

Design and Fabrication of Power Generation Using Gravitational Force

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ABSTRACT

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There are various kinds of non-renewable and renewable resources present on our planet. Many of them are being utilized within the generation process. Now a days the requirement of electrical energy is increasing vigorously and hence we must increase our generation capacity of energy. But as maximum generation is finished using renewable resources which are the limited source of energy. Hence the necessity of latest reasonably resource is increasing which must be constant and never-ending resource of energy, therefore the Gravity or Gravitational energy is the aid for this need of resource. it's limitless sort of energy present everywhere the world. It will be utilized within the sort of energy resource and may be converted within the electrical type of energy.

I. INTRODUCTION

During the previous few decades power requirement has reached to high extent, for various purposes, Because of ever increasing population, development and modernization. Power is harnessed through various methods using Renewable energy source or Non-Renewable energy source. But all this method won't produce electricity, all have their own limitations and energy is grasped only in a specific quantity and just for some extent. Therefore, there is vital need for having a source which might generate power overcoming these limitations. Gravity is one such source which may serve our purpose. attractive force is force that draws any object with mass. The first objective is to supply a gravity power generation mechanism which might continuously convert

gravity P.E. into kinetic energy. This motion is converted into circular motion and is then converted into electricity using a generator. Thus during this paper we are mainly concerned with study of power generation employing a technique which produces power from gravity force. Gravity engine could be a free energy generator that apparently harnesses power of gravity and use it to form mechanical work.

II. PROPOSED METHODOLOGY

An apparatus which generates power from the gravitational forces is sole concept of this project. The load within the right section of the system is these sources of mechanical energy. This mechanical energy is converted into mechanical energy of the gears. At initial the weights is placed on height and

hang to chain then it provides acceleration to dynamo through gears and power is generated. Generation by gravity may be a new concept, during which generation is finished with the assistance of gravity. A dead Weight is main a part of the principle without it the system can't be run. When the dead weight is hanged to height then it attracted or pulled by gravity in linear motion at downward motion. This motion is converted in move and this motion is given to dynamo. Then dynamo generates electricity. Here, because the weight increase, the generation will increase dead weight generation.

III. CONSTRUCTION

The assembly consists of gears, shaft and chain. Gears are called as cogwheel. It's a rotating machine parts having cut teeth, or cogs which mesh with another toothed parts to transmitted torque. Geared devices can change the speed, torque and direction of power source. The teeth on the meshing gears all have the identical shape. Two or more meshing gears, working in sequence are called a gear train. Gears, sprocket, bearing, etc are mounted on the shaft. On these shafts spur and pinion gears are mounted. There are three spurs and 4 pinion gears. Spur gears are accustomed make compound gear train. A compound gear train could be a system within which there aren't any. of gears fix together and mounted geared box. When there are two gears are connected solidly on one shaft then it's called compound gear train.

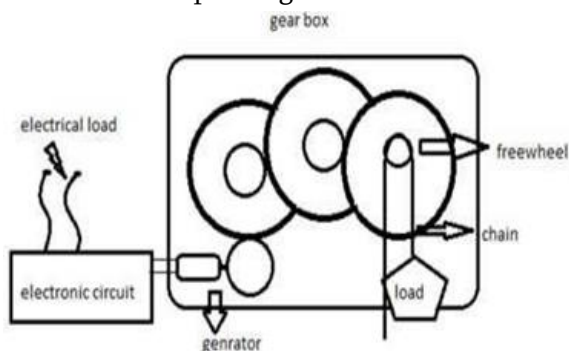


Fig 1 Schematic diagram of system

Normally this kind of compound gear train is employed to alter the revolutions of the system either from higher revolutions to lower or from lower to higher revolutions. We used compound gear train to convert lower revolution to higher revolutions. On low rotation side a free wheel is solidly connected to gear, on which a sequence is placed. A dead weight is hanged to chain. on this dead weight gravitational pull will act, thanks to gravitational pull the dead weight will move in linear motion i.e., from higher attitude to lower attitude. This movement of dead weight is converted into rotary rotation by gear train, and convert its lower rotation is converted into higher revolution and given to dynamo. Then dynamo generates electricity which is further used for several applications.



Fig 2 Power generation of system by gravity

IV. GEAR DESIGN CALCULATIONS

$$\begin{aligned}
 \text{The Pitch Diameter (D)} &= 48\text{mm} \quad \text{The Pitch Radius (R)} \\
 &= D/2 = 24 \\
 \text{The Base Circle Diameter (DB)} &= D * \cos(\phi) \\
 &= 48 * \cos(20^\circ) \\
 &= 45.105
 \end{aligned}$$

The Base Circle Radius (RB) = $DB/2 = 22.5525$ The Addendum (a) = $1/P = 1/8.31 = 0.1203$ Dedendum (d) = $1.157/P = 1.157/8.31 = 0.1392$

Outside Diameter (DO) = $N+2/N/D = 54.0054$ Outside Radius (RO) = 27.0027

Root Diameter (DR) = $D-2*d = 47.7216$ Root Radius (RR) = 23.8608

Force analysis calculation considering gear 1 & gear Pitch circle diameter of gear 1, 2, 4 are given by

$D1 = M \times Z1 = 2.5 \times 25 = 62.5\text{mm}$ $D2 = M \times Z2 = 2.5 \times 17 = 42.5\text{mm}$ $D4 = M \times Z4 = 2.5 \times 17 = 42.5\text{mm}$

Pitch line velocity for gear 1 is given by $V1 = (\pi \times D1 \times N1) / 60$

$= (\pi \times 62.5 \times 3750) / (60 \times 1000)$

$= 12.27\text{m/s}$

Since gear 1 & 2 are coaxial the speed are same $N1 = N2$

=

$= 3750\text{rpm}$

Gear ratio $I = Z1 / Z2 = 25/17 = 1.5$

Speed of gear 4 is $N4 = \text{speed of gear 1} / \text{gear ratio}$

$= N1 / I$

$= 3750/1.5$

$= 2500\text{rpm}$

Tangential force of gear 1 on gear 4, $Tf14 = P/V1$

$= 2610/12.7$

$= 2118.9\text{N}$

Radial force $Rf14 = Tf14 \times \tan \phi$

$= 211.89 \times \tan 20$

$= 77.12\text{N}$

The Resultant force $F14 = Tf14 / \cos \phi$

$= 211.89 / \cos 20$

$= 225.48\text{N}$

V. BLOCK DIAGRAM

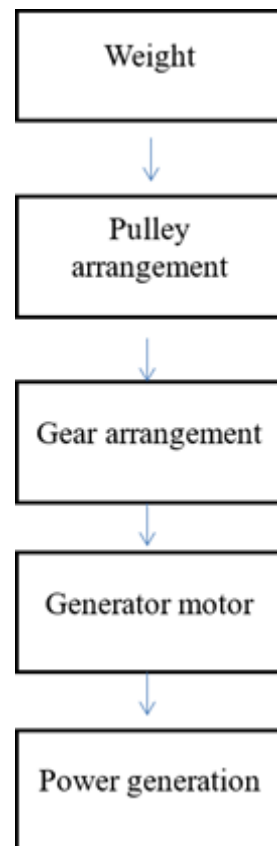


Fig 3 Block Diagram

VI. WORKING

This machine generally works up and down movement. So here up and down movement possible to gravity force. This cause weight attached the gear, machine's linear motion converts to rotary motion. This force converts to chain drive, chain drive attached to generator. Here generator generated the wattage it's stored in battery. For the movement of machine will produce power to the battery by the rotation of the generator which is connected to gear arrangement. Solar energy has less impact on the environment compared to the other energy source because it doesn't produce greenhouse gases and doesn't pollute the water. The solar array produces more power with none interruptions when the intensity of sunshine is more. one amongst the most

obstacles we face within the operation of electrical device is overheating due to excessive radiation and high ambient temperatures. Overheating reduces the efficiency of the panels. This will be overcome by certain cooling methods. The cooling mechanisms reduces the temperature of the panel to a threshold value without affecting the output. Thus, the most objective of this paper is to boost the efficiency of the solar battery using solar tracker, solar concentrator and water for the aim of cooling.



Fig 4 Completed fabricated model

VII. CONCLUSION

In short, the project was a success in proving the concept that electrical energy can be harnessed from Gravitational power. By such arrangements, the gravity power generation mechanism has the advantages such as: more simplified structure, higher conversion ratio and more environment-friendly. The other main advantage of the gravitational power generation mechanism discussed in this invention is that it can aid the system in weight dropping independently using gravitational free fall and thereby generating electricity in parallel. This arrangement also can be applicable in elevators and cranes as it generates electricity during free fall. Thus in this project it was studied a power generation mechanism that produces power from gravity having

a simplified structure as well as eco-friendly and which would overcome present pollution problems and global warming faced by existed generation methods.

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