

Power Generation through Speed Breaker

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Abstract – A large amount of energy is wasted by the vehicles on the speed breakers through friction, every time it passes over it. Energy can be produced by using the vehicle weight and speed. So here we propose a smart speed breaker that generates power. The reciprocating motion of the speed breaker is converted into rotary motion using the rack and pinion arrangement. We design a smart speed breaker that can pass vehicles coming from both sides and yet generate energy from it. The system makes use of mechanical assembly with metal sheets with linkages that press down with spring arrangement. The system makes use of the speed breaker press and then uses a rack and pinion arrangement to press down and run generator motor thus generating energy. The spring mechanism is the used to drive the speed breaker back into original position. It converts rotary motion into linear motion, but sometimes we use them to change linear motion into rotary motion. This mechanism is very economical and easy to install. By doing proper arrangements we may generate high power electricity from road traffic.

Keywords – Power Generation, speed breaker, LED's, Rack and Pinion, Mechanism, etc.

I. INTRODUCTION

1. Working Principle

A Speed breaker arrangement is a mechanical device designed to smooth out or damp shock impulse, and convert kinetic energy to another form of energy (usually thermal energy, which can be easily dissipated). It is a type of dashpot. A Speed breaker is a device which converts mechanical energy into electrical energy.

The pushing power is converted into electrical energy by proper driving arrangement. The reciprocating mechanism, Rack and pinion arrangement is fixed at the downside of the speed breaker. The spring is used to return the inclined step in same position when releasing the load. The generator is used here, is permanent magnet D.C generator. The generated voltage is 12Volt D.C.

II. LITERATURE REVIEW

Reciprocating mechanism: Reciprocating motion, also called reciprocation, is a repetitive up-and-down or back-and-forth linear (motion). It is found in a wide range of mechanisms, including reciprocating engines and pumps. The two opposite motions that comprise a single reciprocation cycle are called strokes.

A rack and pinion is a type of linear actuator that comprises a pair of gears which convert rotational motion into linear motion. The circular pinion engages teeth on a linear "gear" bar the rack. Rotational motion applied to the pinion will cause the rack to move to the side, up to the limit of its travel. For example, in a rack railway, the rotation of a pinion mounted on a locomotive or a railcar engages a rack between the rails and pulls a train along a steep slope.

For every pair of conjugate involutes profile, there is a basic rack. This basic rack is the profile of the conjugate gear of infinite pitch radius.

A generating rack is a rack outline used to indicate tooth details and dimensions for the design of a generating tool, such as a hob or a gear shaper cutter.

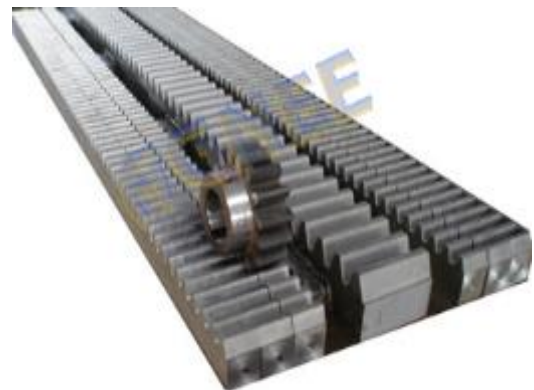


Fig .1. Standard Gear Racks.

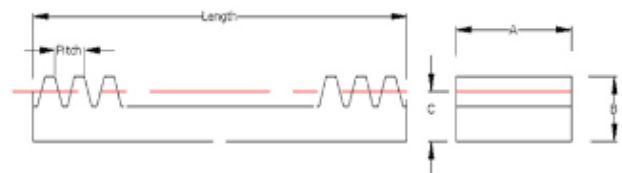


Fig. 2. Line Diagram of Standard Gear Racks.

III. EXPERIMENTAL PROCEDURE

3.1 Fabrication of Project

This project consist of rack and pinion , spring, DC generator, LED's. In this system first the speed breaker setup is placed on a spring in a circular pipe with the help

if the rack and pinion the electricity generates through DC generator and then the LED's get lighted up

3.2 Rack and Pinion

A rack and pinion is a type of linear actuator that comprises a pair of gears which convert rotational motion into linear motion.

3.3 Spring

A typical spring is a tightly wound coil or spiral of metal that stretches when you pull it (apply a force) and goes back to its original shape when you let it go again (remove the force). In other words, a spring is elastic. I don't mean it's made from rubber; I mean that it has elasticity. Depending on how a spring is made, it can work in the opposite way too: if you squeeze it, it compresses but returns to its original length when the pushing force is removed.



Fig .3. Springs.

3.4 DC Generator

3.4.1 Generator principle

An electrical generator is a machine which converts mechanical energy (or power) into electrical energy (or power). Induced e.m.f is produced in it according to Faraday's law of electromagnetic induction. This e.m.f causes a current to flow if the conductor circuit is closed. Hence, two basic essential parts of an electrical generator are:

- Magnetic field.
- Conductor or conductors which can move as to cut the flux.



Fig .4. Conductor.

3.5 Applications

- This energy can be utilized for simple house hold appliances.
- This energy can be stored and utilized as backup power supply mainly in industries.

IV. CONCLUSION

Integrating features of all the hardware components used have been developed in it. Presence of every module has been reasoned out and placed carefully, thus contributing to the best working of the unit. Secondly, using highly advanced IC's with the help of growing technology, the project has been successfully implemented. Thus the project has been successfully fabricated and tested

In Speed breaker based power generation system" is mainly intended to generate electrical power as non-conventional method by simply walking or running on the Speed breaker. Non-conventional energy using Speed breaker is converting mechanical energy into the electrical energy.

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