FOOT STEP ENERGY CONVERSION SYSTEM

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ABSTRACT-

In this project we are produced electrical energy by pedestrian and moving vehicles on the ground surface by means of renewable energy generation method. As our country is a developing country so the renewable energy resource are very important at this time. The renewable energy using foot step impact load of human and vehicles is converted into electrical energy. The main motto of this mechanism is to create cheaper and better way of electrical power generation method, this system does not create any kind of pollutants so that we can decrease the most powerful effect greenhouse effect and power shortage so that we will get rid of the problem of power cuts. In this project the interchange of impact load due to the heavy weight into electrical energy by using simple rack-pinion gear drive mechanism because of its specification, linear motion can be converted into rotatory motion. In this project impact load is converted into electrical energy. The whole mechanism includes rack-pinion, gear mechanism, a shaft and dynamo. We can store produced electrical energy by the implementation of the combination of invertor and a battery.

Keywords: foot step energy conversion, rack-pinion drive mechanism, dynamo, renewable energy

INTRODUCTION-

Energy plays a vital role in our daily life. The energy consumption is increasing very rapidly, due to increase in population, industrialization etc. all most all cities and villages of developing countries suffering from several hours of daily power cuts due to lack of power supply because the increase in demand for electricity exceeds the increase in electric power generation due to the lack of energy resources (i.e. conventional energy resources are limited). The rate of energy consumption is increasing and supply capacity is decreasing resulting in inflation and energy shortage known as energy crisis. For get rid of the energy crisis uses the non- conventional energy resources. Non-conventional energy system is very essential at this time to our nation as the conventional energy resources are limited. In this project we are generating electrical power as non-conventional method by simply walking or running on the foot step. We know that, Walking is the most common activity in our daily life. When a person walks, his losses energy over the road surface in the form of impact, vibration and sound etc., due to 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. Alternative or non-conventional or renewable energy are

very essential to develop for future energy requirements. Non-Conventional energy using foot step needs no input power to generate the output of the electrical power. In this project use simple drive mechanism such as rack and pinion assembly.

WORKING PRINCIPAL /PROCEDURE-

The main phenomenon on which the working of this project is based is that rack and pinion assemble converts the linear motion into rotary motion and vice versa also. The pinion is of finite diameter and gives circular motion when the rack of infinite diameter comes in contact with pinion and gives linear or translatory motion for proper contact between both rack and pinion the should have equal module. The shafts of rack and pinion remains parallel during their motion.

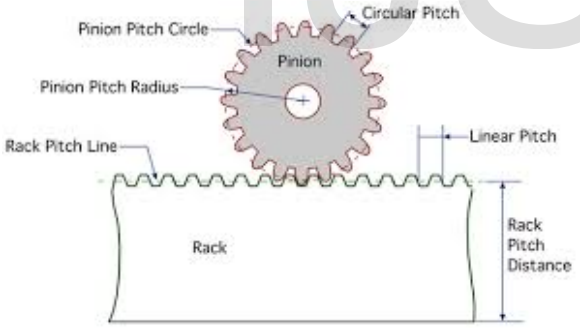

Fig. 1: rack and pinion assemble

The complete and real image of this project and mechanism is shown in fig 3 given below. The impact load is put on surface on the step. One end of spring is attached to the other surface of step (plate) and other end is fixed to the stand. Firstly the spring is compress down due to impact of load. During this process the energy is absorb in the spring. When the weight is removed from the top of the plate, the spring come back to its original position. By releasing the energy inside it and the plate moves upward and return its original position.

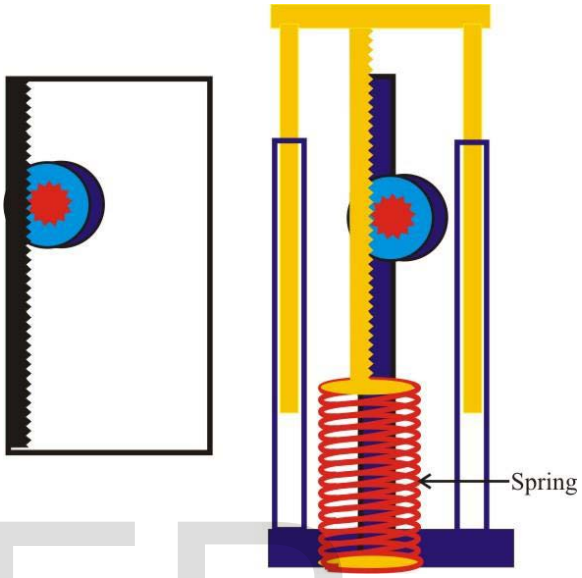

Fig 2: Working principle of foot step energy conversion system

When the spring is compressed due to impact of weight on plate, the energy absorbed in the spring and the rack move downward direction vertically and the rack is in contact with pinion. So, pinion rotates in anti-clock wise direction. The pinion shaft is directly coupled with dynamo (generator). So, dynamo generates electricity. When the spring expends releasing the energy stored inside it, the rack move in upward direction vertically and the rack is in contact with pinion. So, pinion rotates in clock wise direction. The pinion shaft is directly coupled with dynamo. So, dynamo generates electricity again.

If we want to store the electrical energy for future use, we connect the dynamo to the

invertor which store the energy in the form of D.C. in the battery.

HARDWARE REQUIREMENT-

- Springs
- Rack
- pinion
- P.M.D.C generator
- Shaft
- LED bulbs
- And others auxiliaries such as machine tools etc.

OUTPUT POWER CALCULATION-

Let us consider,

The mass of a body = 65 Kg (Approximately)

Height of spring = 8 cm

∴Work done = Force x Distance

Here,

Force = Weight of the Body

= 65 Kg x 9.81

= 637.65 N

Distance traveled by the body = Height of the spring

= 8 cm

= 0.08 m

∴Output power = Work done/Sec

= (637.65 x 0.08)/60

= 0.8502 Watts

(For One pushing force)

FEASIBILITY OF PROJECT-

i. ECONOMICAL FEASIBILITY:-

This device is completely in the favour of Human economy; its components are not so expensive and can be easily installed. By using this device we can save electric energy and part of money in schools, cinemas, station, etc.

ii. ENVIRONMENTAL FEASIBILITY:-

The materials and the components used in it is completely also in the favour of environment and any type of pollution is not be created. The materials used in this device are not harmful to the nature components in any way.

ADVANTAGES OF THE PROJECT-

1) This is a Non-conventional system
2) No need fuel input.
3) Power generation is simply walking on the step.
4) Power also generated by running or exercising on the step.
5) Battery is used to store the generated power.
6) No pollution content is produced
7) It is fully eco friendly
8) Easy construction
9) It can be used at any time when it necessary
10) Easy maintenance because of less moving parts.

APPLICATION OF THE PROJECT-

1) Colleges.
2) Cinema theatres.
3) Shopping complex.
4) Railway stations.
5) Airports.
6) Bus stand.
7) Speed breakers.
8) Suspension system.
9) Dancing floors.
10) Street lighting.
11) Rural area.

CONCLUSION-

The project **"FOOT STEP ENERGY CONVERSION SYSTEM"** is successfully observed, tested and implemented which is the best economical, affordable energy and best way for power generation which is according to the pocket of common men. This can be used for many applications in rural areas where power availability is less or totally absence. As India is a developing country where energy management is a big challenge for huge population. By using this project we can drive both AC as well as D.C loads according to the force.

KIT PHOTO REPRESENTATIONS-

Fig.3: kit photo of foot step energy conversion system.

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