DOUBLE OSCILLATING MECHANISM

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ABSTRACT: As we know nowadays the main problem in the rural areas of our country is electricity or energy. So we have decided to make a convenient and efficient machine which is capable to generate electricity and supply it to the rural parts of the country. This is the machine whose objective is to generate electricity from Gravity Energy which is easily available. Input to this machine is movement of the pendulum due to gravity, which is freely available. And this motion of the pendulum is converted into usable mechanical or electrical energy. This way we get continuous energy.

INTRODUCTION

The basic concept of this project is to convert one form of motion to the other form of motion (here the conversion is from oscillatory to reciprocating). Here we are using the energy which is freely available and we are surrounded by the same which is termed as Gravitational Energy**.**To utilize this gravitational energy we used a pendulum for using its continuous oscillating motion. Once the pendulum is provided with initial input for motion, it remains in oscillation for some time due to the inertia and gravity.We came across a mechanism called Two Stage Oscillating Mechanism which was invented by Sir Veljko Milkovic from Serbia in the year 1999 which converts vertical oscillation motion of the Pendulum to horizontal oscillation of lever which can be converted into various motions according to the requirement e.g. Rotary or Reciprocating. This motion will be of great help in our daily life.Once the pendulum is provided with initial motion, it remains in oscillation for some time which is sufficient for transferring the energy to the lever. The highlight of this mechanism is the amount of input energy required is very less and the energy obtained is very high.The research done till today is concentrated on the working and effectiveness of the mechanism only. Considering all of the advantages of the mechanism it was decided to use it for lifting water with the help of reciprocating pump such that the input to the mechanism is given by humans which is comparatively less than the effort applied by humans to lift water using hand pumps directly.

OBJECTIVES

As students of Mechanical Engineering, it is very important to apply theoretical knowledge gained from the polytechnic into practical application. The main objective of our project is to utilize the energy from gravity effectively in various applications (Viz. Pumping Water, Hammering, Electricity Generation etc.)The prototype we have made is intended to Reduce the Human efforts to lift water using hand pumps by using the Double Oscillating Mechanism as an attachment to conventional hand pumps. This mechanism consists of a Pendulum and

set of links which converts the oscillation of pendulum into reciprocating motion which will drive the pump. The input here would be the human efforts required to swing the pendulum which would give output in form of pumping of water.Our aim is to not only make a working prototype but also to study the behaviour of the mechanism under varying circumstances and also its various other possible applications.Irrespective of success of the model, we also expect to learn things practically about fabrication, application of various manufacturing processes etc. and also the problems arising at time of manufacturing and solving the same at that point of time.

So to summarize the objectives:

- To utilize Gravitational Energy available ample in the atmosphere.

- Design and manufacture a device that makes pumping easy and with less efforts.

- Cost efficient Solution.

- Build a non-polluting device.

- Renewable Power source.

Background

Useful work from the gravitational force cannot be obtained more than once. Once potential energy of the mass is turned into kinetic it can be spent for some useful work or turned back into potential energy again. To allow pendulum to continue swinging its kinetic energy must be left to turn into potential energy again. So, how any useful work can be obtained from gravity energy then? If it was possible to turn gravity off after all potential energy was spent and then move mass up again and then turn gravity on, perpetual mobile would be created. However, nobody was able to turn gravity off yet, but it is well known fact that artificial gravity effects can be created by using rotation and inertia of the system. This is used in space stations. Some of these effects can be found in gravity converter machine constructed by a Serbian inventor Veljko Milkovic.

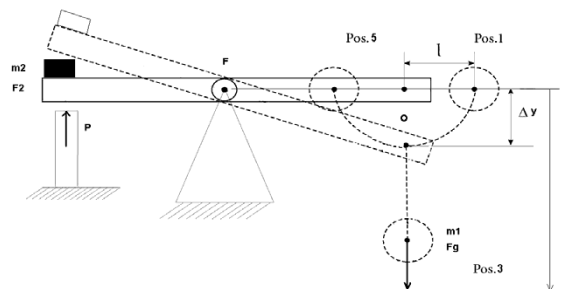Below is two-stage oscillator consisted of a lever and pendulum attached to it.

Figure 4.

- Pendulum starts from position 1. To come to that position some external work has to be done equal to raising potential energy of the pendulum from the zero (from position 3) up to $Ep = m1\ g\ l$ in position 1. On the left side of the lever, a weight with mass $m2$ is in place.
- This mass must always be greater than mass $m1$ of the pendulum in order to be able to prevail and press down if both arms of the lever have the same length as in Figure (1). It is a mistake to believe that this oscillator works like lever on the scale and has both

masses equal. Masses could be equal if right arm were shorter than left one. Here lever with two equal arms will be examined. If someone wanted to make oscillator with right arm shorter he should take mass *m1* greater in the same proportion to balance moments of the forces.

PROPOSED SYSTEM
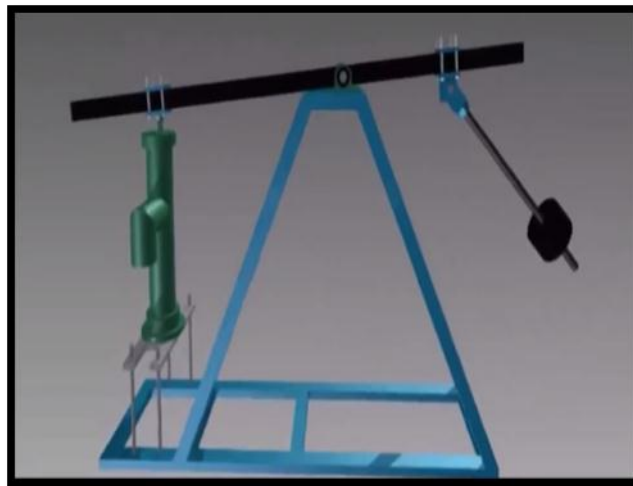
This is the photo of our design named PENDULUM PUMP

It contains following parts as labeled above:

- The Frame

- The Pendulum

- Pendulum Bracket (Acting as the swivelling point of the pendulum)

- The Lever

- Pedestal Bearings (Acting as the pivot for lever)

- Connecting Rod Bracket

- Connecting Rod

- The Reciprocating Pump

- The Counter Weights

5.1 Construction of the model:

- It consists of a frame on which all the components are mounted.

- Pedestal bearing are mounted on frame on which the lever is mounted.

- One end of the lever contains the pendulum and other end the connecting rod which is further connected to the rod of the pump.

- The Pendulum & connection rod assemblies are made to be held in position with use of four nut bolts on each side.

- The connection rod is connected to the rod of pump with use of nut and bolts.

- The counter weights attached on the other side of pump for working of the mechanism

CALCULATIONS

Basics for calculations:

Well known fact from the mechanics is that energy in pendulum will swing between potential and kinetic energy. Once potential energy reach its maximum kinetic energy would come to zero as velocity become zero in two extreme points, one on the right and second on the left side. Kinetic energy will have its maximum when potential energy has its minimum and it is in vertical low position of the pendulum. Here velocity is also in the maximum.

Another fact from the physics is that anybody which moves along curved path has acceleration and if body has acceleration it means that a force acts upon it. The force which caused body to curve is puling inside and was named as Centripetal force. It could be any force in nature as gravitational force which caused rotation of the planets around the Sun or electrostatic force which keeps orbiting electrons around the core of atom. In the case of the pendulum that force is inside the handle and is named Reaction force. Weight of the pendulum bob and Reaction force in the pendulum handle are only real forces in the pendulum system if pendulum pivot was fixed.

According to the Newton's third law which says that every action has its reaction in opposite direction and of the same intensity, the force opposite to Centripetal force which prevents curving indefinitely and falling into a center is named Centrifugal force. These two forces are in the balance if body moves harmoniously like moving along the circle.

Theory of Pendulum:

In this model only real forces are taken into calculations. In the Fig. 1 can be seen two forces: Weight Fg and reaction in the handle T. Summary force R is displayed as broken into two components: Normal N and tangential Ft, see Fig. 2.
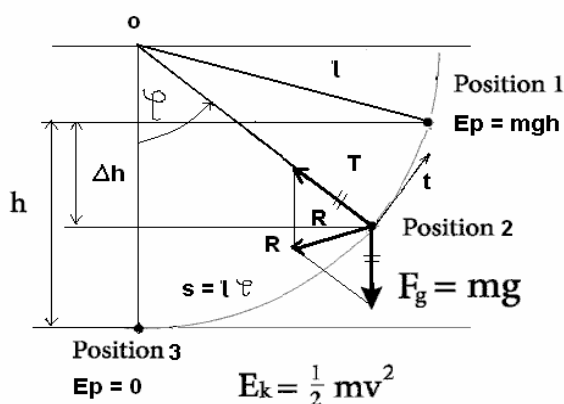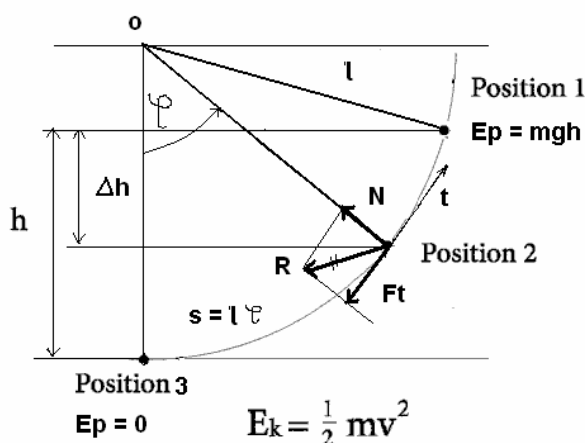

Fig. 1

Fig. 2

CONCLUSION

The wonderful journey of "Project" with a positive outcome comes to a pleasant end. It gave us a great opportunity to express ourselves to the massive technical ocean of knowledge.We realised what reality is and it clearly justifies the proverb "FAILURE is the First step to SUCCESS". All through the time, we came across lot of ups and downs, broken a set up couple of times but the moral support given by our Guide and Mentors really rejuvenated us.Along with this, it also gave us opportunity to meet experts in the technical fields which changed the way of thinking towards practicality of things.We can say that after this, we are confident enough to take up challenges in the highly competent Industrial world.

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