendly power generator. The pendulum power generator is the motion of pendulum i.e. mechanical energy into electrical energy. This is most helpful source or machine for power generation in today.

2. FOOTSTEP POWER GENERATION Abhinav C Raj, Basil Baby, Krishnapriya K B , Vishnumaya T S , Neema S Volume: 06 Issue: 06 | June 2019

Abstract -

The demand of energy is increasing day by day, so the ultimate solution to deal with these sorts of problems is just to implement the renewable sources of energy .Humans are using the renewable energy which are solar, wind etc. but we still could not satisfy our power needs, because of that we have to generate electricity through each and every possible ways. The objective of this work is to produce power through footsteps as a source of renewable energy that we can obtained while walking or standing on to the certain arrangements like footpaths, stairs, plate forms and these systems can be install specially in the more populated areas. In this project the force energy is produced by human foot step and force energy is converted into mechanical energy by the rack and pinion mechanism and electricity is produced by DC generator. We are studying existing methods of foot step power generation that are rack and pinion arrangement and supposed to modify the existing system.

3. Gravity Based Power Generation R.S. Shinde, Manish Kasare, Kishan Kande, Rohit Pande, Sumit Vishvambhare Volume: 07 Issue: 07 | July 2020

Abstract -

Conserving energy has become the biggest issue in the scenario. Due to the development and modernization, the electricity demand is increasing to a high extent. to fulfil this demand globally which is without any harmful effect on the environment is possible by using gravity-based power generation. There are many energies around us like solar power, wind energy, tidal energy, hydro energy, thermal energy, gravity energy. And during this project, we are employing gravitational energy to get electric energy. With the assistance of this energy, we will generate power for light loads like street lamps in colonies because of an outage of power. This power is reliable compare to solar energy we'd like to store that power and this power can access any time anywhere like lift, on the terrace of the building. The basic concept of using gravity base power generation mechanism is when a body moves from higher altitude to lower one its potential energy is converted into kinetic energy. This motion is converted into circular motion and this motion is converted into electrical energy



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7. Fabrication of Pendulum Machine for Generation of Electricity through Oscillation Motion Dhawal Bodhankar, Ankit Chauvhan, Santosh Rahangadale, Gaurav Uprikar, Sangram

Deshmukh, Prof. Swapnil Choudhary Volume: 07 Issue: 04 | Apr 2020IRJET

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:

a) Oscillating pendulum-lever system.

b) System for initiating and maintaining the oscillation of the pendulum

c) 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.

5. Design, fabrication and experimentation of swing electricity power generation system Juntakan Taweekun ,Saba arif ,Mas Fawzi ,Nor Zelawati Binti Asmuin , Mohd Faizal Mohideen Batcha, Zamri Noranai sciencepubco.com/index.php/IJET

Abstract

Energy need of today's world is growing day by day because of consumption of larger extent of electricity due to growing population. Project is about generation of electricity by swing. Large number of children play in a playground, part of the power of their play caused by swing can be usefully harnessed resulting in significant energy storage. Yielded energy can be converted to electrical energy to be utilized for many applications. Oscillatory motion of swing is transferred to shaft attached, which further transfers its angular motion to rotary motion of the flywheel, rigidly connected at the end. The flywheel is connected to a generator by specific transmission to conserve and increase the speed at generator end. The generator converts the mechanical energy into electrical energy to be utilized for many applications. Current swing is able to generate enough electricity to power a 15 W DC fan and a 9 W DC bulb. The method provides a lowcost, low-resource means of electricity generation, especially for use in developing countries.

III. MANUFACTURING PROCESS

The process of conversion of raw material in to finished products using the three resources as Man, machine and finished sub-components. Manufacturing is the term by which we transform resource inputs to create Useful goods and services as outputs. Manufacturing can also be said as an intentional act of producing something useful. The transformation process is shown below-





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It s the phase after the design. Hence referring to those values we will plan The various processes using the following machines:-

- **1.** Universal lathe
- 2. Milling machine
- **3.** Grinding machine
- 4. Power saw
- 5. Drill machine
- 6. Electric arc welding machine

STRUCTURAL DESIGN METHODS

This describes some of the mathematical technique used by designers of complex structures. Mathematical models and analysis are briefly describe and detail description is given of the finite – element method of structural analysis. Solution techniques are presented for static, dynamic & model analysis problems. As part of the design procedure the designer must be analyses the entire structure and some of its components. To perform this analysis the designer will develop mathematical models of structure that are approximation of the real structure, these models are used to determine the important parameters in the design. The type of structural model the designer uses depends on the information that is needed and the type of analysis the designer can perform.

Three types of structural models are

- 1. **Rigid Members:** The entire structure or parts of the structure are considered to be rigid, hence no deformation can occur in these members.
- 2. **Flexible members**: The entire structure or parts of the structure are modeled by members that can deform, but in limited ways. Examples of this members trusses, beams and plates.
- 3. **Continuum**: A continuum model of structure is the most general, since few if any mathematical assumptions about the behavior of the structure need to be made prior to making a continuum model. A continuum member is based on the full three dimensional equations of continuum models.

In selecting a model of the structure, the designer also must consider type of analysis to be performed. Four typical analysis that designers perform are :

- 1. **Static equilibrium**: In this analysis the designer is trying to the determine the overall forces and moments that the design will undergo. The analysis is usually done with a rigid members of model of structure and is the simplest analysis to perform.
- 2. **Deformation**: This analysis is concerned with how much the structure will move when operating under the design loads. This analysis is usually done with flexible members.
- 3. **Stress** : In this analysis the designers wants a very detailed picture of where and at what level the stresses are in the design. This analysis usually done with continuum members.
- 4. **Frequency** : This analysis is concerned with determining the natural frequencies and made shape of a structure. This analysis can be done with either flexible members of a structure. This analysis can be done with either flexible members or continuum members but now the mass of the members is included in the analysis.

The subject of MACHINE DESIGN deals with the art of designing machine of structure.

A machine is a combination of resistance bodies with successfully constrained relative motions which is used for transforming other forms of energy into mechanical energy or transmitting and modifying available design is to create new and better machines or structures and improving the existing ones such that it will convert and control motions either with or without transmitting power. It is the practical application of machinery to the design and construction of machine and structure. In order to design simple component satisfactorily, a sound knowledge of applied science is essential. In addition, strength and properties of materials including some metrological are of prime importance. Knowledge of theory of machine and other branch of applied mechanics is also required in order to know the velocity. Acceleration and inertia force of the various links in motion, mechanics of machinery involve the design.



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SWING OPERATED POWER GENERATION





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The Swing Human Powered Generator will receive mechanical energy generated by children, which will then be converted into electricity. The electricity will then be either stored in a battery or directly connected to the DC House with the former having a higher probability of occurring in the final design.

During the forward stroke & backward stroke of swing some torque is induced in shaft. The shaft is mounted between two bearings. At one end of the shaft a large pulley is attached and the smaller pulley is attached to the dynamo. The construction of the swing model is shown in the Fig. When the seating of the swing set moves forward & backward some torque is induced in the shaft by the holding bars of swing set. This torque displaces the larger pulley which is pivoted over axis of shaft causing the angular displacement. This angular movement is converted to rotational motion. The big pulley rotates and transmit the power to smaller pulley with the help rope drive which runs the dynamo, thus producing the electricity. The electricity thus produced is stored in a battery by using electric circuits

V. **ADVANTAGES**

- 1. Easy in operation.
- 2. Low cost
- 3. Simple construction.
- 4. Adaptable.
- 5. High capacity.
- 6. Performance.
- 7. Manually operated.
- 8. Environmental friendly.
- 9. Easy to setup
- 10. Light weight.
- 11. Easy maintenance.
- 12. No operated required.
- 13. Children will have great fun.
- 14. With the perspective of entertainment.
- 15. Kid's energy is utilized to obtain current.

VI. **APPLICATION**

- 1) To generate small amount of power.
- 2) We can attach this mechanism to any garden play instrument.

Applications of the developed model are:

- > Schools
- ➤ Nurseries
- > Parks
- ➤ Gardens
- > Playgrounds
- ➤ House

VII. **FUTURE SCOPE**

It is way of life "Things change constantly and the way of civilization has progressed have come to the present state. Perfection is rather a difficult thing to achieve and there is always scope for improvement."

Such play can be designed to withstand heavy weight to increase the output of the. More suitable and compact mechanisms can enhance the efficiency.

We feel the project that we have done has a good future scope in any public places. The main constraint of this device is the high initial cost but has low operating costs.

Savings resulting from the use of this device will make it pay for itself with in short period of time & it can be a great companion in any field dealing with rusted and unused metals.

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The device affords plenty of scope for modifications, further improvements & operational efficiency, which should make it commercially available & attractive. If taken up for commercial production and marketed properly, we are sure it will be accepted in the in global world.

VIII. CONCLUSION

To make a complete mechanical device which does not uses any electrical power so that it is wholly independent of its own, Beneficial for people staying in hilly stations, where the power is main problem and for household uses which results an easy way of generation of power

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