

Power generation through step

Vipin Kumar Yadav¹, Vivek Kumar Yadav¹, Rajat Kumar¹, Ajay Yadav²
¹ B.Tech students, ²Assistant Professor, Department of Mechanical Engineering,

Buddha Institute of Technology, GIDA Gorakhpur, India.

Abstract: Electricity is a big problem in India. This is faced by every people, who live in the country. Electricity is the form of energy. It is a basic part of nature and one of our most widely used of energy. In this paper we have presented the methodology of electrical power generation using foot step for urban areas energy application. Everybody has needed energy at an increasing rate ever since he came on the earth. Due to this lot of energy resources have been exhausted and wasted. Proposal for the utilisation of waste energy with foot step power human location is very much appropriate and is very important for highly populated countries in India and China, where roads, railway stations, bus stations and temples are overcrowded and millions of people moving around the clock. by using such principle the energy can be utilised in the whole are where the mechanical energy is converted in to electrical energy. If there is no electricity present in the human beings then they can not done there work easily and properly. The time will spend more and they have to done more physically hard work. This paper is presenting the study of electricity generation through the step mechanism. For obtaining the electricity through the step mechanism a prototype model is developed and studied. The electrical power generation system is configured to generate electric power via movements of the humans. The power source is used in the form of a generator to prime the variable capacitor that effectively multiplies the priming energy of the power source by extracting energy from the passing humans. Findings from this research work are discussed in this paper. The generator used here is permanent magnet D.C. generator.

Keywords: Gears, electric power, inverter, lead acid battery, permanent magnet D.C. generator.

1. Introduction

Energy in the form of electricity plays a very important role in the life of a normal man. It has practically revolutionized the world. The gradual but excessive use of electricity has come to bring about a Astonishing changes in industry. With it our modern huge tools are worked. Computers as also calculators sum up totals and make other calculations with the greatest accuracy. Newspapers and books are printed in millions over night. There is not a single phase of human life that is not thankful to electricity for its progress. The modern age has, therefore, been truly called the "age of electricity." We do many things with electricity now a days. Here we convert the mechanical energy in to electrical energy with the arrangement of gears. It is the most important and revolutionary creation in this world of ours. It provides an electric power co-generation system for use with a step network. Most people use the word energy for input to their bodies or to the machines and thus think about crude fuels and electric power. Energy in the form of electricity plays a very important role in the life of a normal man. Electricity is one of the greatest wonders of science. We do many things with electricity nowadays. We warm our homes, we drive the machines in plants, we run our trains and buses. Electricity has completely transformed the methods of travel and transport. But we know that the resources to generate electricity are limited, and this has lead to the energy crisis. We do many

things with electricity nowadays. As we know that humans are increasing day by day which will help us to generate electricity as these pass through the steps? This electricity generated can be used for different purpose such as lighting of street lights on malls and colleges etc. Many models were introduced according to condition. After each generation the

efficiency of model increased and the limitations diminished.

Different-different models have variant designs, with use of gears, rack, dynamos etc with different application at different places has introduced. Each model was encouraged due to limitations of previous one. This paper includes almost all the models and will give the review of different technologies used in generation of energy with the help of step.

2. Principle of Working

In this setup mechanical energy is converted into electrical energy using a D.C. generator. Here the vertical motion of the top of the rack is converted into the rotational motion, which rotates the shaft of generator and generates electricity. This set up requires very basic mechanical components such as gear shaft bearing.

There are also some electrical components such as battery, inverter etc.

3. Name of the Components

Components used in the generation of electricity power are as follows.

3.1 Table no.1

S. No.	Name of the Components
1	Spring
2	Gear
3	Shaft

4	Bearing
5	D.C. Generator
6	Battery
7	Invertor

3.2 Table no.2

S. No.	Name of the Components	Specification
1	Motor	1-Voltage:10 volt 2-Type:D.C. Generator 3-RPM:1000 rpm
2	Gear	1-Mild Steel 2-No. of teeth:59(big gear) 3-No. of teeth:36(small gear) 4-Type:Spur Gear 5-No. of gear used:2
3	Spring	1-Load bearing capacity:60-90 kg 2-Mild Steel 3-Total displacement:5 inch
4	Bearing	1-Type: Ball bearing 2-Bearing no.N35
5	Shaft	1-Diameter: 15 mm 2-Material: Mild steel 3-Length: 390 mm

3.3 Block diagram

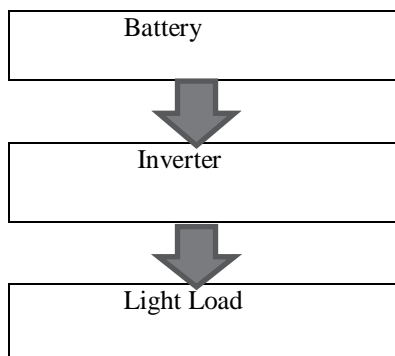
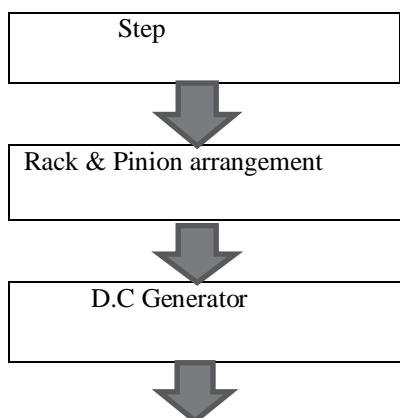


Fig. Procedure of different constituents

Rack and Pinion system

The project is concerned with generation of electricity from speed breakers-like set up. The load will acted upon the step & further the load will transmitted to rack and pinion arrangements. Here the reciprocating motion of the step is converted into rotary motion using the rack and pinion arrangement. The axis of the pinion is coupled with the gear arrangement. The gear arrangement is made of two gears. One of larger size and the other of smaller size. Both the gears are connected which serves in transmitting power from the larger gear to the smaller gear. As the power is transmitted from the larger gear to the smaller gear, the speed that is available at the larger gear is relatively multiplied at the rotation of the smaller gear.

Direct use of load

The load can be directly used by using reciprocating device. It may be done with the help of shafts and spring as horizontal rod connected with shaft at its centre and springs at its both ends. This mechanism will give it a reciprocating motion and hence power can be generated. This motion is used to compress the air using compressing device and after compression, the air get collected in a cylinder and further can be used.

5. Operation of the Model:



Fig.2 Arrangements of rack & pinion

The operation of step arrangement is used for generating the electricity. When any person is pass over the step then the human load acted upon the step and the load will transmitted to rack and pinion arrangement. Hear the reciprocating

motion of the step is converted into rotary motion using the rack and pinion arrangement. The axis of the pinion is couple with the shaft so shaft is also rotate then big gear is rotate which is mounted on shaft and it is attached with small gear. When big gear complete one rotation then small gear complete then one rotation so we got more rotation by the small gear and shaft is attached with D.C Generator with the help of the pulleys when pulley moves then the shaft of DC Generator is rotate. The phenomena of DC Generator which convert the mechanical energy into the electrical energy and this energy are store in battery and it attached with light load.

MEETING POWER SUPPLY NEEDS

In northern New Jersey, the Delaware, Lackawanna & Western chose a 3,000- V DC overhead wire system for its 1930-31 electrification of what are now known as the Morris & Essex Lines of New Jersey Transit (NJT).¹⁹ This installation was fully adequate then, but faced the prospect of major renewal as it aged. NJT replaced the original system with a nominal 25,000-V AC, 60-Hz system in 1984.²⁰ The 25,000-V specification was chosen to facilitate access to New York's Penn Station (through service began in 1996) in anticipation of Amtrak converting its Northeast Corridor to 25,000 V, although that plan was cancelled for cost reasons

in 1979, by which point New Jersey's reelectrification work was already underway. The reelectrified system meets NJT's needs, and was extended beyond Bay Street, Montclair to Montclair State University in 2002. The New York Central began electric operation on its Hudson and Harlem Lines serving Grand Central Terminal in 1906.²⁰ The step mechanism adopted an unusual variant of third-step technology whereby the pickup shoes ran beneath rather than atop the third step. Although this system was costlier to build and maintain, the step mechanism sought to avoid the potential effects of icing on third-step conductivity.

6. Benefits

- Conversion of mechanical energy into electrical energy is easy.
- Maintenance cost is low.
- There is no any use of fuel.
- Free from all types of pollution.
- Its construction is simple.

7. Limitations

- Selection of spring.
- To get the required r.p.m. of the generator shaft.
- Skilled operators are required.
- Less electricity will produced.

8. Application

- Power generation system using step arrangement can used in many places such as :
- This technique can be used in all malls.
- This technique can be used in all railway stations.
- This technique can be used in all colleges.

This mechanism of generating the electricity can be placed on the railway stations. The power is generated when people pass through it. Which is stored in the battery. This power can be used in many places such as malls colleges e.t.c. after using the inverter.

Conclusion

In the coming days, demand of electricity will be very high as it is increasing every day, speed breaker power generator will prove a great boon to the world Future. Aim of this research is to develop the world by enriching it in utilizing its sources in more useful manner. Any country can only develop when it uses power supply frequently and not by getting breakdown in middle course of time. Now time has come for using these types of Innovative ideas and it should be brought into practice. It is suggested that further developments should be done for above mentioned challenges.

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