Swayam Generator

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Abstract- Swayam generator is mainly related to the electricity generation by non-polluting and renewable sources of energy. Generation of electricity by non-polluting and conventional sources of energy has become really important for developing country such as India. The per capita consumption of electricity is increasing day by day .India has many thermal electric power plant which are operated on the coal and it creates huge amount of air pollution. So in this project an effort has been made to give best possible solution by using non-polluting and renewable sources of energy. In this project some basic concepts from fluid mechanics and physics used to rotate the shaft of an electric generator.

Indexed Terms- Swayam, Capita, Renewable, Thermal

I. INTRODUCTION

Generation of electricity by non -polluting and conventional sources of energy has become really important for developing country such an s India. The per capita consumption of electricity is increasing day by day. India has many thermal electric power plant which are operated on the coal and it creates huge amount of air pollution whose effects are known to us on Nature. So an effort has been made to give best solution to this problem by using some basic concepts. The project is designed on such a way that designed such a system will be 100 percent pollution free and will use really less resources and give us maximum output. So by using basic concepts of fluid mechanics, physics, design of machine elements. So the concept involves siphon[4] which is nothing but "A practical siphon, operating at typical atmospheric pressures and tube heights, works because gravity pulling d- own on the taller column of liquid leaves reduced pressure at the top of the siphon[5] (formally, hydrostatic pressure when the liquid is not moving. Secondly by using electric generator which is nothing but A conductor coil (a copper coil tightly wound onto a metal core) [3] is rotated rapidly between the poles of a horseshoe type magnet. The magnetic field will interfere with the electrons in the conductor to induce a flow of electric current inside it. And thirdly the concept of priming [1] and vacuum which is nothing but air enters the pump and mixes with water at the impeller. Water and air are discharged together by centrifugal action of the impeller into the water reservoir. The air naturally tends to rise, while the water tends to sink.

II. OBJECTIVES

The project is mainly related to the electricity generation by non-polluting and renewable sources of energy. Generation of electricity by non-polluting and conventional sources of energy is become really important for developing country such as India. The per capita consumption of electricity is increasing day by day. India has many thermal electric power plant which are operated on the coal and it creates huge amount of air pollution.

So in this project an effort has been made to give best solution by using non-polluting and renewable sources of energy.

III. SCOPE OF PROJECT

Everyone needs electricity, without electricity we can't do our day to day work.

This project is beneficial for everyone. We are generally focusing on the village areas where electricity is major problem. So this project will help them to create electricity on their own on a large scale.

The process used in this project to make electricity is completely different. It is a completely eco-friendly process. It does not have any hazardous effect on environment which the other systems have

IV.   NOMENCLETURE

d=Inner diametre
D=Outer Diameter
r=radius
L_n=Number of LinksS
v=velocity
g= Acceleration due to gravity
C= Dynamic Load Capacity
C_o=Static Load Capacity
Z=Number of teeth
H=Height

V.   DESIGN

The design is simple, it contains simple parts such as:
1) Generator shaft
2) Sprockets
3) Buckets
4) Rails
5) Chains
6) Tanks
7) Water supply tube

A. TANK

Volume of Tank = 16 litres
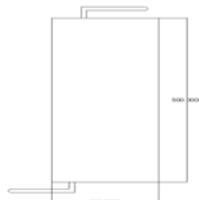Height =500mm
Radius= 100mm
Mounted at 7m above the grounds

Fig1-Tank

B. BUCKET

Length =200mm
Breadth=200mm
Height=100mm
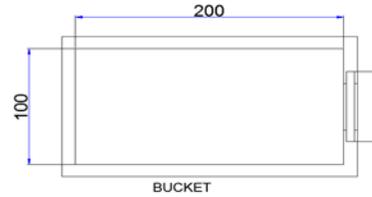
Fig2- Bucket

C. SPROCKETS

No of Teeth on Sprocket: Z=10
$$= 360/Z$$
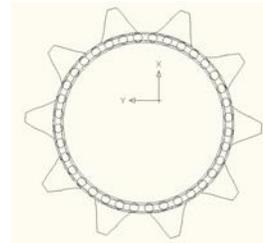$$=360/10$$
$$=36$$
Nominal Diameter=40mm
 Pitch = 12.4mm

Fig3-Sprocket

D. JOURNAL BEARING

Internal diameter (d) = 40mm
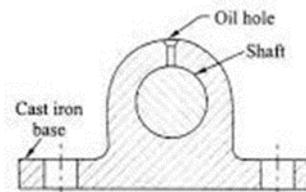External diameter (D) = 50mm
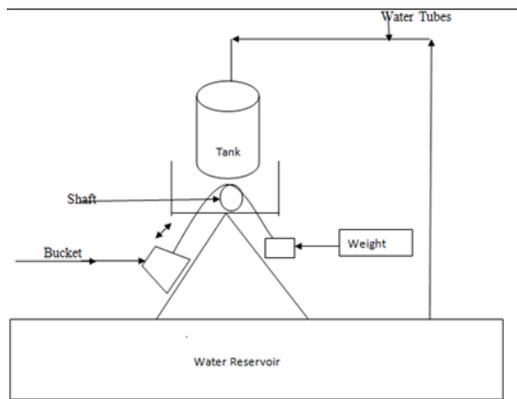Available bearing is 6203

Fig4-Journal Bearing

VI. WORKING

Fig5-Basic Working Diagram

1) The first thing we have to do is to create vacuum in the tubes which are connected to the upper tank and reservoir .Then after whole system will ready to follow bernoullis principle steadily.[8]
2) So by creating vacuum in the tube at the top the, water will flow from lower reservoir to the top tank thereby filling the upper tank.[8]
3) The opening given at the bottom of sealed tank is open to atmosphere under gravity. Water can flow through this opening due to gravitational force act on it,this outgoing water will decrease the volume of water inside tank which will cause for increase in pressure at inlet of the tank.
4) This increased pressure is now try to pull water from the other end of the pipe connected to top of the tank ,now due to demanded pressure water head will gone be increased.
5) The three sprockets are connected to the shaft of generator .Both the sprockets have their separate chains on them.
6) At the both end of the each chain the rectangular buckets are fitted. Which are rolling on the railing on the inclined surface.
7) When the one bucket will be at the top the second bucket will be at bottom. Now the tank at top will automatically fill the water at the top bucket. So the weight of the bucket will increase and by gravity it will automatically more downward.
8) And it will release the water when it reaches downward to the bottom reservoir. Now the bucket at the other side will automatically move upward. Now again the upper tank will automatically fill

the bucket and now this bucket will move downward and will rotate the shaft of the generator.
9) So due to this bucket motion the sprockets which are mounted on the generator shaft will automatically rotate and will create electricity.

VII. CALCULATIONS

1) Designation Of Bucket:
   L=200mm,
   H=100mm,
   B=200mm

2) Velocity of Bucket
   Weight on Bucket Converted To Its KE Due to Gravity For, H= 2 Meters
   $v = \sqrt{2gh}$
   $v = \sqrt{39.24}$
   $v = 6.24 m/s$
3) Diameter Of Shaft, N=1500RPM
   $v = DN/60$
   D=39.85 mm
   D=40 mm

4) No Of Teeth On Sprocket:
   Z=10 = 360/Z =360/10=**36**
5) Pitch Of Chain:
$$\sin\frac{1}{2} = \left(\frac{P}{2}\right)\left(\frac{D}{2}\right)$$
   P=12.4mm
6) Length Of Chain:
$$L = L_n \times p$$
   L=3.6 M

7) Generator Designation:
   Revolution- 1500RPM
   Frequency-50Hz

8) Force=Mg.
   M= Mass of Water in Bucket=3kg
   g=Gravitational Constant=9.8m/s*s
   Force= 58.86N

9) Torque = Force Displacement.
   = (39.812)
   = Torque= 58.86N

Power $= 2\pi NT/60$.
$= 2(1500) (58.86)/60$

Power=2.943 KWatt

CONCLUSION

1) Starting of the system is really important step in the entire project. Once the starting is done carefully the entire system will work seamlessly and will work at its maximum efficiency.
2) The concept of siphon plays an important role in system. Due to the siphon the water flows continuously in the system from up and down.
3) As per the calculation the result are completely satisfied. The system generates adequate amount of electricity which is useful to everyone.
4) The experimental calculation shows that the system has huge potential for the generation of electricity.
5) The system can be used by everyone and can be implemented by every individual easily.
6) The system is economical.
7) The system is non-polluting.
8) The system is eco-friendly.

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ACKNOWLEDGMENT