

# Generation of Electricity Using Foot Steps

PIYUSH MAHAJAN, APURVA WANKHADE, NIHAL MANSURI,  
MONIKA GHODAKE



1Electrical Engineering, All India Shri Shivaji Memorial Society, Institute of Information Technology, Pune.

2Electrical Engineering, All India Shri Shivaji Memorial Society, Institute of Information Technology, Pune.

3Electrical Engineering, All India Shri Shivaji Memorial Society, Institute of Information Technology, Pune.

4Electrical Engineering, All India Shri Shivaji Memorial Society, Institute of Information Technology, Pune.

## ABSTRACT

The paper focuses on making proper use of footsteps. Since non-renewable energy are getting exhausted we have found alternative to make use of renewable sources like Wind, tidal, Solar, biomass, etc to generate energy . But still the problem remains unchanged. Thus, there is requirement for an innovative method to produce electricity that is presented in this report. A mechanical arrangement of worm gear mechanism is used on the staircase. This arrangement will convert the force from the footstep applied on the platform, as a rotational motion. Rotating motion rotates the rotor of the motor and electricity is generated. This model is an eco-friendly and easy to access in power generation system.

## ARTICLE INFO

### Article History

Received: 8<sup>th</sup> March 2020

Received in revised form :  
8<sup>th</sup> March 2020

Accepted: 10<sup>th</sup> March 2020

Published online :

11<sup>th</sup> March 2020

## I. INTRODUCTION

Today, power is basic requirement. Countries are dependent on energy for their economy. Growing population as well as increasing standard of living has drastic environmental change. Fossil fuel is the main power generating source, but they are harmful to environment and reducing eventually. So the only option is to invest in alternative creations. Energy production using renewable sources is the best option. Currently we are working on Solar, Wind, tidal, biomass, etc for energy production.

## II. SYSTEM REQUIREMENT

In crowded cities like India, China, etc generation of energy via human movement is highly applicable scenario. Human energy in the form of footsteps would otherwise be wasted but because of this phenomenon it can be utilized efficiently. Crowded areas like banks, schools, malls, railway station, airports, etc can make precise use of this system. Also, it will be an great exercise for people sitting idle to improve their health.

## III. WORKING PRINCIPLE

In this project principle used is, when the force is applied by human weight on the platform, the platform will make

the downward movement of the platform. The platform is connected to the worm gear mechanism and supported by four springs. Worm gear mechanism is connected to the rotor shaft of the stepper motor. Stepper motor acts as generator. The mechanism rotates the rotor of the motor during upward and downward motion of the platform. The rotor is the permanent magnet which when rotates the magnetic flux linked with the stator coil of motor changes and hence emf is induced in the coil.

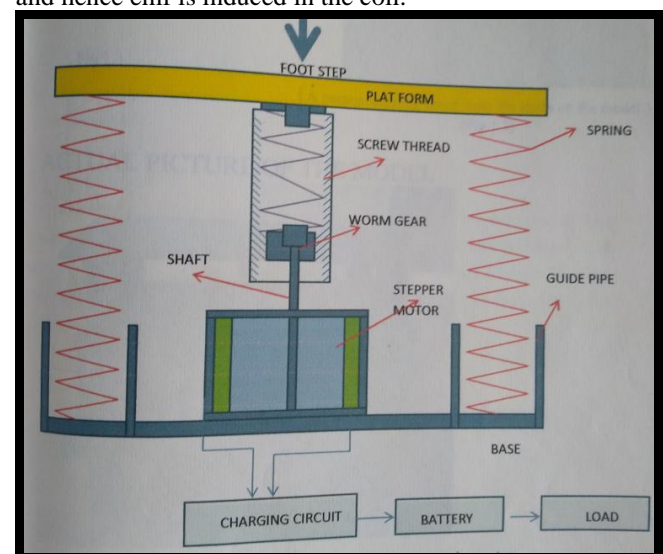


Fig.1. Working of Foot Step Mechanism

#### IV. COMPONENTS

- 1) WORM GEAR MECHANISM
- 2) STEPPER MOTOR
- 3) SPRINGS
- 4) BATTERY

##### 1. WORMGEAR MECHANISM

This mechanism converts the translatory motion into rotational motion. It is connected to the shaft of the motor. It consists of worm gear screw, internally threaded guided pipe and spring. During downward movement, this mechanism rotates the shaft in one direction after releasing the pressure due to the restraining force in spring the shaft moves in opposite direction. This mechanism is better than rack and pinion in terms of cost, size and construction.

##### 2. STEPPER MOTOR

Stepper motor is special type of DC motor which makes its movement in precise angular increments. Angular increments are measured in degrees. Applications of stepper motor are used in medical industry, robotics, satellites and control applications. Generally all stepper motors have similar specifications and features. They have high accuracy, stepper motors are brushless, are not depended on load. For varying load they will rotate at set speed provided their torque is maintained. Holding torque of the motor holds its position without breaks. Stepper motor has sequencers and driver to rotate. Switching is operated by sequencers. Flux direction in the phase winding's are changed by driver.

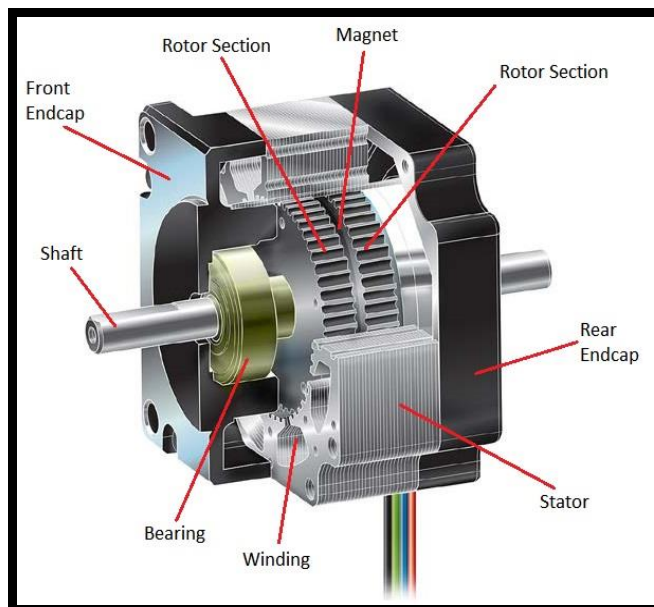


Fig.2. Stepper Motor

#### V. DESIGN OF FOOTSTEP MECHANISM

Points to be considered for machine design:

- a) High productivity
- b) Ability to produce and provide required accuracy of shape, size and surface finish is also necessary.

- c) Simplicity of design
- d) Low cost
- e) Good appearance

#### VI. ADVANTAGES

The proposed system has the following advantages:

- Electricity is generated in limited budget.
- Area required to setup the system is less.
- Traffic barrier is also very less compared to other systems.
- Maintaining this system is easy.
- Components required are less making the construction simpler.
- Generated electricity has many applications

#### VII. APPLICATIONS

Security alarms use this system.

For variety of purposes, like LED lights are using this system.

Street lamps have this system installed.

Batteries have applied this system.

It can be practiced in crowded areas like malls, temples, railway stations, airports, educational institutes.

It can be manipulated by small fans for air circulation in smaller rooms.

#### VIII. CONCLUSION

A fact that, a person walks about 150 million steps in a lifetime, which can be used to generate energy. Power generation using footsteps is reliable, economical, eco-friendly and can be used in most of the places.

In this project there is use of worm gear mechanism which is cost effective and easily available as compared to piezoelectric material or sheets or plates.

Final conclusion of 'GENERATION OF ELECTRICITY USING FOOT STEPS' is, to implement creative way to utilize energy which is wasted and to store it for future. This project can be boon for energy production in developing countries like India.

#### REFERENCES

- [1] Text book of ELECTRICAL TECHNOLOGY- B.L.Theraja, A.K. Theraja.
- [2] Analog Electronic Circuits- Sudhakar Samuel.
- [3] INTERNATIONAL JOURNAL OF ENGINEERING SCIENCES AND RESEARCH TECHNOLOGY, An Investigation on Generation of Electricity Using Foot Step Mechanism- Sibbrata Mohanty, Sasank Shekhar Panda.
- [4] Machine Design data book- K.Lingaiah.
- [5] G.R.Nagpal. "power plant engineering" khanna publishers, delhi.