

Review Paper on Electricity Generation by Using Foot Steps

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Abstract – Energy is the primary need for survival of all organisms in the universe. Everything what happens in the surrounding is the expression of flow of energy in one of the forms. But in this fast moving world, population is increasing day by day and the conventional energy sources are lessening. The extensive usage of energy has resulted in an energy crisis over the few years. Therefore to overcome this problem we need to implement the techniques of optimal utilization of conventional sources for conservation of energy. This project includes how to utilize the energy which is wasted when the vehicles passes over a speed breaker. Lots of energy is generated when vehicle passes over it. We can tap the energy generated and produce power by using the speed breaker as power generating unit. The kinetic energy of the moving vehicles can be converted into mechanical energy of the shaft through rack and pinion mechanism. Then, this mechanical energy will be converted to electrical energy using generator which will be saved with the use of a battery. The energy we save during the day light can be used in the night time for lighting street lights. Therefore, by using this arrangement we can save lot of energy which can be used for the fulfillment of future demands. This project harvests energy from speed breaker by making gear arrangement and using electronic gadgets. Large amounts amount of electricity can be generated saving lot of money. And if implemented will be very beneficial for Government.

Keywords- *Renewable energy, rack and pinion, kinetic energy, electro-mechanical unit,, roller mechanism, chain sprocket*

I- INTRODUCTION

Energy is nothing but the ability to do the work. In day to day life, Electricity is most commonly used energy resource. Now-a-days energy demand is increasing and which is life-line for people. Due to this number of energy resources are generated and wasted. Electricity can be generated from resources like water, wind etc. to generate the electricity from these resources development of big plants are needed having high maintenance cost. Some other energy resources are also costly and cause pollution. They are not affordable to common people Walking is the most common activity in human life. When a person walks, he loses energy to the road surface in the form of impact, vibration, sound etc. Due to the transfer of his weight on to the road surface, through foot falls on the ground during every

step. This energy can be tapped and converted in the usable form such as in electrical form. This device, if embedded in the footpath, can convert foot impact energy into electrical form. Human-powered transport has been in existence since time immemorial in the form of walking, running and swimming. However modern technology has led to machines to enhance the use of human power. The conventional sources of energy are generally non-renewable sources of energy, which are being used since a long time. Energy generated by using wind, tides, solar, geothermal heat, and biomass including farm and animal waste is known as nonconventional energy. All these sources are natural, renewable or inexhaustible and do not cause environmental pollution and are eco-friendly. Moreover they do not require heavy expenditure. To improve the power generation technologies and to make them more

sustainable, non –conventional technologies have been discovered. The non-conventional sources of energy are abundant in nature. Most of the non – conventional sources have been boons at hand only to the well developed countries. The developing countries that lag behind in technical assets and financial limitations are striving to install the technologies of the latest trends and advanced versions.

Man has needed and used energy at an increasing rate for his sustenance and well being ever since he came on the earth a few million years ago. Primitive man required energy primarily in the form of food. He derived this by eating plants or animals, which he hunted. Subsequently he discovered fire and his energy needs increased as he started to make use of wood and other bio mass to supply the energy needs for cooking as well as for keeping himself warm.

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With further demand for energy, man began to use the wind for sailing ships and for driving windmills, and the force of falling water to turn water for sailing ships and for driving windmills, and the force of falling water to turn water wheels. Till this time, it would not be wrong to say that the sun was supplying all the energy needs of man either directly or indirectly and that man was using only renewable sources of energy.

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II- LITERATURE REVIEW

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.

Vipin Kumar Yadav1, Vivek Kumar Yadav1, Rajat Kumar1, Ajay Yadav, [2]In this research paper authors used the equipment with following specification: Motor Voltage:10 volt Type: D.C. Generator, RPM:1000 rpm, Gear 1-Mild Steel, No. of teeth:59(big gear),No. of teeth:36(small gear),Type: Spur Gear, No. of gear used:2 Spring 1-Load bearing capacity:60-90 kg, Mild Steel, Total displacement:5 inch, Bearing 1- Type: Ball bearing, Bearing no.N35,Shaft 1- Diameter: 15 mm-Material: Mild steel author concluded that with these method energy conversion is simple efficient and pollution free.

From the viewpoint of **Shiraz Afzal, and FarrukhHafeez**,[3]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 1MegaWattAs 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. In this project a gear system is attached with flywheel which causes to rotate the dynamo as the tile on the deck is pressed The power that is created is saved in the batteries in addition we will be able to monitor and control the amount of electricity generated When an individual passes it push the tile on the ground surface which turn the shaft beneath the tile, turn is limited by clutch bearing which is underpinned by holders. Primary shaft is rotate approx. twice by a single tile push ..The movement of the prevailing shaft turn thegearbox shaft which builds it 15 times (1:15) then its movement is smoothen by the help of fly wheel which temporary store the movement, which is convey to the DC generator (it generates 12V 40 amp at 1000 rpm).

From the perspective of **Sasankshekhara Panda** has described the based on crank shaft; fly wheel, and gear

arrangement. This type of footsteps power generation system is eligible to be installed in crowded places and rural areas. Thus, this is a very good technology to provide effective solution to power related problems to affordable extent. This will be the most acceptable means of providing power to the places that involves difficulties of transmission. Maintenance and lubrication is required time to time.

[4] **Jose AnanthVino** described the simple drive mechanism which include rack and pinion assembly and chain drive mechanism. The conversion of the pressure or force energy in to electrical energy. The power generation is very high but the initial cost of this system is high. There is no need of power from the mains and this system is ecofriendly. It is very useful at the crowded places and on all roads and as well as all kind of foot step which is used to generate the electricity. Maintenance and lubrication is required time to time. Power is not generated during return movement of rack. Arun S. et. al. [20] developed a method for controlling the operations of punching machine using Programmable Logic Controllers. Reduced manufacturing lead time and increase worker safety using this system.

III - MODIFICATION

Water pump a circulator pump circulating pump is a specific type of pump used to circulate gases, liquids, or slurries in a closed circuit. They are commonly found circulating water in a hydronic heating or cooling system. Because they only circulate liquid with in a closed circuit, they only need to overcome the friction of a piping system (as opposed to lifting a fluid from a point of lower potential energy to a point of higher potential energy). Circulator pumps as used in hydronic systems are usually electrically powered centrifugal pumps. As used in homes, they are often small, sealed, and rated at a fraction of a horsepower, but in commercial applications they range in size up to many horsepower and the electric motor is usually separated from the pump body by some form of mechanical coupling.

COMPONENTS REQUIRED FOR FOOT STEP POWER GENERATION

- SHAFT
- BEARINGS
- RACK & PINION
- SPROCKETS

- CHAIN DRIVE
- GEAR ARRANGEMENT
- SPRING
- BATTERY
- FLYWHEEL
- P.M.D.C. GENERATOR
- HEX NUT
- BOLT
- WASHER
- WATER PUMP
- MULTIMETER



Fig.1-Foot step power generation

COMPONENTS & DETAILS

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 rubber or other material which is placed within the surface areas. This section is mainly placed in the crowded areas . This footstep arrangement is attached with spring section



Fig 2.1.1 Rack & Pinion Fig 2.1.2 Chain Drive



Fig 2.1.3 Shaft



Fig 2.1.4 Spring



Fig 2.1.5 Spur Gears



Fig 2.1.6 Bearing

Table 2.1. Specifications

| Sr.No. | Component | Details |
|--------|-------------------------|--------------------|
| 1. | Base and upper plate | Mild steel |
| 2. | Fixed Cylindrical pipes | MS pipes |
| 3. | Moving pipes | MS pipes |
| 4. | Springs | Alloy Steel Wire |
| 5. | Rack and pinion | Cast iron, |
| 6. | DC motor | Electric equipment |
| 7. | Stair frame | MS |

The rack & pinion, spring arrangement is fixed at the inclined step. The spring issued to return the inclined step in same position by releasing the load. The pinion shaft is connected to the supporter by end bearing. The larger sprocket also coupled with the pinion shaft, so that it is running at the same speed of piston. The larger sprocket is coupled to the small cycle sprocket with the help of chain.

The complete fabricated model picture of Foot Step is shown. The upper plate is mounted on two springs; the weight impact is converted into electrical power with proper control unit. The spring and rack & pinion arrangement is fixed below the foot step which is mounted on base. Spring system is used for return mechanism of upper plate after release of load. The shaft along with pinion is supported by end bearings. A gear is provided there also. A gear is coupled to the shaft. The gear wheel which is provided in shaft is coupled to the Dynamo. The dynamo capacity used

here is 12V. From the dynamo the wires are taken. These wires are connected to LEDs, to show the output power. The generator is used here is 12V permanent magnet DC generator. The terminal of DC generator is connected to lightning LEDs.

Footstep section consists of Springs

- Gearwheel arrangement
- Rack and Pinion Section
- Chain drive Mechanism
- Coupling section
- Dynamo
- LEDs
- Springs
- Gearwheel arrangement
- Rack and Pinion Section
- Chain drive Mechanism
- Coupling section
- Dynamo
- LEDs

IV - CONCLUSION

The utilization of energy is an indication of the growth of a nation. One might conclude that to be materially rich and prosperous, a human being needs to consume more and more energy. And this project gives us a source of energy that we get in day to day life. In our project we utilized rack and pinion mechanisms for generating the electric power hence it is most useful and economical as compared to the other because it generate the electricity without any fuel. In our project we utilized rack and pinion mechanisms for generating the electric power hence it is most useful and economical as compared to the other because it generate the electricity without any fuel. "Electricity plays a very important role in our life". Due to population explosion, the current power generation has become insufficient to fulfill our requirements. In this project we discover technology to generate electricity from speed breakers in which the system used is reliable and this technique will help conserve our natural resources. In coming days, this will prove a great boon to the world, since it will save a lot of electricity of power plants that gets wasted in illuminating the street lights. As the conventional sources are depleting very fast, it's high time to think of alternative resources. We got to save the power gained from the conventional sources for efficient use. So this idea not only provides alternative but also adds to the economy of the country.

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