

Generation of Electricity by Gear Watch Mechanism without Using Fuel

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ABSTRACT

In present day energy requirement rapidly increasing day by day, in nature energy sources available are wind energy, thermal energy, solar energy etc. By using this energy source we can convert it into electrical energy for many purposes examples: in industry, domestic purposes, for technical experiment but increasing number of industries, need of electrical energy also increases with population. Because of these the cost of renewable energy sources are increases which is not economical for normal people. But these energy resources will be lost in future the present report provides a new and useful apparatus to generate electrical energy without fuel, using only human force. Hence it is more economical and reliable.

Keywords: Worm and Worm Wheel, Inverter, Generator, Differential Axle Gear.

1. INTRODUCTION

Ever increasing demand of energy day by day energy crises will come in future. For reducing these many renewable energy source are presently available but in future these energy source may will be lost. For overcoming these ,electromechanical generator is the best way to reducing these crises It is the combination of mechanical gear system and electronics system.it consist of automated rotated system and differential axle gear system for easily rotate generator shaft. Due to this mechanical spring restore the rotational force and reduce it very rapidly. gear mechanism convert restoring force into rotational force step by step For this mechanical energy is required to produce electricity from generator for which automated gear mechanism system and differential axle are used . Generator used to convert these mechanical energy into electrical energy. Generator uses permanent magnet geared

motor. Due to this flux associated with coil is radial in nature. Also commentator used as a rectifier to convert AC current to DC current as per requirement of user. In this electromechanical generator there should be a hand crank (differential axle gear wheel) can be rotated with maximum RPM.

2. THIS CONCEPT DEVELOPED FROM

Suppose our watch gear mechanism is able to developed very small amount of power to continue the watch. If we increase size of this gear mechanism, we will get more amount of power. Below shows the simple gear mechanism of watch.

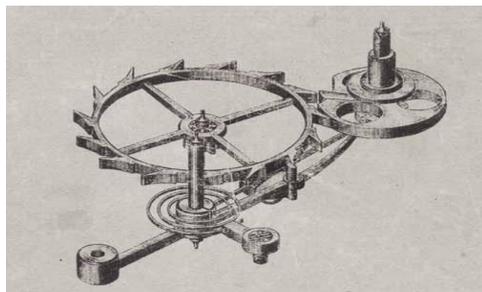


Figure1: Simple Gear Mechanism of Watch

3. BLOCK DIAGRAM

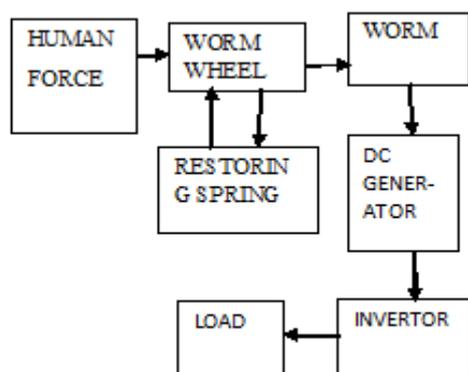


Figure2:-working block diagram of electromechanical generator.

4. COMPONENTS

- 1) DC generator
- 2) Inverter (CD4047)
- 3) Gear system (worm and worm wheel)
- 4) Lever
- 5) Balancing spring
- 6) Axle
- 7) Timer Ic-555
- 8) Hand crack

4.1 Gear Train

Two or more gears are made to mesh with each other to transmit power from one shaft to another. Such a combination is called gear train or train of toothed wheels.

There are mainly four types of gear trains. They are

- A. Simple gear train.
- B. Compound gear train.
- C. Reverted gear train.
- D. Epicyclic gear train.

Our design consists of a compound gear train i.e. more than one gear is present on a shaft, because compound gear train is

used for high speed reductions. The gear connected to the hand crank is driving gear and the gear connected to the generator is driven gear. There are six intermediate gears in between driving gear and driven gear. Intermediate gears are used to increase the speed ratio. By using these six intermediate gears the speed ratio is increased by 74 times i.e., when driving gear rotates with 1 rpm, the driven gear will rotate with 74 rpm. This is the main advantage of using intermediate gears.

4.2 Hand Crank

A crank is an arm attached at right angles to a rotating shaft by which reciprocating motion is imparted to or received from the shaft. It consists of a handle. The main purpose of hand crank is used to support to give the force to rotate the driving gear.

4.3 DC Generator

A DC Generator is a machine which converts mechanical energy into electrical energy. It is based on the principle of production of dynamically induced e.m.f (Electromotive Force). Whenever a conductor cuts magnetic flux, dynamically induced e.m.f. is produced in it according to Faraday's Laws of Electromagnetic Induction. This e.m.f. causes a current to flow if the conductor circuit is closed. The generator used in our design is 6volt DC generator.

4.4 Timer IC555

In this system we used timer Ic-555 for giving controlling alert signal to the operator about the rotational force of a spring when spring will goes to ending terminal.

4.5 AXLE

In this system axle is simply provide mechanical support to the gear wheel.

4.6 Balancing Spring

In this system balancing spring used for restoring rotational force by rotating hand crank in the gear watch mechanism. Due to this rotational force will rotating shaft of generator and it reduces slowly step by step. Hence spring is used as a storing element.

4.7 Inverter

The output of dc generator is dc power. If we want ac power then Inverter is used to convert dc to ac.

5. WORKING MECHANISM

The gear system is rotate with the help of human force so that mechanical energy produced. This energy use to compress spring. After end of given force this compressed spring produce torque. Torque is the one type of mechanical energy in the form of restoring force this restoring force rotate the worm wheel (radius of worm wheel is greater than the radius of worm hence revolution per minute (rpm) of worm is greater than the revolution per minute of worm wheel) hence worm wheel rotate the worm after rotate the worm rotate generator shaft automatically hence after rotate generator shaft armature of generator is rotate. This rotated armature it cut the pole flux therefore emf is generated because of farads law of electromagnetics ($e = -d\phi/dt$) hence current is flow in the conductor and the direction of current is determined by using left hand rule.

Current is the nothing but charge of electron. it finally stored in the dc- battery when we want to use this we required inverter circuit for converting the dc-voltage into ac-voltage by using IC-CD404. Otherwise direct dc current also use as per requirement.

At the ending when the restoring force will goes to the end then timer ic-555 will doing more important work that is it gives the information about the losing restoring torque.

6. ADVANTAGES

- 1) Without using fuel operation is performed.
- 2) Simple mechanism and easy to design.
- 3) The circuit use in this project is low cost and less power consuming.

7. CONCLUSION

- 1) We are using human efforts instead of conventional energy source generates electricity.
- 2) It easily convert mechanical into electrical
- 3) We are using plastic gear for maintenance of the device is very easy.
- 4) It is economical and ecofriendly.
- 5) It does not use any type of fuel.
- 6) It is more reliable.
- 7) It will be very useful in nature.

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