

Foot Step Power Generation

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Abstract: Humans are using the renewable sources which are solar, wind etc., but still the power needs could not get satisfied, because of that we have to generate electricity through each and every means. The objective of this paper is to produce power through footsteps as a source of renewable energy. The energy is produced by human footsteps and it is converted into mechanical energy. The rack and pinion mechanism is then used to produce electricity by DC generator.

Keywords: Renewable energy, Foot step, Electricity

1. Introduction

In this project the weight which acts on the foot step is used to generate electrical energy [1]. When a person walks over the foot step, a force acts on the step. One can simply be amazed by knowing how much energy a person can have just by walking on the floor with normal speed. Whenever a person walks, manages to lose energy towards the floor by means excess weight to the floor. This whole human foot energy being wasted, if it can be made possible to use this energy, it will become great power producing platform and will be very useful energy sources in crowded places. This method generates the electricity without polluting environment. That energy may be used and converted into electrical energy. The Mechanical energy (weight) is converted into electrical energy using drive mechanism, in this case rack and pinion. Generated energy can be stored in batteries. Then the output of the battery is used to lighten the lamps in the room or any such application [1].

2. Problem statement

Proposal for the utilization of waste energy of foot power with human locomotion is very much relevant and important for highly populated countries like India where the railway station, temples etc., are overcrowded all round the clock. Design and fabrication of the model of foot step power generation. Also to fabricate the model of the same which would able to show the characteristics of the systems and working according to need.

3. Objectives

In this project we are converting Mechanical energy into Electrical energy. We are trying to utilize the wasted energy in a useful way [2]. By using Rack and Pinion arrangement we are converting to and fro motion of the steps into rotational motion.

This rotational energy through arrangement of gears is supplied to dynamo which converts it into electrical energy.

4. Methodology

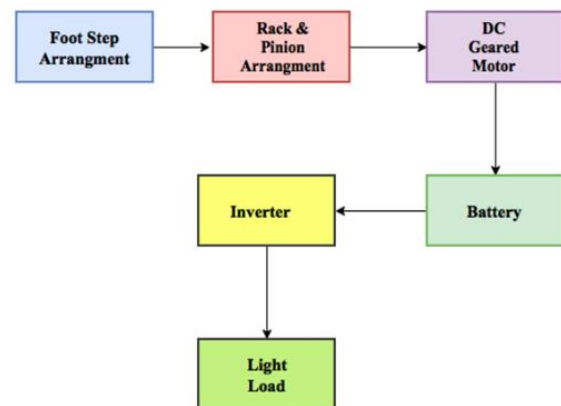


Fig. 1. Generalized Block Diagram

5. Component used

The footstep arrangement is used to generate the electric power. Now a day's power demand is increased, so the footstep arrangement is used to generate the electrical power in order to compensate the electric power demand. In this arrangement the mechanical energy is converted into electrical energy. This section is constructed by of wood or other material which is placed within the surface areas. This section is mainly placed in crowded areas. The footstep arrangement is attached with spring section.

Footstep section consists of following components [1]:

- Springs
- Foot – step
- Gearwheel arrangement
- Rack and Pinion arrangement
- DC Generator
- Shaft
- Battery

6. Working

In this arrangement we are using two steps. The rack & pinion, spring arrangement is fixed below the steps. We are

using four springs for each step. The spring is used to return the step in same position by releasing the load [3]. The rack is coupled to the foot step. From Rack a shaft is provided in which the larger sprocket lies. The larger gear is coupled with Rack, so that it is running at the same speed of Rack. The larger gear is coupled to the smaller gear below in the other shaft. This larger gear is used to transfer the rotation force to the smaller gear on the same shaft. The smaller gear is running in the same direction for forward and reverse direction of rotational movement of the larger gear. It runs at same speed also. The larger gear is provided on the shaft on which the smaller gear is present. The Dynamo capacity used here is 12V. This is the line diagram of foot step power generator. It describes different components of the system in proper manner. In which rack moves downward as human weight applied which cause rotation of pinion on first shaft. A big gear is mounted with pinion on shaft one which is attached to the small gear of shaft two. Another big gear is mounted with small gear on shaft two which is in contact with gear of DC generator.

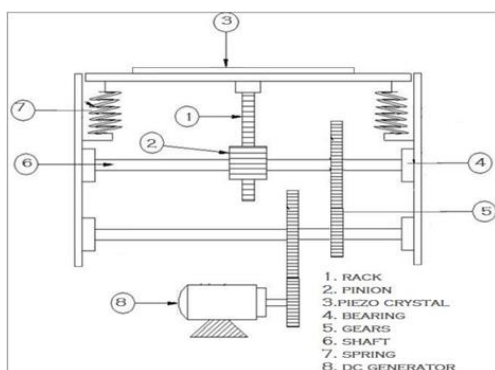


Fig. 2. Line diagram of Foot-step power generation system [4]

7. Advantages

- Non-conventional system.
- No need of fuel.

8. Disadvantages

- Initial cost is high due to presence of generators and batteries.
- Mechanical moving parts are more.
- Only applicable at particular places.

9. Applications

- Railway stations.
- Auditoriums.
- Schools, colleges, etc.

10. Conclusion

This project can be handled in various ways to make the best use of it. There is many more extension that can be made to this project. Generators of more load capacity can be used to get more power. Although the power generation is little less in this project. It tries to make use of the energy wasted to generate electricity. The power generation using footsteps get its energy requirements from the Non-renewable source of energy. There is no need of power from the mains and there is less pollution in this source of energy. It is very useful in the places like railway stations, shopping complex etc.

References

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