Novel Energy Generation

Deepa V Bolanavar[1], Roopa C[2]
Department of Electrical And Electronics Engineering
Assistance Professor, New horizon College of Engineering Bangalore, India

Abstract-*Gravity power generation is basically obtaining electrical energy from the use of gravitational force i.e. using motion of object which moves under the action of gravity force to generate energy. The proposed system consists of one such mechanism which uses gravity as a source to make power by first converting it into mechanical work and then convert it to generate required energy using generator. Due to the availability of gravity all over the earth, abundant and consistent it is very suitable to generating power by using gravity.*

Keywords-Gravity, Gears, Gear Motor, Gear Box

I. INTRODUCTION

It is possible to deflect gravitational action away from an object so that the object is partially deviated. That effect makes it possible to extract energy from the gravitational field, which makes the generation of gravitational electric power technologically feasible. If the gravitational power electric generation comes under operation and working then it can replace all existing nuclear and fossil fuel plants and it would essentially solve the problem of global warming to the extent it is caused by fossil fuel used.

There are many ways to convert gravitational energy into electrical energy. When a body is at certain height from the ground, it possesses potential energy. Due to gravitational pull the body falls down. In this process, potential energy is converted to kinetic energy in the form of torque. And this converted into electrical energy using generator. The electrical energy is supplied to the LEDs, where electrical energy is converted into light energy.

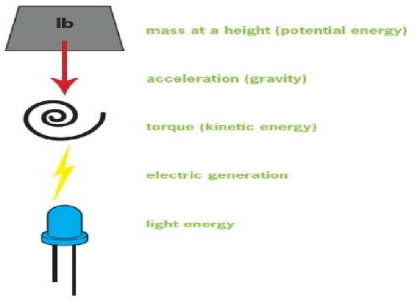


Fig.1 Procedure for power generation

II. METHODOLOGY

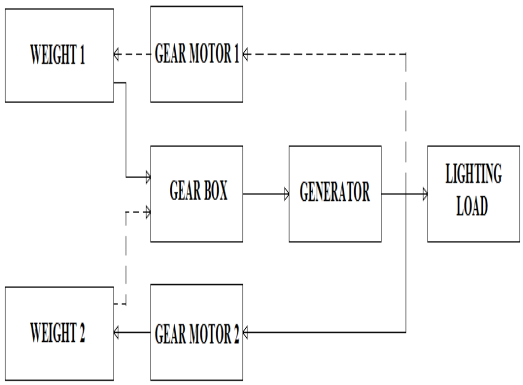


Fig.2 Block diagram of gravity power generation

The above shows the block diagram of a Gravity Power Generator, there are two weights, two gear motors, one gear box, one PMDC generator and one lighting load is used.

Two weights are used to generate the electricity. At the first stage only weight 1 is acting on the gear system another one weight 2 is in rest condition, when the weight 1 starts coming downwards and the weight1 drives the gear system and that intern drives generator at required RPM.

The generator is connected to the gear system and it will starts producing the electric power, the generated power is fed to the lighting load (LED) and also some part of energy is used to power the gear motors.

These gear motors connected to lift the weights. At initial stage the gear motor 2 is connected to lift the weight 2 and further gear motor 1 and weight1 work vice versa after lifting the weight 2.

III. COMPONENTS

Weights

Fig.3 Weights

Fig.4 GearMotor

These motors are used to lift the weights. Totally two gear motors used, of following ratings:
RPM –300
Shaft Diameter – 6mm (with internal hole)
Weight - 125gms
Torque – 2 kg/cm
Voltage – 6 to 24 (Nominal Voltage – 12v)
No-load current = 60 mA(Max), Load current = 300 mA(Max)

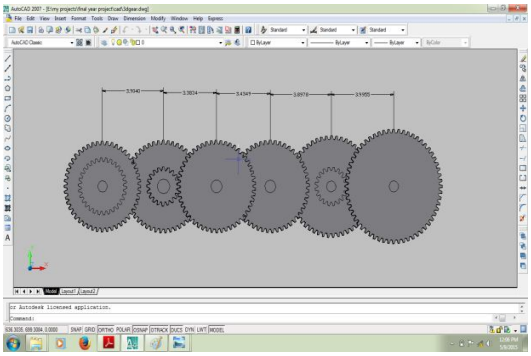
Gear Motor

Gear motors are complete motive force systems consisting of an electric motor and a reduction gear train integrated into one easy-to-mount and -configure package. This greatly reduces the complexity and cost of designing and constructing power tools, machines and appliances calling for high torque at relatively low shaft speed or RPM. Gear motors allow the use of economical low-horsepower motors to provide great motive force at low speed such as in lifts, winches, medical tables, jacks and robotics. They can be large enough to lift a building or small enough to drive a tiny clock.

Most synchronous AC electric motors have output ranges of from 1,200 to 3,600 revolutions per minute. They also have both normal speed and stall-speed torque specifications. The reduction gear trains used in gear motors are designed to reduce the output speed while increasing the torque. The increase in torque is inversely proportional to the reduction in speed. Reduction gearing allows small electric motors to move large driven loads, although more slowly than larger electric motors. Reduction gears consist of a small gear driving a larger gear. There may be several sets of these reduction gear sets in a reduction gear box.

Gear box

Gear box will contain the following components



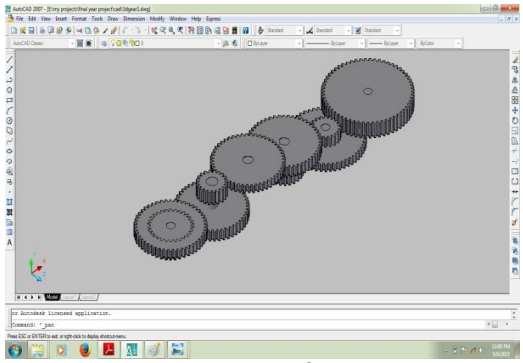


Fig.5 Design Of Gears

A gear or cogwheel is a rotatingmachine part having cut teeth, or cogs, which mesh with another toothed part 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 a sequence (train) are called a gear train or, in many cases, a transmission; such gear arrangements 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 source. 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 wheels in a crossed belt pulley system. An advantage of gears is that the teeth of a gear prevent slippage.

When two gears mesh, and one gear is bigger than the other (even though the size of the teeth must match), a mechanical advantage is produced, with the rotational speeds and the torques of the two gears differing in an inverse relationship.

In transmissions with multiple gear ratios—such as bicycles, motorcycles, and cars—the term gear, as in first gear, refers to a gear ratio rather than an actual physical gear. The term describes similar devices, even when the gear ratio is

continuous rather than discrete, or when the device does not actually contain gears, as in a continuously variable transmission.

Spur gears or straight-cut gears are the simplest type of gear. They consist of a cylinder or disk with the teeth projecting radially and although they are not straight-sided in form (they are usually of special form to achieve constant drive ratio, mainly involutes), the edge of each tooth is straight and aligned parallel to the axis of rotation. These gears can be meshed together correctly only if they are fitted to parallel shafts.

shaft

Fig.6 Different Shafts used in gear box

A shaft is an intermediate shaft within a gearbox that carries gears, but does not transfer the primary drive of the gearbox either in or out of the gearbox. Lay shafts are best known through their use in car gearboxes, where they were a ubiquitous part of the rear-wheel drive layout. With the shift to front-wheel drive, the use of shafts is now rarer.

The driving shaft carries the input power into the gearbox. The driven shaft is the output shaft from the gearbox. In car gearboxes with shafts, these two shafts emerge from opposite ends of the gearbox, which is convenient for RWD cars.

For gearboxes in general, gear clusters mounted on a shaft may either turn freely on a fixed shaft, or may be part of a shaft that then rotates in bearings. There may be multiple separate clusters on a shared shaft and these are allowed to turn freely relative to each other.

Stepper motor

A stepper motor (or step motor) is a brushless DC electric motor that divides a full rotation into a number of equal steps. The motor's position can then be commanded to move and hold at one of these steps without any feedback sensor (an open-loop controller), as long as the motor is carefully sized to the application. Switched reluctance motors are very large stepping motors with a reduced pole count, and generally are closed-loop commutated.

Fig.7 Stepper Motor

Stepper motors effectively have multiple "toothed" electromagnets arranged around a central gear-shaped piece of iron. The electromagnets are energized, to make the motor shaft turn, first, one electromagnet is given power, which magnetically attracts the gear's teeth. When the gear's teeth are aligned to the first electromagnet, they are slightly offset from the next electromagnet. This means that when the next electromagnet is turned on and the first is turned off, the gear rotates slightly to align with the next one. From there the process is repeated. Each of those rotations is called a "step", with an integer number of steps making a full rotation. In that way, the motor can be turned by a precise angle.

A stepper's low speed torque will vary directly with current. How quickly the torque falls off at faster speeds depends on the winding inductance and the drive circuitry it is attached to, especially the driving voltage. Steppers should be sized according to published torque curve, which is specified by the manufacturer at particular drive voltages or using their own drive circuitry.

IV. WORKING MODEL

Fig.8: weight is at rest

Fig.9 Weight Coming Down

V. RESULTS

TABLE: 2 Results obtained by proposed system

SI.NO	Weights (Kg)	Generated Voltage (Avg voltage)	Generated Power(watts)	Power used for taking back of weight(watts)& Lighting load
1	0.5	0v	-	-
2	1	0v	-	-
3	1.5	12v	1	-
4	2	15v	2	2

By observing the above readings, generated power goes on increasing by increasing the weight. Here we are using 2kg of weight to generate 2 watts of electric power. Out of this 2watts of power, 1watt is utilized for lighting and another 1watt is utilized for lifting the weight.

VI. A. Advantages

1. Environmental friendly: As gravity power is using as fuel to generate to produce electricity, propose project will not pollute environment hence it is environmental friendly.
2. Non-intermittent: Gravity is stable on the earth and it is also continuously available everywhere on the earth.
3. Abundant in nature: Gravity power is abundantly available and no cost is invested for gravity power as it is freely available.
4. Less running cost: Because no requirement of fuel to run the generator and less maintenance required.

B. Disadvantages

1. Part of generated energy is used for lifting of weight for continues generation.
2. By observing above readings, to install the proposed project will be higher capital cost required.
3. To produce more power space required more.

C. Applications

1. For domestic purpose we can use it for lighting and fan load.
2. In rural areas there is a need of electricity for irrigation purpose, by using this method we can provide electricity to operate the water pumps.

VI. CONCLUSION

By such arrangements, the gravity power generation mechanism not only has the advantages such as: more simplified structure, higher conversion ratio and more environment-friendly but only needs a little starting energy to perform a long time energy conversion and stable energy output. The other main advantage of the gravitational power generation mechanism is that it can independently generate electricity and it can be parallel connected to the wind power and the solar power generation systems to generate electricity.

VII. FUTURE SCOPE

Whether a developing nation with ambitions of economic growth, or an industrialized region moving towards a low carbon economy, the challenges of future electricity production are shared. Therefore an attempt is made to generate electricity with an eco-friendly concept using Gravity.

The shown prototype is a simple one which generates little voltage. Researchers are being carried out to make improvements to this idea. Large scale production can be achieved using this knowledge.

REFERENCES

[1] Vidhan Srivastava, Sumit Chaudhary, Shailesh M. Pandey, Kulvinder Rana " Gravity Power Generation"

IJMRS's International Journal of Engineering Sciences, Vol. 01, Issue 03, September 2012.

[2] George.O. Schur, "Gravity actuated thermal motor", United States Patent number: 4121420.

[3] Richard P Feynman, Robert B Leighton, Matthew Sands " Lecture on physics", Narosa book distributors ltd. ,volume 1.

[4] Chun-chao Wang, Yuh-suiang Wang "Gravity Power Generation Mechanism" United States patent number: 20090115195 A1 App No.11/935,228 May, 2009.

[5] Victor Rene AnguloValpreda, Mayra Palomares Coral US 8344537 B2 App No. 12/668,757 January, 2013.

[6] David Hatcher Childress Anti-gravity and the Unified field Adventures Unlimited press Pages: 6,38,106,204,545 May,1990.

[7] John. J. Hurford, "Gravity motor ", United States Patent number: 6237342.

[8] Md.Muqtar Ahmed, Heena Naaz, "Power Generation through Gravity and Kinetic Energy", International Journal of Scientific and Research Publications, Volume 4, Issue 1, January 2014.