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Power Generation from Footsteps and Cycling Wheel

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Abstract - *With using non-renewable energy sources such as petroleum as well as renewable sources like solar, wind, tidal power etc., but still we couldn't overcome our power needs. So it is required to generate electricity through each and every possible ways. Power can be generated through stairs while stepping on the stairs; the generated power will be stored and can be used for domestic purposes. This system can be installed at homes, colleges, railway stations, where the people move around the clock. The utilization of human foot pressure can be very much relevant and important for populated countries like India and China. A special mechanical arrangement such as rack and pinion with geared dynamo mechanism is employed on the stair case. Power can also be added using cycling instrument power generator. This arrangement will convert the foot pressure applied on stairs, as a rotary motion. This rotary motion will be used to generate efficient electricity. It's an eco-friendly; easily accessible and non-conventional power generation system when compared to existing systems*

***Key Words*: Battery, Power Generation, Foot pressure, Load, Server.**

1. INTRODUCTION

Man has needed and used energy at an increasing rate for his sustenance and wellbeing ever since he came on the earth a few million years ago. Primitive man required energy primarily in the form of food.. With the passage of time, man started to cultivate land for agriculture.. Proposal for the utilization of energy of foot pressure with human locomotion is very much relevant and important. The energy generated from the staircase and the cycling wheel will be regulated to the battery with the help of charge controller. The stored energy from the battery will be used as a power supply for the atmega328. The relay driver will be used to switch the inverter on and off. When the inverter is turned on, further with the help of step-up transformer the voltage will be sufficient to glow the bulb i.e load. The command to switch the inverter will be passed through the user. Both atmega328 and the user will be connected to wifi.

1.1 Objectives

Nowadays energy and power are the one of the basic necessities regarding this modern world.

1) As the demand of energy is increasing day by day, so the ultimate solution to deal with these sorts of problems is just to implement the renewable sources of energy.
2) As the energy consumption is going to increase in the future, renewable energy can be a contribution to fulfill the energy requirements.

1.2 Need of project

Nowadays energy and power are the one of the basic necessities regarding this modern world. As the demand of energy is increasing day by day, so the ultimate solution to deal with these sorts of problems is just to implement the renewable sources of energy. As the energy consumption is going to increase in the future, renewable energy can be a contribution to fulfill the energy requirements.

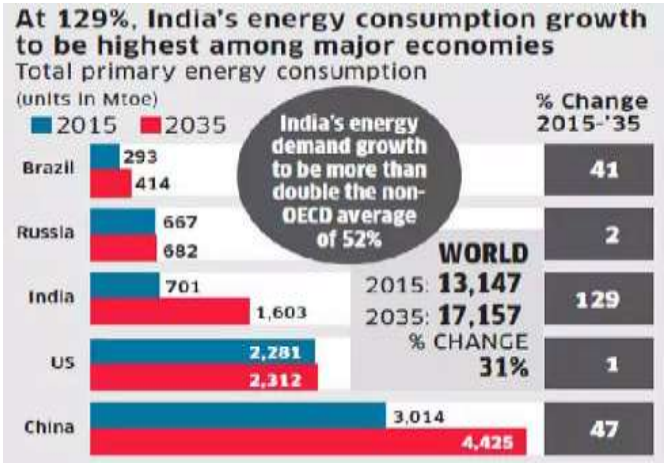

Fig -1: Chart

2. BLOCK DIAGRAM

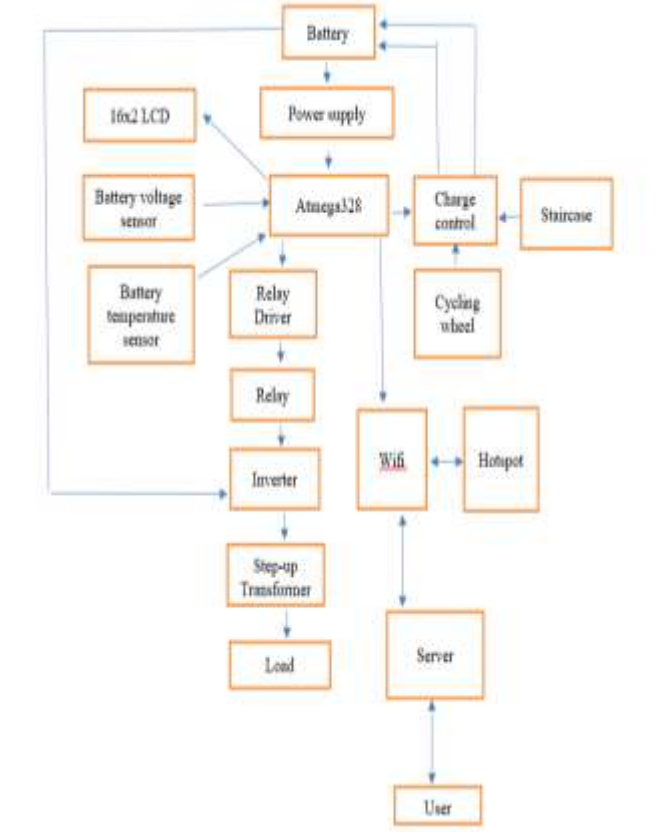

Fig -2: Block Diagram

The energy generated from the staircase and the cycling wheel will be regulated to the battery with the help of charge controller. The stored energy from the battery will be used as a power supply for the atmega328. The relay driver will be used to switch the inverter on and off. When the inverter is turned on, further with the help of step-up transformer the voltage will be sufficient to glow the bulb i.e load. The command to switch the inverter will be passed through the user. Both atmega328 and the user will be connected to wifi. The battery temperature sensor will sense the temperature of the battery and forward the data to the mega which will be further processed to LCD to display the current battery temperature. Battery voltage will also be similarly displayed on the LCD. The user can control the switch of the load. The energy in the staircase model is generated with the help of the rack and pinion arrangement and in the case of the cycling wheel it is generated by attaching a disc to the dynamo which is rotated with the help of an handle.

3. Working Mechanism

This project was mainly concerned with generation of electricity from 'power step' set up. The human load acts upon the Power step-setup will produce linear reciprocating motion on the power step. Here the reciprocating motion of the power step is converted into rotary motion using the crankshaft arrangement. A flywheel is used to produce rotary motion. The flywheel and the power step pedal are connected by means of connecting rod. The rotary motion of large flywheel is given to the small pulley by belt or chain. Hence the speed that is available at the flywheel is relatively multiplied by the rotation of the smaller pulley. This speed is sufficient to rotate the rotor of a 12V generator. The rotor which rotates within a static magnetic stator cuts the magnetic flux surrounding it, thus producing the electro motive force (emf). This generated emf is then sent to an inverter, where the generated emf is regulated. This regulated emf is now sent to the storage battery where it is stored. This current is then used for other purposes. generator converts the mechanical rotary motion into electrical energy.

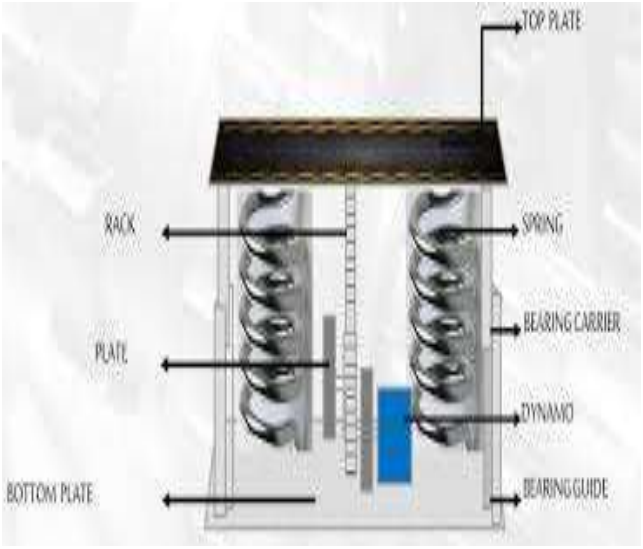

Fig -3: Rack and pinion arrangement

3. Results

The results obtained from the model is been described in table below,

Output voltage from Rack and pinion arrangement	8-10V
Output voltage from cycling wheel arrangement	8-10V
Output current from Rack and pinion arrangement	150mA
Output current from cycling wheel arrangement	150mA

Power generated in 24 hours.	1.41KW
Time needed to charge the battery	9 hours
Temperature of the battery sensed by LM35	25 degree celsius
Battery voltage rating	6V

Table -1:Results

4. CONCLUSION

In concluding the words for this work, since the power generation using stair case, rotating wheel and the get its energy requirements from the renewable source of energy. There is no need of power from the mains and there is no pollution in this source of energy. It is very useful to the places all roads and as well as all kind of stair case which is used to generate the non-conventional energy like electricity. Expected output is that the LED bulb of 0.5 watt can glow. It is able to extend this project by using same arrangement and construct in the footsteps so that increase the power production rate by fixing school and colleges, highways etc.

REFERENCES

1. GordanaLaštovička-MedinGenerating Electricity through Pedal Power. International Journal of Contemporary ENERGY, Vol. 3, No. 2 (2017) ISSN 2363-6440
2. Miss. MathaneNitashree V., Miss. SalunkheArati L, Miss. GaikwadSayali S Foot Step Power Generation Using Piezoelectric Material ISSN: 2278 – 909X International Journal of Advanced Research in Electronics and Communication Engineering (IJARECE) Volume 4, Issue 10, October 2015
3. Ramesh Raja ,Sherin Mathew Power generation from Staircase.An ISO 3297: 2007 Certified Organization, Volume 3, Special Issue 1, February 2014 International Conference on Engineering Technology and Science-(ICETS'14)
4. P. Vigneshwaran, P. Selvakumar POWER GENERATION USING SPEED BREAKER International Journal of Advanced Research in Civil,Structural,Environmental and Infrastructure Engineering and Developing Volume: 3, Issue: 1,Special Issue: 1 ,Mar,2017 ,ISSN_NO: 2320-723X

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