



REVIEW ON ‘GENERATE ELECTRICITY BY WALKING POWER GENERATION’

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Abstract:

As the demand of energy is increasing day by day, so the ultimate solution to deal with these sorts of problems is just to implement the renewable sources of energy. Humans are using the renewable energy which are solar, wind etc. but we still could not satisfy our power needs, because of that we have to generate electricity through each and every possible ways. The objective of this work is to produce power through footsteps as a source of renewable energy that we can obtain while walking or standing on to the certain arrangements like footpaths, stairs, platforms and these systems can be installed specially in the more populated areas. In this project the force energy is produced by human foot step and force energy is converted into mechanical energy by the rack and pinion mechanism. Electricity is produced by DC generator. We are supposed to study existing methods of foot step power generation that are rack and pinion arrangement and piezoelectric crystals and supposed to modify the existing system.

Index Terms - Electric Power Generator, Piezoelectric Device, Foot Step Electronics Tools.

I. INTRODUCTION

This project includes number of simple setup and component that is installed under the walking or standing platform. When person walk or stand on this platform their body weight compresses the setup of system which tends to rotate a dynamo and current produced is stored in dry battery and while the power producing platform is over crowded with moving population, energy is produced is high. More movement of people will generate more energy. 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. The source of energy is continuous and renewable.

II. Basic Idea

The basic concept of this system is capturing unused energy. When a person walks on a certain arrangement and converting it into electrical energy. The power generated with this non-conventional method depending on the human daily activity (walking).

2.1 Block Diagram of Board

The diagram of the foot step power generation system is shown below. Only one step is required to generate the power. The pushing power is converted into electrical energy by proper driving arrangement.

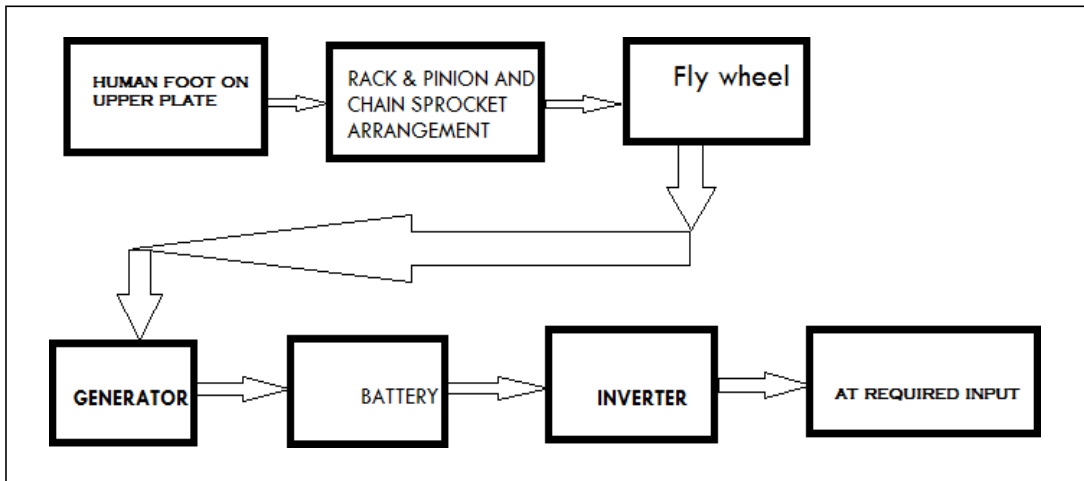


Fig 2.1: Block Diagram of Generation of Electricity

2.2 Working of Project

The rack & pinion, spring arrangement is fixed. The function of spring is to return the step in same position by releasing the load. The pinion shaft is connected to the supporter by end bearings as shown in figure. The larger sprocket is also coupled with the pinion shaft, so that it is running at the same speed of pinion. The larger sprocket is coupled to the small cycle sprocket with the help of chain. This larger sprocket is used to transfer the rotation force to the smaller sprocket. The smaller sprocket is running same direction for the forward and reverse direction of rotational movement of the larger sprocket. The flywheel and gear wheel is also coupled to the smaller sprocket shaft. The flywheel is used to increase the rpm of the smaller sprocket shaft at different speeds. The gear wheel is coupled to the generator shaft with the help of another gear. The generator is permanent magnet D.C generator. The generated voltage is 12Volt D.C. This D.C voltage is stored to the Lead-acid 12 Volt battery. The battery is connected to the inverter. This inverter is used to convert the 12 Volt D.C to the 230 Volt A.C. This 230 Volt A.C voltage is used to activate the light, fan and etc. By increasing the capacity of battery and inverter circuit, the power rating is increased.

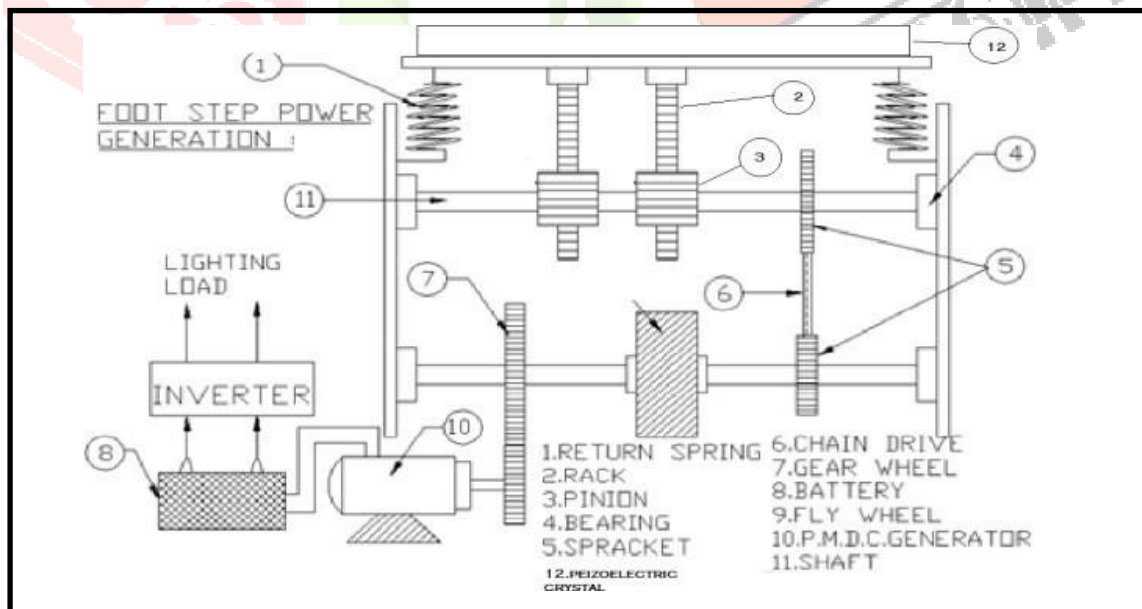


Fig2.1 Model of Foot Step Power Generation System

II. Literature Survey

- According to **T.R. Deshmukh** described along with design International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056 Volume: 06 Issue: 05 May 2019 www.irjet.net p-ISSN: 2395-0072 and modeling of parts of the model of the foot step power generation system using 3d modeling software. This process consists number of simple setups that is installed under the walking or standing platform. Project system works on the principle of converting the linear motion because to pressure of footsteps into rotating motion by rack and pinion arrangement. This mechanism fails if there is any occurrence of variable load leads to balancing type problems Power is not generated during return movement of rack.
- **Shiraz Afzal, and Farrukh Hafeez** this paper is all about generating electricity when people walk on the Floor if we are able to design a power generating floor that can produce 100W on just 12 steps, then for 120 steps we can produce 1000 Watt and if we install such type of 100 floors with this system then it can produce 1MegaWatt As a fact only 11% of renewable energy contributes to our primary energy. If this project is deployed, then not only we can overcome the energy crises problem but this also contributes to create a healthy global environmental change.

III. Problem Summary

Electricity is one of the daily requirements of life. It is required to increase as much as sources of renewable energy. This system can be used for utilization of waste energy of foot step to provide electricity during the cut-off of electricity in some places like gym or any crowded places. For example, there is cut-off of electricity because of that, gym members are not able to measure their weight on weighing scale and in the night, visibility is disappeared due to cut-off of electricity. This system can be used with different techniques like use with weighing scale etc.

IV. Fabrication Details:

The frame structure for the total units fabricated using L-Angle frames and ordinary frames. These frames are made of mild steel. They are held to proper dimensions are attached to form a unit with the help of welding. Then the bearings which are of standard make are kept in place with their respective shafts through them and are welded to the frame structure. The shafts are also made of mild steel. A rack which are made up of mild steel is welded to the upper plate arrangement. A pinion which is also made up of mild steel and which has thirty-six teeth is fitted on the shaft initially, and welded. This pinion tooth is exactly made to mate with the teeth of the rack. A bicycle sprocket and chain arrangement of standard make is fitted with the larger sprocket on the top shaft and its smaller sprocket on the bottom shaft. The sprocket wheels are welded to the shafts. A fly wheel that is made of cast iron is machined suitably to the precise dimensions in a lathe and is placed on the shaft with its axis coinciding with the axis of the shaft and is welded. A special stand arrangement is made to seat the 12v DC generator using frames. A 12v DC generator is placed within the seat and is held firm using bolts and nuts. Wires are connected to the terminals of the DC generator and its other ends are connected to a Lead-Acid battery. Another wire is taken from these points on the battery and its other ends are connected to the positive and negative terminal of an inverter. An output wire from the inverter is sent to the required input. In existing rack and pinion arrangement system, power is not producing during the return movement of rack so we can use rack and pinion with ratchet mechanism inside the pinion for obtaining power generation during return movement of rack as shown in figure.

In below figure gives 3D over view of existing system. In which rack moves downward as human weight applied which cause rotation of pinion on first shaft and rotation of chain sprocket and flywheel on second shaft. Generator is driven by gear mounted on second shaft. But during reverse or upward rotation of rack, power is not generated due to no rotation of second shaft. Second shaft remain idle during upward rotation of rack because of chain sprocket arrangement.

Figure describes the 3D view of new system. In this system there are two rack and two pinions are used which are provided with ratchet mechanism. Ratchet mechanism allow the power generation during upward rotation of rack. This improves the power generation of the system and utilize the power generation during reverse movement. In this system first rack and pinion will cause the rotation of first and second shaft during downward movement of rack, during this second rack and pinion will not cause any rotation due to ratchet mechanism.

Same, during upward movement second rack and pinion will cause rotation of first and second shaft, during that first rack and pinion will not cause any rotation due to ratchet mechanism.

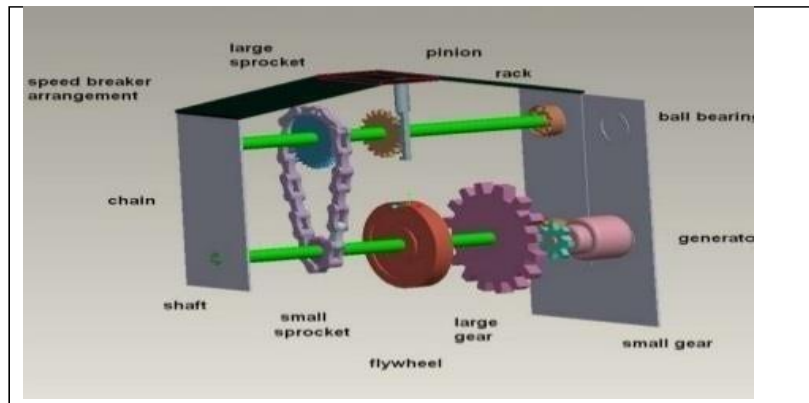


Fig.5.1 Foot Step Power Generation System

5.1 History of Project

Earlier researchers had work on the conversion of dynamic energy to electrical by human movement, Jeff Kru pen -kin and Ashley Taylor proposed a new technique called reverse electro-wetting which states that whenever there's a vibration on a platform caused by human motion could result in producing electrical energy.

5.2 Need of Project

Some developing countries, in almost all cities and villagers, faces several hours of daily load shedding due to uneven demand for electricity with the electric power generation rate. Many developed countries use gasoline electric generator and IPS (Instant power supply) at their homes during the power-cut. Industry and IT hubs also use standby generator due to power crisis. This system ultimately intensifies the crisis of power.

5.3 Objective of Project

Our aim is to design and develop almost free noise power generator that depends on human footsteps, also to create a model that would show the feature of the system and works depending on our need. Collect and arrange the electrical system in proper order that will transfer.

- In order to reach this valuable aim, these objectives should be achieved: After that, voltage is produced through the steps and stored in the lead acid.
- Attach the Piezo sensors to the platform in suitable arrangement.
- Mechanical energy into electrical energy. Finally, this voltage could be used in many applications like charging the mobile battery.

V. Flow Chart

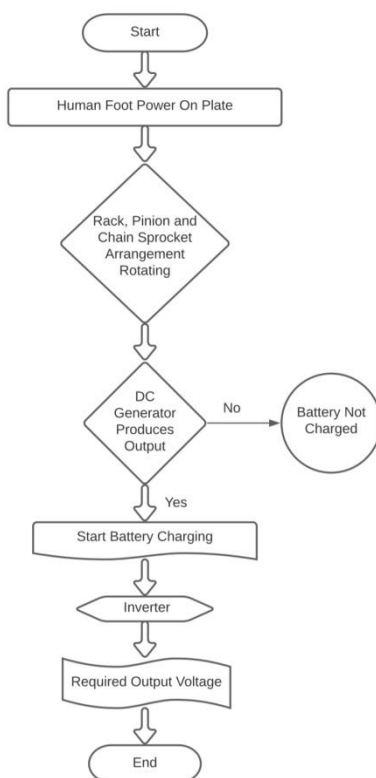


Fig.6.1:Flow Chart of Foot Step Power Generation System

VI. Advantages

This method has a lot of advantages.

- 1) It is highly economic. it is a cost-effective method.
- 2) This method is pollution free and utilizes waste energy as there is no combustion or waste generation involved.
- 3) This system can be employed to recover from energy crisis and for supplying energy to remote location also.

VII. Application

Foot step generated power can be used for agricultural, home applications, street lighting.

- 1) Metros, Rural applications etc.
- 2) It can be used as a source for both AC and DC applications.
- 3) It is also used in universities.
- 4)It can use in emergency power failure situations like hospitals.

VIII. Future scope

This idea can be implemented in the floors of crowded places as footpaths, railway platforms etc.

- Also, these floors will be useful if they are implemented in gyms in tread mills and other machines.
- Other useful places where this idea may be implemented is dance floors.
- Stairs can be also used for production of energy by mere walking.
- This method can also be used for security purposes and in various alarm systems
- This principle can also be employed in construction of inverters which can be used in case of power cuts.

IX. Conclusion

Footsteps are the main source of power generation. There is no need of energy from conventional source of energy and there is zero percent of pollution in this type of power generation. There is no need of any kind of power from mains and it is important to the areas, all tracks where footsteps are used to generate non-conventional energy such as electricity. The contribution of non-conventional energy to our primary energy is 11% that is a common fact. If this project is activated it will not only add and overwhelm the energy deficit problems but this will also form sound global environmental change.

X. References

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