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Design And Development of Conventional Energy Using Varying Load on Staircase

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"Design And Development Of Conventional Energy Using Varying Load On Staircase"

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ABSTRACT

We are using the 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 we have to generate electricity through each and every possible ways. Power can be generated through we are 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 waste energy of human foot power is very much relevant and important for populated countries like India and China. There is a great possibility of tapping this energy and generating power by making every staircase as a gear power generation unit. The generated power can be stored by battery and it will be used for lightening the building. The project is concerned with generation of electricity from speed breakers-like set up. The load will acted upon the step & further the load will transmitted to rack and pinion arrangements. Here the reciprocating motion of the step is converted into rotary motion using the rack and pinion arrangement. The axis of the pinion is coupled with the gear arrangement. The gear arrangement is made of two gears. One of larger size and the other of smaller size. Both the gears are connected which serves in transmitting power from the larger gear to the smaller gear. As the power is transmitted from

the larger gear to the smaller gear, the speed that is available at the larger gear is relatively multiplied at the rotation of the smaller gear.

Keywords-foot- step, energy , Rack, pinion Gear, power, Conventional , convert

1. INTRODUCTION

Man has needed and used energy at an increasing rate for his sustenance and wellbeing ever since he came on the cart 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 untied. 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. 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 emeriti, mas began to use the wind for sailing ships and for driving windmill's, and the force of falling water to turn water for sailing ships and for driving windmills', and the force of falling water to term water wheels. Till this time, it would not be wrong to say that the sun was supplying all the energy needs of man cither directly or indirectly and that man was using only renewables sources of energy. Proposal for the utilization of waste energy of foot power with human locomotion is very much relevant and important. Man has needed and used energy at an increasing. rate for his sustenance and well-being ever since he came on the cart a few million years ago, 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 term water wheels. This project attempts to show how energy can be tapped and used at a commonly used four steps. The usage of steps in every building is increasing day by day, since even every small building has some floors. A large amount of energy is wasted when we are stepping on the floors by the dissipation of heat and friction, every time a man steps up using stairs. There is great possibility of tapping this energy and generating power by making every staircase as a power generation unit. The generated power can be stored by batteries, and it will be used for lighting the building. Earlier various researchers had work on the conversion of dynamic energy to electrical by human locomotion. In the re-verse electro-wetting in which motion of conductive liquid on dielectric coated conductive substrate causes to create electric-al energy, so whenever there is any vibration on the upper plate due to human locomotion or by any mean could result in producing electrical energy as shown in following figure Scientist of the hull university also worked on transforming man motion in to electrical energy and get positive results. Various experiments had made in Japan also to amasses energy from footsteps.

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 cosily replicated but it is expensive to produce at this stage. This technology would facilitate the future creation of new unbar 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

Proposed System:

1. 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.

2. The 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 easing The electrical energy generated at such farms will be useful for nearby applications

3. The creation of new source of perennial environmentally acceptable, low cos 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 elemental change in leading to worldwide drought and decertification. Solar power stations (S.P.S) provide a cost-effective solution even though work on solar photo voltaic and solar thermal electric energy sources has been extensively pursued by many countries. Earth based solar stations suffer certain basic limitations.

Methodology:

Methodology is the systematic, Theoretical analysis of the methods applied to a study or to the theoretical analysis of' the method and principles associated with branch of study. The project is consisting of the stair case which works on the force applied by the man when standing on it. The springs get deflected by the force and reciprocating motion is carried out. By using of rack and pinion arrangement reciprocating motion converted in to rotary motion an attachment of motor work as a generator.

1. Studying the present mechanism
2. Field survey
3. Problem definition
4. Design of frame, gear, spring.
5. Fabrication.
6. Calculation.

Block Diagram:

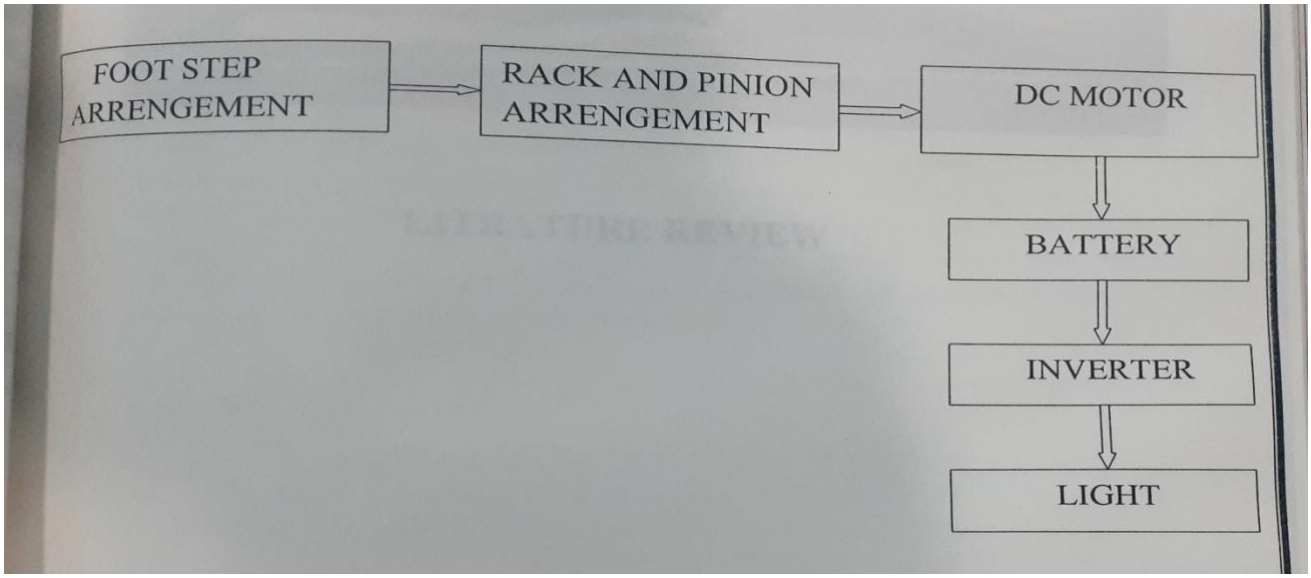

Fig no: 1 schematic flow chart of staircase

2. Literature Review

In the review, research papers of power generation are referred and studied, Some of the reviews are an follow

1 Siba brata Mohanty and Nasank shekhar Panda

They ensure proper operation that meats the performance requirement, for the they determine the voltage the micro-generator can generate from various rotation speeds.

> This can be done by using a motor to drive to generators and using moil miler to measure the voltage. At the same tine we will need to us seniors to determine the rotation speed of our gears and flywheel and adjust them in older to obtain optimum speed. Determine the capacitance and number of capacitors we will use for the storage, An oscilloscope can be unused to she how long does average thriftier charge up different capacitors.

2 Chandra Sekhar And B Murali Kishore

They have aim of this project is to develop much leaner cost effective way of power generation method, which in turns helps to bring down to global warming an well as reduce the power shortages In this paper they are generating electrical power as nonconventional method by simply walking or running on the foot step. Nonconventional energy system is very essential at this time to our nation. Nonconventional energy using foot step is converting mechanical energy into the electrical energy. This paper uses electromagnetic induction principle. In this

paper the pressure energy is converted into electrical energy. The control mechanism carries the copper coil and bar magnetic which is used to generate voltage, a rechargeable battery is used to store this generated voltage.

3 Kiran Boby And Aleena Paul

The piezoelectric material converts the pressure applied to it into electrical energy. The source of pressure can be cither from the weight of the moving vehicles or from the weight of the people walking over it. The output of the piezoelectric material is not a steady one. So a bridge circuit is used to convert this variable voltage into a linear one Again an AC tipple filter is used to filter out any further fluctuations in the output. The output de voltage is then stored in a rechargeable battery. As the power output from i single piezo-film was extremely low, combination of few Piezo films was investigated Two possible connections were tested - parallel and series connections, The parallel connection did not show significant increase in the voltage output.

4 Shiraz Afkal And Farrukh hafeez

They given a same approach as was anticipated by Tom Jose but different mechanism is proposed. In this paper a gear system is attached with By wheel which causes to rotate the dynamo as the tile on the deck is pressed The power that is crested is saved in the batteries In addition they 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 tum the shaft beneath the tile, tum is limited by clutch bearing which is underpinned by holders. Primary shaft is rotate approx. twice by a single tile pasty The movement of the prevailing shaft tum the gearbox shaft which builds it 15 times (1:15) then its movement is smoothen by the help of try wheel which temporary store the movement, which is convey to the DC generator (it generates 12V 40 amp at 1000 rpm). Energy generated is stored in the batteries, an inverter circuitry is implemented to convert the DC to AC.

5 Siba brata Mohanty And Sasank Shekhar Panda (2015)

The objective of this work is power generation through footsteps as a source of renewable energy that we can obtained while walking on to the certain arrangements like footpaths, stairs, Plate forms and these systems can be installed elsewhere specially in the dense populated areas. The basic working

principle of footstep power generation system" is based on the crank shaft and gear arrangement and lie wheel.

6 C.Nithiyesh Kumar, K.Gowtham, M.Manikandan, P.Bharathkanna, "PowerGeneration in Automobile Suspension System" been this research paper author studied three methods of foot step power generation namely piezoelectric method, rack and pinion method and fuel piston method comparatively and found that the rack and pinion mechanism is more efficient with moderate cost of operation and maintenance.

7"Md.azhar, Zitender rajpuroht, Abdul Saif Nalla, P sai chandu

Generation of Electrical Energy from Foot Step Using Rack and Pinion Mechanism" In this research paper authors used regulated 5V power, 500mA power supply. Bridge type full wave rectifier is used to rectify the ac output of secondary of 230/12V step down transformer. A rack and pinion is a type of linear actuator including a pair of gears which convert rotational motion into linear motion. The "pinion" engages teeth on the rack. In this paper, since the power generation using foot step get its energy requirements from Non-renewable source of energy. There is no need of power from external sources (mains) and there is less pollution in this source of energy. It is very useful to the places like all roads and as well as all kind of foot step which is used to generate the non-conventional energy like electricity.

3. Design and construction:

3.1Design Analysis.

1.General Design considerations:

Generally, the design of this system depends primarily on the moment of the pinion which is meshing with the rack and the stuffiness of the spring which deflections are occurs by putting the pressure on the stair. The system is also depends on the rating of the DC permanent magnets which produce the DC and the required output power. In light of the above constrain the following design consideration and assumptions has been made for this project design

2. Sizing and economic consideration

This system is design to compact in consideration of power requirement as well as reduction in the cost of fabrication.

3.Safety consideration:

This system is design in such a way that peoples can use it for sustain period of time. it preserves the safety of our immediate environment from air pollution stability of the unit was also considered to ensure that the equipment remains upright at all time

4. Technological consideration:

The design of this system is well considered in such a manner thought it can be produced within the technology of our immediate environment

3.2 frame design:

1. Choosing Frame Material.

The material used for frames have a wide range of mechanical properties. MS frames provides the ideal combination of performance and purchase cost. They can be inexpensively repaired and have the ability to reveal frame stress injuries before they become failures. Because it is

soft material, mild steel is easy to weld, whereas high carbon steels, such as stainless steel, require the use of specialized wielding techniques. Mild steel is a variant of hard steels, which makes it less brittle and enhances its flexibility.

2. Frame dimension and construction:

We have used rectangular angles and circular pipes to build the frame of our project.

The size of the frame is 300+200 mm,

3.3 Selection of Motor:

In any electric motor, operation is based on simple electromagnetism. A current carrying conductor generates a magnetic field; when this is an extremal magnetic field it will experience a force proportional to the current in the conductor, and to the strength of the external magnetic field.

Specification of motor:

1. Torque- 180Nm

2. Voltage- 12 DC

3. Current- 4amp

4. Speed-1000mpm

This motor acts or delivers the characteristics of shunt motor that is of constant torque characteristic, hence we have converted third low torque at high speed into hish toraue at Jow speed by gear mechanism

3.4 Selection of gear

1. Type: spur gear

2. Mechanism: rack and pinion

3. No of teeth on rack :25

4. No of teeth on pinion:07

5. Uses: to convert sliding motion to rotary motion.

6. Material: MS metal

3.5 Selection of spring:

1. Material: steel wire.

2. No ofcoil: 18

3. Dia Of wire (d): 5mm.

4. Mean coil dia (D): 30mm.

5. Stiffness of spring (K): 1.2525mm

6. No of active coil: 18

7. No of inactive coil: 2

8. Total no of turns: 20

3.6 Rack and pinion Mechanism:

A rack and pinion is a type of linear actuator that comprises a pair of gears which convert rotational motion into linear motion. A circular gear called "the pinion" engages teeth on a linear "gear" bar called "the rack"; rotational motion applied to the pinion causes the rack to move relative to the pinion, thereby translating the rotational motion of the pinion into linear motion. For example, in a rack railway, the rotation of e pinion mounted on a locomotive or a railcar engages a rack between the rails and forces a train up a steep slope. For every pair of conjugate involutes profile, there is a basic rack. This basic rack is the profile of the conjugate gear of infinite pitch radius**.** A generating rack is a rack outline used to indicate tooth details and dimensions for the design of a generating tool, such as a hob or a gear shaper cutter. Rack and pinion combinations are often used as part of a simple linear actuator, where the rotation of a shaft powered by hand or by a motor is converted to linear motion. The rack carries the full load of the actuator directly and so the driving pinion is usually small, so that the gear ratio reduces the torque required. This force, thus torque, may still be substantial and so it is common for there to be a reduction gear immediately before this by either gear or worm gear reduction.

Rack gears have a higher ratio, thus require a greater driving torque, than screw actuators. A rack and pinion mechanism is used to transform the rotary motion in to linear motion and vice versa. A single gear, and pinion meshed with a sliding toothed rank. This combination is converts rotary motion in to back and forth motion. Windshield wipers in cars are powered by rack and pinion mechanism.

3.7 Helical extension springs:

The variety of ends that can be put on extension springs is limited only by the imagination and may include threaded inserts, reduced and expanded eyes on the side or in the centre of the spring, extended loops. hooks or eyes at varying positions or distances from the body of the spring, and even rectangular or tear drop shaped ends.(The end is a loop when the opening is less than one wire size; the end is a hook when the opening is greater than one wire size.) By far the most common, however, are the machine loop and crossover loop. These ends are made with standard tools in one operation and should be specified whenever possible to minimize cost. Remember that as the space occupied by the machine loop is shortened, the transition

radius is reduced and an appreciable stress concentration occurs. This contributes greatly to shortening spring life and premature failure.

Most extension spring failures occur in the area of the end. To maximize the life of the extension spring, the path of the wire should be smooth and gradual as it flows into the end. Tool marks and other stress concentrations should be held to a minimum. A minimum bend radius of 1 1/2 times the wire diameter is recommended.

Spring Terms

OD = Outside Diameter

D = Mean Diameter

d = wire diameter

Na = number of active coils.

R = Spring Rate

P = applied force

St = tensional stress

Sb = bending stress(in loops)

IT = initial tension

c = spring index

L = deflection

XLP = cross centre loops

MLP = machine loops

UTS = Ultimate Tensile Strength

3.7.1 Selection:

Extension Springs are organized in order of increasing diameter and wire size. Note that in each category the spring rate decreases as the length increases. After identifying the proper outside diameter of the spring needed, select a range for wire diameter and free length. The broader the range of values selected the more options will be offered. Maximum Load & Extension.

3.7.2 Maximum Load & Extension:

The maximum loads and extended lengths are provided as a precautionary guide. They are based on a stress of 35% of tensile which is good for most applications. Even though most of

these springs could be used beyond the listed lengths in light applications, there is a higher probability that the spring will deform or the loop will fail.

3.7.3 Determining Loads at any Length:

Determining Loads at any Length To determine loads at lengths other than the maximum extended length multiply the amount of extension beyond the free length by the spring rate and add the initial tension. Ends Machine or X-Centre Loops - Random Position.

Special loops, gaps and position can be furnished upon request. The cost for special ends is based on difficulty and quantity required.

3.7.4 Finish:

Plain finish Special finishes including Plating, Shot Preening and Passivation can be supplied on request. Please allow additional time

3.7.5 Tolerances:

Spring Rate +10% Load at Max. Length ±10%

Outside Diameter 0.063 to 0.119 ±0.003 0.120 to 0.240 ±0.005 0.241 to 0.500 0.008 0.501 to 1.000 ±0.015 1.001 to 1.225 40.020 1.226 to 1.460 10.030 1.461 to 2.000 ±0.040

3.8 Construction:

DC motors consist of one set of coils, called armature winding, inside another set of coils or a set of permanent magnets, called the stator. Applying a voltage to the coils produces a torque in the armature, resulting in motion.

1. The stator is the stationary outside part of a motor. The stator of a permanent magher de motor is composed of two or more permanent magnet pole pieces.

2. The magnetic field can altematively be created by an electromagnet. In this case, a DC coil (field winding) is wound around a magnetic material that forms part of the stator.

- **Rotor**:

1. The rotor is the inner part which rotates.

2. The rotor is composed of windings (called armature windings) which are connected to the external circuit through a mechanical commentator.

3. Both stator and rotor are made of ferromagnetic materials. The two are separated by air-gap.

- **Winding**:

A winding is made up of series or parallel connection of coils.

Armature winding - The winding through which the voltage is applied or induced.

Field winding- The winding through which a current is passed to produce flux (for the electromagnet)

Windings are usually made of copper.

3.8.1. Energy Conversion:

If electrical energy is supplied to a conductor lying perpendicular to a magnetic field, the interaction of current flowing in the conductor and the magnetic field will produce mechanical force (and therefore, mechanical energy).

3.8.2 Circuit description:

1. 1In one simple inverter circuit, DC power is connected to a transformer through the centre tap of the primary winding. A switch is rapidly switched back and forth to allow current to flow back to the DC source following two alternate paths through one end of the primary winding and then the other.
2. The alternation of the direction of current in the primary winding of the transformer produces alternating current (AC) in the secondary circuit. The electromechanical version of the switching device includes two stationary contacts and a spring supported moving contact. The spring holds the movable contact against one of the stationary contacts and an electromagnet pulls the movable contact to the opposite stationary contact.
3. The current in the electromagnet is interrupted by the action of the switch so that the switch continually switches rapidly back and forth. This type of electromechanical inverter switch, called a vibrator or buzzer, was once used in vacuum tube automobile radios. A similar mechanism has been used in door bells. Buzzers and tattoo guns .As they became available with adequate power ratings, transistors and various other types of semiconductor switches have been. Incorporated into inverter circuit designs.

4. Design and Calculation:

4.1 Frame Design:

1)M/I × 6/Y.....(1)

2) I bd3/12 = 1600mm

3)6b= 638x150 =6/1600 = 119.62 N/mm1600 ..using equation (1)

4)6b <<6allow = so design is safe.

4.2 Spring Calculations

- Material = Steel Wire

- .Ultimate tensile strength =1090N/mm2
- Modulus of Rigidity = 81370 N/mm2
- Wire diameter: Permissible shear stress for spring wire should be taken as 50% of the ultimate tensile strength.

  P=638

  G-81370N/mm2: T-0.5 T=0.5*sut = 0.5*1090 = 545 N/mm2

  K= 4C – 1/4C – 4 + 0.615/C = 4x6-1 / 4×6-4+ 0.615 /6 = 1.2525.

  £ = K × 8PC/3.14d2 = 1.2525 × 8 × 638 × 6/ 3.14d2 = d = 5 mm.

  Where,

  d= wire diameter , Di- inside diameter.

1. D = mean coil diameter: D = c×d = 6x5 = 30mm.
2. Number of active coil : € = 8×PD^3 × N / Gd4 ; 50 = 8× 638×30^3× N/81370×5^4 = 18
3. Total no of turns: it is assumed that the no of in active coils is 2
   N1 = N+2-20
4. Free length of the spring : the actual deflection of the spring.
   8×P×D^3×N/G×d^4 = 8×638×30^3/ 81370×5^4 = 48.78.
5. Solid length of the spring =20x5=100
6. It is assumed that here will be gap of between consecutive coils which spring is subjected to max force, Total no of coils is 18
   Axial gap (N1)-N-1 =(18-1)*1=17mm
   Free length = solid length + axial gap.(solid length- N1xd-20x5-100)
   100+17+19=166 mm
7. Pitch of coil: p- = free length/N1 – 1 = 166/18 -1 = 9.76mm

4.3 Rack and pinion:

8. Fn = Ft tan 20 .....(1)
   Ft = tangential force (weight of human =60kg) ...std value.
   Ft = 60×9.81=588.6N
   Fn =588.6xtan 20 = 214.23N
   Fr = Ft / cos 20 = 588.6 / cos 20= 626.38 N
9. P = force x Displacement/ Time = 588.6x0.050/1 =29.43watt
   P = 2×3.14xNxT/ 60 = T = 9.3Nm
4. T = ftxr; r = 0.15m
5. r= 15mm, so D= 30mm.
6. 6x= 38,22N/mma
   6allow Sut/ FOS = 210/ 2 = 105N/mma
   So,6t<<6allow, hence design is safe.

m=2=3.571, the module of the pinion = 3.571; also module of the rack = 3.571

7. pinion dimension: outer Dia, =2m+D=2x3.571+25= 32.14mm.

8. Root dia (d-) D-(2m+2C)-25-(2x3.571+2x0.25)= 17.358mm.

9. Addendum ,Ad =m=3.571 mm

10. . Duodenum (Dd) = m+c = 3.571+0.25=3.8mm

11. Linear displacement of rack =L=3.14mxT=Tx3.571x18= 201 mm (max. length of the rack is 200mm; width of rack is 15mm)

4.4 Voltage Calculation:

Let us consider,

1 The mass of a body = 60 Kg (Approximately) Height after step =12em

Hence, work done = Force x Distance

Here,

Force= Weight of the Body.

=60Kg x9.81 = 588.6 N

2. Output power =work done /sec. =(588.6x0.12)/60 = 1.17 watts.

3. P = V/ 2 = R

P= power, R= resistance, V Voltage.

Hence, V=VPRV1.17 x13 = 3.9 Volt.

5. Working principle

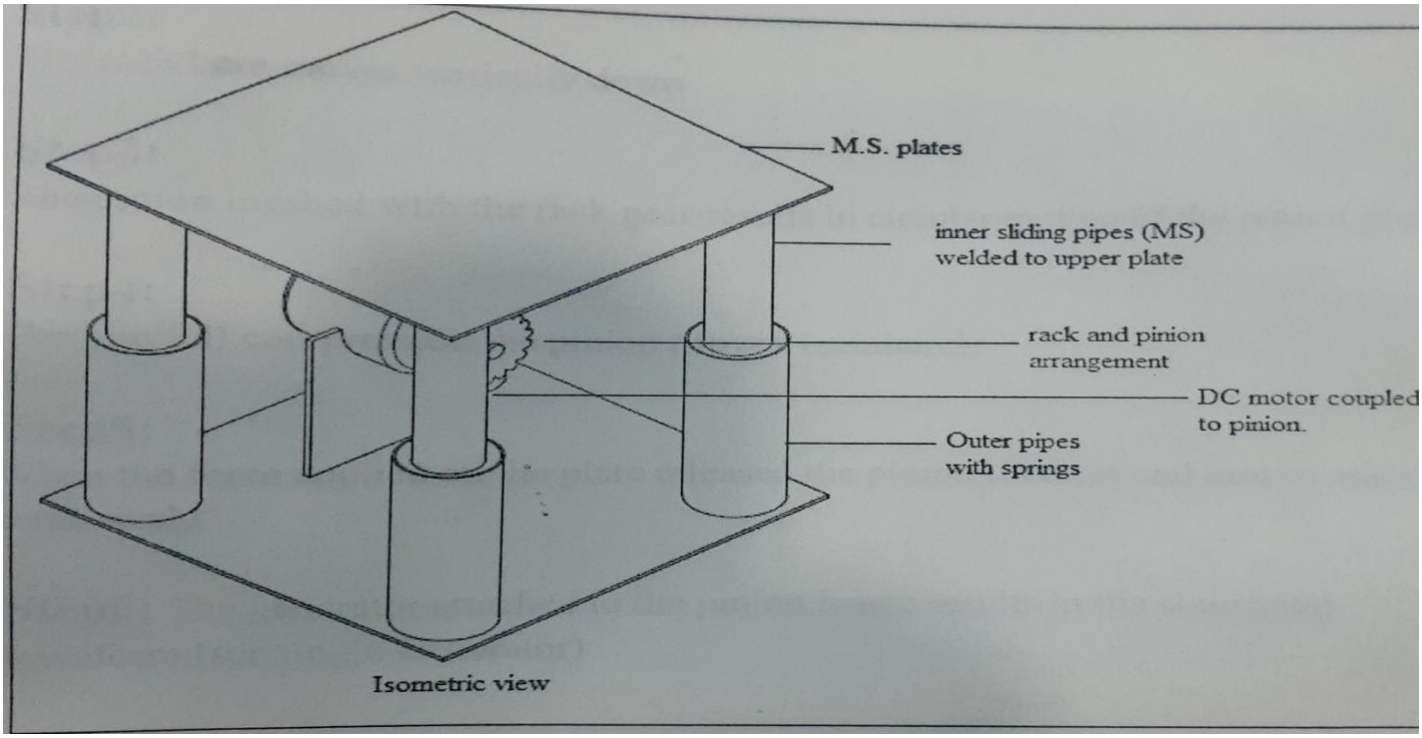

Fig no-2 schematic diagram of stair case

The complete diagram of the power generation using STAIR CASE is given below. L shapes window 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 rack & pinion, spring arrangement is fixed at the STAIR CASE which is mounded bellow the L-shapes window. The spring is used to return the inclined L-shapes window in same position by releasing the load. The gear wheel is coupled to the smaller motor shaft. The generator is used here, is permanent magnet D.C generator. The generated voltage is 12Volt D.C. This D.C voltage is stored to the Lead-acid 12 Volt battery. The battery is connected to the inverter. This inverter is used to convert the 12 Volt D.C to the 230 Volt A.C. This working principle is already explained the above chapter. This 230 Volt A.C voltage is used to activate the 380

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

Step 2 - The rack here 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 Isemicircle

Step 5 - When the force applied on the plate released the pinion reverses and moves another semi-circle

Step 6 - The generator attached to the pinion hence results in the sinusoidal waveform (for single Generator)

5.1 Types of motion:

- Linear
- Rotary
- Reciprocating

5.2 The different types of forces:

- Static- no movement (still force) .
- Dynamic - moving forces .
- Compression- squashing force .
- Tension-pulling force.
- Bending - compression and tension .
- Torsion - turning or twisting.
- Shear- cutting
- Equilibrium- all forces are balance

6. Advantages:

1. Simple technology and easy maintenance.
2. No labour required.
3. No fuel required.
4. Pollution free power generation.
5. This system does not depend on the weather like solar, wind and hydro power generations, so the energy available all around the year.
6. This unit has minimum cost of installation
7. Conversion of mechanical energy into electrical energy is easy.
8. Maintenance cost is low.
9. Power is generated simply by walking on the step
10. Power also generated by running or exercising on the step and implementing this mechanism on treadmills.
11. This is a Non-conventional system.
12. Highly efficient in more crowded places.
13. Depending upon the power generator and number of them, power output is very high

14. This process depends on human resources which is available in plenty in our country which makes our country a favourable place for this project.
15. Promising technology for solving power crisis to an affordable extent.
16. Reduces transmission losses.
17. Battery is used to store the generated power else we can use directly this generated power for conventional purposes.

7. Limitations:

1. Selection of spring
2. To get the required r.p.m. of the generator shaft.
3. Skilled operators are required.
4.Less electricity will produced.
5. Initial cost is high

8.Applications:

1. This can be implemented on railway stations, bus stops, air ports to generate electric power by human physical activity.
2. Also can be implemented in parking lots, electric escalators.

3. This mechanism can be implemented on jimmying instruments like cardio machine for power generation and the power generation rate is high.

4. We can use this mechanism in automobile suspension system

5. In rural areas etc. High Initial Cost.

6. Also can be implement in temples, music hall ,audios.

7 .Foot step generated power can be used for agricultural, home applications, street lightening

8 .Foot step power generation can be used in emergency power failure situations.

9. This technique can be used in all colleges.

9.Conclusion

1. In concluding the words for this work, since the power generation using stair case get its energy requirements from the Non-renewable source of energy.
2. There is no need of power from the mains and there is less pollution in this source of energy.
3. 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.
4. 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 the output power generated is 3volt.
5. .Our final conclusion in this project is creative way to make use of the energy wasted in various ways. By storing output power in batteries we can utilize this for further use. By making to rotate rack and pinion arrangement in either direction though out power can be increased. When we implement this project in large scale the overall cost of the project reduces.

10.Future Scope:

Small changes in construction and design of the power generation set up can help to make the following future applications. 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. Aim of this project is to develop the world by enriching it in utilizing its sources in more useful manner. Any country can only develop when it uses power supply frequently and not by getting breakdown in middle course of time. Now time has come for using these types of Innovative ideas and it should be brought into practice. It is suggested that further developments should be done for above mentioned challenges.

IN this project ,we can also use Damper to overcome the problem of jerk and unbalance of people with luggage bag.

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