

ELECTRICITY GENERATION BY FOOTSTEPS

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Abstract:

As the demand of energy is increasing day by day, so the ultimate solution to deal with the 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 way. 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, plate forms 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.

Keywords: Footpaths, Stairs, Plate forms, and Footstep power generation system

I. INTRODUCTION

Now-a-day the consumption of electricity has increased drastically within few years. So it is very important to save electricity otherwise in near future we will suffer huge loss. As we know through electricity only our main equipments are running this without electricity it is very difficult to live in this modern age.

We are going to prepare a project by which we can generate electricity by tapping on the ground or we can say by our footstep so there are two ways to generate electricity by footsteps. First is by mechanical motor and second by piezoelectric effect by sending the vibration.

Thus saving the electricity for future use is very important so there are various methods to generate electricity and this we are applying in current situation. But what if we generate electricity just by walking on the ground / tapping on it. This will become the easiest way to produce power.

There are two ways to generate it i.e. piezoelectric effect

Mechanical effect

In piezoelectric effect is that when the crystal are mechanically stressed thus due to vibration electricity is produced. And the converse piezoelectric effect is the stress or strain in the crystal when an electric potential is applied. For this we use piezoelectric crystal such as barium titanate ($BaTiO_3$), lead titanate ($PbTiO_3$), lead zirconate titanate (PZT) ($PbZrTiO_3$).

Second is by mechanical effect that is by arranging a rack and pinion setup and attaching it to the motor then by applying the force on the pedal electricity is generated.

But the limitation is that by piezoelectric effect very less amount of electricity is produced thus for generating more power/electricity we use mechanical means so it is used.

Thus here we are going to use both the ways simultaneously to generate power so thereby we get a significant amount of energy generated.

II.LITERATURE SURVEY

Papet1.A Unique Steptowards Generation of Electricity via NewMethodology:

Author:ItikaTandon,AlokKumar

In these research paper we are seen that electricity requirements are increasing day by day,so it is important to produce electricity by innovative way.In this,we are producing electricity by piezoelectriccrystal.This method of generating electricity by the use of piezoelectric material has already bieng started in many country's likeJapan,Israel,netherland etc.Use of piezoelectric materialis Ecofriendly and nonpolluting.It is an inexpensive way of generating electricity and is easy to install.In future this method promising Eco-friendly electricity generation.

Paper2.DESIGN OF FOOTSTEP POWER GENERATION SYSTEM USING RACK AND PINION GEARS MECHANISM

Author:MuhammadAsadSaeed,MuhammadHamzaTahir

After studying authors paper we can say that these method is also very good to produce electricity.It is also Ecofriendly method.This method does not required hugel and are a like other powerplants,and this method is easily installed atpublic areas.The maintenance and installation cost is economical. and by expanding power generation system energy can be produced more than 10.925KW(hr). We can install this system at park and make independent incase of electricity.And we can't depends onthe rsources of energy.

This is very efficient method among all and we can produce more electricity by expands the size of plant and it's cost is also low than other methods.

Paper3.Foostep Power Generation Using PiezoElectric Transducers

Author:KiranBoby,AleenaPaulK,Anumol.C.V,JosnieAnnThomas,NimishaK.K

In these paper we are studying about electricity generation by the use of Piezo Electric Transducers.For these first we have to choose the piezoelectricmaterial,For this,an analysis on the

2most commonly available piezoelectric material PZT and PVDF,to determine the most suitable material was done.By varying forces are applied on the Piezomaterial,different voltage readings corresponding to the force is displayed.For each such voltage reading across the force sensor,various voltage and current readings of the Piezotest material are noted. After that we can choose the material.And PZT shows the superior characteristics. This system is used for street light and It can also be used as charging ports,lighting of pavement side.building

II. SPECIFICATIONS

1 SPECIFICATION OF PINION

MATERIAL: Mild Steel

PITCH CIRCLE DIAMETER: 30mm

INSIDE DIAMETER: 14mm

No. OF TEETH: 19

WIDTH: 15m

PRESSURE ANGLE: 20 degre

2 SPECIFICATION OF RACK

MATERIAL: Mild Steel

Length – 80mm

Breadth – 15mm

Height – 15mm

No. of teeth – 18

3 SPECIFICATION OF SPRING

Material – Mild steel

Wire diameter – 2.5mm

Outer diameter – 25mm

Pitch – 7mm

4 SPECIFICATION OF MOTOR GEAR

Material – Mild steel

PCD -20mm

ID – 8mm

No. of teeth – 13

Width – 15mm

5 SPECIFICATION OF BIG GEAR

Material – Mild steel

PCD -60mm
ID -14mm
No. of teeth – 39
Width – 15mm

III. CONSTRUCTION & WORKING



Figure 1: Electricity Generation By Footsteps

- The rack&pinion and spring is fixed at below the foot step.
- Larger sprocket is located at pinion shaft.it is run at same speed of pinion.
- Larger sprocket is coupled to small sprocket with the help of chain.
- This larger sprocket is used to transfer the rotational force to the smaller sprocket.
- The fly wheel and gear wheel is also located to the smaller sprocket shaft.
- The gear wheel is a permanent magnet D.C generator.
- Here 12v D.C voltage is generate.
- This D.C voltage is stored to the lead acid 12 volt battery.

- The battery connected to the inverter This inverter is used to convert the 12 volte D.C to 230 volt A.C.
- So that Electricity is generated.

VI.RESULTS AND DISCUSSION

It is easy and simple in mechanisms.Cost of This Machine Is Low, So Anyone Can Buy This Machine and Accident Chance of This Machine Is Very Less and Electricity Produce without used of fuel and without polluting of environment.

VII.CONCLUSIONS

Project work based on the idea of electric power generation without polluting the environment. The waste energy in form of human walking is utilized in the system. it is very useful at crowded places to install this system to produce electricity. This system is smother and less noisy in operation and provide flexibility in working. This system plays a important role for producing electricity at places where there are no sources of electricity like village areas. This energy source is renewable and continuous.

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