

DESIGN & FABRICATION OF DANCING POWER GENERATION MECHANISM

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Abstract - In this paper, we have presented the design of power generation using footstep based on available piezoelectric sensors. Human race requires energy at very rapid rate for their living and wellbeing from the time of their arrival on this planet, because of this reason power resources have been worn out and enervated. Proposal for the employment and application of extravagant energy in foots of human is very much to the purpose for extremely populated nations like China and India. Where the streets, rail and bus station are over peopled and packed like sardines moving around the clock. So, using such concept the power can be availed and deployed by converting mechanical energy to electrical energy.

Key Words: Piezoelectricity, Plates, Footsteps, Power Generation, Electricity, Rack, Pinion.

1.INTRODUCTION

As the availability of conventional energy declines, there is need to find alternate energy sources. All most all the state electricity departments in our country, they are unable to supply the power according to the demand. The power produced by these companies is not even sufficient for domestic utilities; in such critical situation it is very difficult to divert the energy for other public needs.

There by an alternative source must be discovered, many people propose for solar energy, but it is going to be a costliest affair, moreover availability of solar energy is poor particularly in rainy & winter seasons, as a result it is not dependable.

Hence an alternative cheapest method must be determined for few applications; consequently, this project work has been taken up, which is aimed to generate electricity from Dancing Floors mechanism.

Out of the many alternative energy resources, this technology described in this project report is the ultimate source of all known forms of energy. It is clear, safe, and free, does not pollute the environment and thus will be an extremely viable alternative in the days to come. As there is a tremendous increase in the crowd, the load applied on the Dancing Floors by the people, it generates nonstop energy, which can be stored and utilized to energize the street lights. Here the concept is to convert the mechanical energy in to electric energy. 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. With the passage of time, man started to cultivate land for agriculture. He added a new dimension to the use of energy by domesticating and training animals to work for him.

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. This whole human energy being wasted if can be made possible for utilization it will be great invention and power producing platform will be very useful energy sources in crowded countries.

2. TYPES OF ENERGY RESOURCES

1. Conventional energy sources.

2. Alternative energy sources.

1. CONVENTIONAL ENERGY SOURCES:

Primary energy sources can be defined as sources which provide a net supply of energy coal, oil, uranium etc. The energy required to obtain this fuel is much less than what they can produce by combustion or nuclear reaction. The supply primary fuel is limited. It becomes very essential to use this fuel sparingly. Example: Coal, natural gas, oil and nuclear energy

2. ALTERNATIVE ENERGY SOURCES

It is any energy source that is an alternative to fossil fuel. These alternatives are intended to address concerns about such fossil fuels. The nature of what constitutes an alternative energy source has changed considerably over time, as have controversies regarding energy use. Today, because of the variety of energy choices and differing goals of their advocates, defining some energy types as "alternative" is highly controversial.

3. EXISTING SYSTEM:

Other people have developed piezo-electric (mechanical-to-electrical) surfaces in the past, but the Crowd Farm has the potential to redefine urban space by adding a sense of fluidity and encouraging people to activate spaces with their movement. The Crowd Farm floor is composed of standard parts that are easily replicated but it is expensive to produce at this stage. This technology would facilitate the future creation of new urban landscapes athletic fields with a spectator area, music halls, theatres, nightclubs and a large gathering space for rallies, demonstrations and celebrations, railway stations, bus stands, subways, airports etc. Like Capable Of Harnessing Human Locomotion For Electricity Generation.

4. PROPOSED SYSTEM:

Proposal for the utilization of waste energy of foot power with human locomotion is very much relevant and important for highly populated countries like India and China where the roads, railway stations, bus stands, temples, etc. are all over crowded and millions of people move around the clock. This whole human/bio-energy being wasted if can be made possible for utilization it will be great invention and crowd energy farms will be very useful energy sources in crowded countries. Walking across a "Crowd Farm," floor, then, will be a fun for idle people who can improve their health by exercising in such farms with earning. The electrical energy generated at such farms will be useful for nearby applications. The creation of new source of perennial environmentally acceptable, low cost electrical energy as a replacement for energy from rapidly depleting resources of fossil fuels is the fundamental need for the survival of mankind. We have only about 25 years of oil reserves and 75 – 100 years of coal reserves. Resort to measure beginning of coal in thermal electric stations to serve the population would result in global elementary change in leading to worldwide drought and decertification. The buzzards of nuclear electric-stations are only too will. Now electric power beamed directly by micro-wave for orbiting satellite. Solar power stations (S.P.S) provide a cost-effective solution even though work on solar photo voltaic and solar thermo electric energy sources has been extensively pursued by many countries. Earth based solar stations suffer certain basic limitations.

5. OBJECTIVES:

In this project we are converting Mechanical energy into Electrical energy. We are trying to utilize the wasted energy in a useful way. By using Rack and Pinion arrangement we are converting to and fro motion of the steps into rotational motion of the dynamo. In first step we are using rack and pinion arrangement directly to rotate the dynamo. But in second step we are using gear mechanism to obtain better efficiency. Through Dynamo the rotational energy is converted into electrical energy. This electrical energy output will be shown by Glowing the LEDs or showing the output in a multimeter. The output power is expected to be 3V to 4V or slidely more in prototype. Depending upon the Literature Survey of different papers we have decided to moved forward to take this project in practical means. For this purpose, we have aimed to construct

a prototype for Dancing Floor mechanism by using rack and pinion motion.

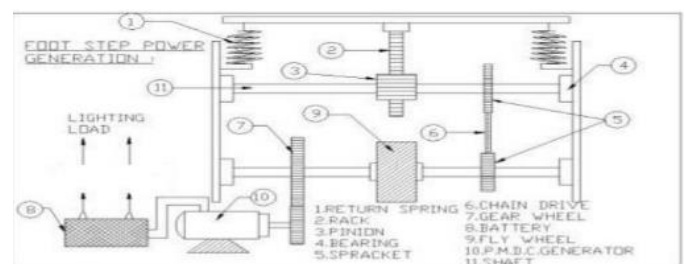
6. COMPONENTS USED

The Dancing Floor arrangement is used to generate the electric power. Now a day's power demand is increased, so the Dancing Floor 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 crowed areas. This Dancing Floor arrangement is attached with spring section. Dancing Floor section consists of:

- ☐ Springs.
- ☐ Dancing Floor.
- ☐ Gearwheel arrangement.
- ☐ Rack and Pinion section.
- ☐ DC Generator.
- ☐ Multimeter.
- ☐ Shaft.

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 gearwheel arrangement is connected to the shaft which in turn is connected to the DC generator. The DC generator is connected to the battery and the LEDs.

7. DANCING FLOOR ARRANGEMENT



8. WORKING AND BASIC PRINCIPLE:

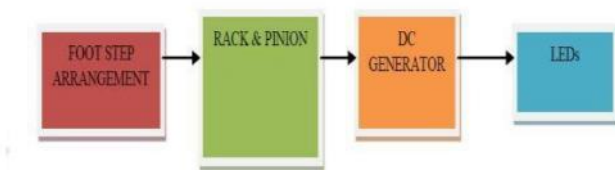
The downward movement of the plate results in rotation of the shaft of an electrical generator fitted in the device, to produce electrical energy. The top plate reverts back to its original position due to negating springs provided in the device. The upper plate is mounted on two springs; the weight impact is converted into electrical power with proper control unit.

The spring and rack & pinion arrangement is fixed below the Dancing Floor 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. One end is connected with small belt pulley system and on the other end a flywheel is mounted. The dc generator is rotated with the help of this belt & pulley arrangement. The terminal of DC generator is connected to lightning LEDs. The complete

diagram of the Dancing Floor power generation is given below. Only one step is inclined in certain small angle which is used to generate the power. The pushing power is converted into electrical energy by proper driving arrangement. : The complete fabricated model picture of Dancing Floor is shown below. 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 Dancing Floor 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 12Volt permanent magnet DC generator. The terminal of DC generator is connected to lightning LEDs. In the first step the Dancing Floors is directly connected to the Rack & pinion arrangement. To the pinion shaft dynamo is provided and LEDs are coupled to it. Thus Mechanical energy is converted in to Electrical energy.

BLOCK DIAGRAM:



With the help of block diagram as shown in Fig. 4, the working procedure is explained in step-by-step manner as follows:

Step 1: When force is applied on the plate by virtue on stamping on the plate the force spring gets compressed.

Step 2: Due to this the rack moves vertically down.

Step 3: The pinion meshed with the rack gear results in circular motion of the pinion gear.

Step 4: For one full compression the pinion Moves one semicircle, when the force applied on the plate released the pinion reverses and moves another semi- circle.

Step 5: The intermediate gear with more number of teeth will rotate as a result of motion of pinion.

Step 6: The generator attached to the intermediate will obtain the rotating motion, hence results in the sinusoidal waveform (for single Generator).

Step 7: The obtained voltage is passed through Ac neutralizer in order to reduce the ripples that are produced due to uneven motion of generator.

Step 8: From here the power is stored directly in 12v lead acid battery.

Step 9: So, the 12v DC is connected to the inverter to convert it into 230AC.

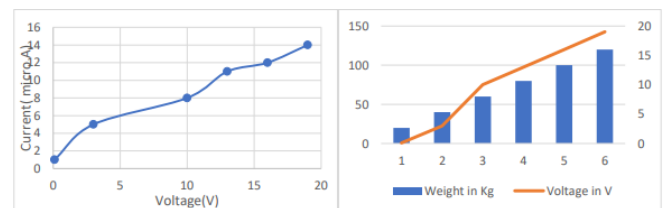
Step 10: Now the voltage obtained is used for small applications.

Step 11: The display unit takes signal from battery and converts it into digital signal by ADC and transfers its data to microcontroller.

Step 12: The voltage signal thus obtained will be displayed in LCD display about how much voltage of current is available.

9. RESULT AND DISCUSSION

The V-I characteristics of both piezoelectric effects were examined to better understand how output corresponds to the pressure and stress applied to them. The voltages formed across piezoelectric effect, as well as the quantity of current that passes through them, are measured using voltmeters and ammeters. When different pressures and stresses were evaluated on the piezoelectric element, different voltage readings were observed that corresponded to that same different pressures and strains. By charging the capacitor, energy that can be stored in it, and the resistive element can be discharged whenever needed.



First Graph is of Current (in micro-A) versus Voltage (V) and second is Weight (Kg) versus Voltage (V)

10. CONCLUSION

The project work “DANCING FLOOR POWER GENERATION MECHANISM” is designed and developed successfully, for the demonstration purpose a proto type module is constructed with lower ratings of devices, & results are found to be satisfactory. As it is a demo module it cannot be used for real applications, but the concept is near to the real working system, to make it more realistic, higher rating power generator with suitable gear mechanism is essential to produce more energy. This concept falls under the subject of non-conventional energy resources, out of the many alternative energy resources one dependable source is solar energy, but it is quite costliest affair. Therefore, alternative cheapest source is to generate electricity from Dancing Floor. This technology proven here is the ultimate inexpensive source of all known forms of energy. When it is implemented practically, depending up on the size & traffic flow, each Dancing Floor may produce tens of kilowatts power every day, this power can be utilized for many applications. If we are used this project at very busy stairs palace then we produce efficient useful electrical for large purposes. One important advantage of producing energy through this technology is that it does not pollute the environment. Hence this Dancing Floor can be altered with this technology, there by all the street lights belongs to a particular city can be energized

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