Generate Electricity on stagnant water without fuel or any other raw material (Pollution free)

Shubhankar Paul

Abstract— **If water is put on different level then from upper level to lower level it flows automatically for it's same height principle. If we submerge a bucket in a water tank and pull it up holding it's open faces vertically down then water enters into the bucket and the level goes up as far as the bucket pulled up because air give pressure on open water and water enters into the bucket to fill up the void area. Because the void area has no pressure. Now if we can attach a pipe from the upper part of the bucket and keep it's open end down than the bucket's pulled up height from the water then water will automatically come out from the bucket. Now if we fix a generator output terminal shaft with a fan fixed on it in the water flow then the shaft will rotate and eventually the generator will output electricity. This is how electricity is generated without fuel or any raw material or not from flowing water rather from stagnant water.**
Another method (Method 2) is on the same principle of water (Same height principle) is discussed later.
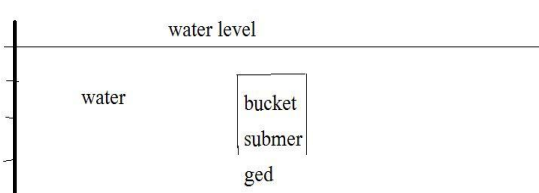
Index Terms— **This is how electricity is generated without fuel.**
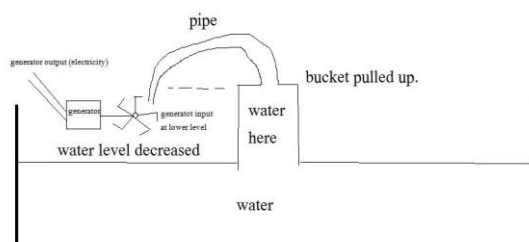
I. INTRODUCTION

Here is a manuscript for generating electricity on stagnant water without fuel or other raw material.

Process Design and materials needed :

Initial condition bucket is submerged.

After bucket is pulled up

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the bucket will be hold by a holder. This is not shown in the figure.

So, materials needed are stagnant water pool, generator, big bucket. Pipe, pipe holder and bucket lifter.

II. PHYSICS BEHIND :

When the bucket is pulled up the water level decreases and the volume of water that decreases is the volume that is inside the bucket. So, if we make the bucket narrow and of more height then water level will be up more and from pipe water will emerge at more speed.

Say, the tank level is decreased by height h and the area of the base of the tank is a. The area of the base of the bucket is A and height of the bucket is H.

Then, ah = AH
⇨ H = ah/A
⇨ Less the area of the bucket and more the area of the water tank the height (H) is more and hence the sped of the water from pipe outlet is more. Hence generator will find enough energy to start.

III. RISK :

When the pipe is fixed on the bucket it is to be cared that no air is going into the bucket. Otherwise water level will fall down due to the pressure of the air that has entered bucket through pipe. So, we need to take a water filled pipe closed at both end and after fixing it to the bucket the close end should be made open so that air cannot enter anywhere.

IV. ADVANTAGE :

Advantages are as follows :
1) There is no cost of generating electricity.
2) No dam or big thing needs to be installed so that initial cost is also low.
3) Once in action then maintenance cost is minimum as such no maintenance cost.
4) No big risk of the employees working over there.
5) It is pollution free.

V. LOSSES :

Eddy current loss will be there in the generator. We will discuss this. Mutual Inductance will be there in the generator. We will discuss this as well.

VI. EDDY CURRENT :

Consider a solid plate of metal which enters a region having a magnetic field. Consider a loop drawn on the plate, a par of which is in the field. As the plate moves, the magnetic flux

through the area bounded by the loop changes and hence a current is induced, There may be a number of such loops on the plate and hence currents are induced on the surface along a variety of paths. Such currents are called EDDY CURRENTS. The basic idea is that we do not have a definite conducting loop to guide the induced current. The system itself looks for the loops on the surface along which eddy currents are induced. Because of the eddy currents in the metal plate, thermal energy is produced in it. This energy comes at the cost of the kinetic energy of the plae and the plate slows down. This is known as electromagnetic damping.

Mutual Inductance :

Suppose two closed circuits are placed close to each other and a current i is passed in one. It produces a magnetic field and this field has a flux Φ through the area bounded by the other circuit. As the magnetic field at a point is proportional to the current producing it, we can write,

$$\Phi = Mi$$

where M is a constant depending on the geometrical shapes of the two circuits and their placing. This constant is called mutual inductance of the given pair of circuits. If the same flux is calculated through the area bounded by the first circuit, the same proportionality constant M appears. If there are more than one turns in a circuit, one has to add the flux through each turn before applying equation $\Phi = Mi$.

If the current i in one circuit changes with time, the flux through the area bounded by the second circuit. This phenomenon is called mutual inductance. From the above equation the induced emf is

$$E = -d\Phi/dt$$
$$= -Mdi/dt$$
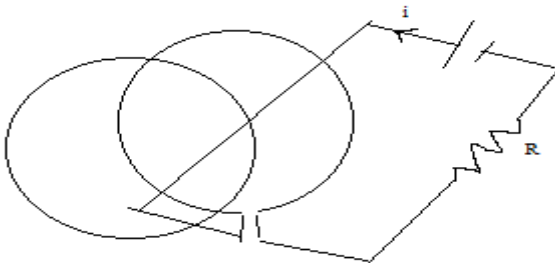
A. Generator Principle :

An electrical generator is a machine which converts mechanical energy (or power) into electrical energy (or power).

The energy conversion is based on the principle of dynamically (or motionally) induced e.m.f. Whenever a conductor cuts magnetic flux, dynamically induced e.m.f. is produced in it according to Faraday's laws of electromagnetic induction. This e.m.f. causes a current to flow if the conductor circuit is closed.

Hence, two basic part of an electrical generator are i) a magnetic field ad ii) a conductor or conductors which can so move as to cut the flux.

B. Faraday's law :

Whenever the flux of magnetic field through the area bounded by a closed conducting loop changes, an emf is produced in a loop. The emf is given by $E = -d\Phi/dt$ where $\Phi = \int B.dS$ is the flux of the magnetic field through the area.

Direction of Induced Current (Lenz's Law) : The direction of the induced current is such that it opposes the change that has induced it.

The Origin of Induced EMF : The flux $\int B.dS$ can be changed by

(a) *Keeping the magnetic field constant as time passes and moving whole or part of the loop.*

(b) *Keeping the loop at rest and changing the magnetic field.*

(c) *Combination of (a) and (b), that is, by moving the loop(partly or wholely) as well as by changing the field.*

C. Motional Emf :

Below shows a rod of length PQ l moving in a magnetic field B with a constant velocity v. The length of the rod is perpendicular to the magnetic field and the velocity is perpendicular to both the magnetic field and the rod. The free electrons of the wire also move with the velocity v together with the random velocity they have in the rod. The magnetic force due to the
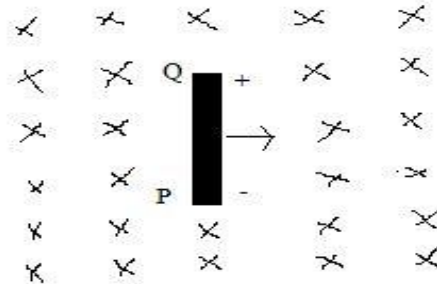
random velocity is zero on the average. Thus, the magnetic field exerts an average force $F_b = qv \times B$ on each free electron where $q = 1.6 \times 10^{-19}$ C is the charge on the electron. This force is towards QP and hence the free electrons will move towards P. Negative charge is accumulated at P and positive charge appears at Q. An electrostatic field E is developed within the wire from Q to P. This field exerts a force $F_e = qE$ on each free electron. The charge keeps on accumulating until a situation comes when $F_b = F_e$.

Or, $|qv \times B| = |qE|$ or $vB = E$.

After this, there is no resultant force on the fee electrons of the wire PQ. The potential difference between the ends Q and P is $V = El = vBl$.

Thus, it is magnetic force on the moving free electrons that maintains the potential difference $V = vBl$ and hence produces an emf $E = vBl$.

As this emf is produced due to motion of a conductor it is called motional emf.
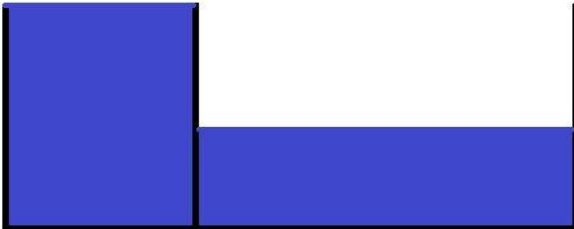
VII. METHOD 2 :

A tank, filled with water, with moveable floor is required. A moveable partition inside the tank which can be moved as required as shown below in Figure 1:
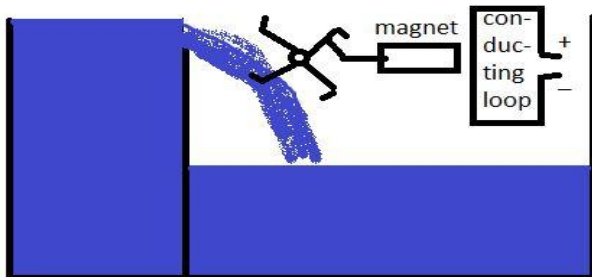
Figure 1 :
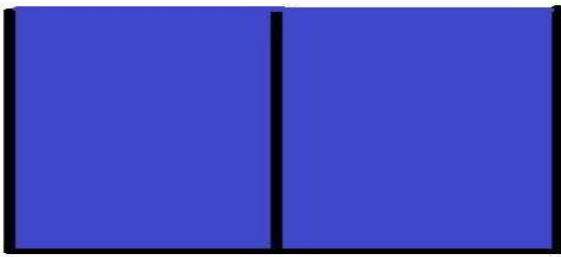
Now, the floor of the tank is moved in right side keeping the partition fixed as shown below :

Figure 2 :

Now, the partition is lowered and water flows to the lower level side due to it's same height principle and the fan rotates due to water flow and electricity is generated as shown in the figure below :
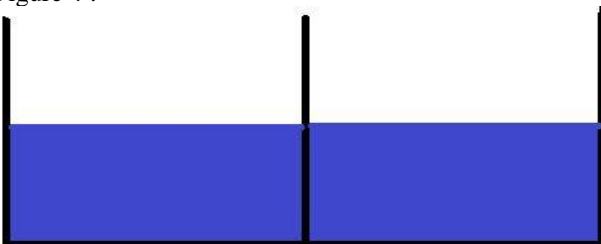
Figure 3 :

Now, when water in the left part and right part of the partition becomes of same height, then the floor of the tank moved left and the partition is raised to get the initial position again as shown in Figure 1 above. Then again the same procedure is followed to generate electricity.
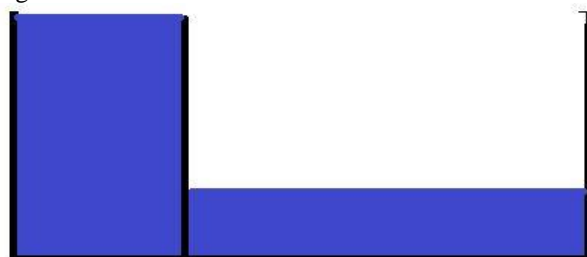
OR

It can be done by moving the partition only as shown in below figures :
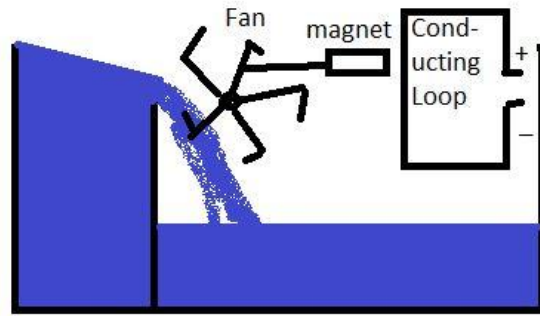
Figure 4 :

Equilibrium Position

Figure 5 :

Piston moving left

Figure 6 :

Piston pulled down

Force required to Pull the Partition :

Let, the length, breadth, height of the tank are l, b, H respectively and upto height h water is filled at equilibrium position. Now if the partition is moved x distance in left and then height of water level h_1 will be,

$h*(l/2)*(b/2) = h_1*\{(l/2) - x\}*(b/2)$

$\Rightarrow h_1 = \{h*(l/2)\}/\{(l/2) - x\}$

Change in potential energy = $mg(h_1 - h)$. Where m = mass of water in the left portion (or right portion of the partition) and g is Gravitational constant.

This is the work needs to be done to put the partition from equilibrium position to the position as shown in figure 5 (i.e. to pull it x distance)

Now, work done = Force*displacement

$\Rightarrow mg(h_1 - h) = F*x$

$\Rightarrow F = mg(h_1 - h)/x$

$\Rightarrow F = mgh\{(l/2) - 1\}/[x\{(l/2) - x\}]$

VIII. ADVANTAGES :

1. The generation can be done anywhere in stagnant water.
2. This method can be used in car to generate electricity.
3. It is pollution free.
4. All we need a moveable tank, a partition, water, a generator and instrument to move the floor and partition of the tank.

REFERENCES

[1] Concepts of Physics 2 by H. C. Verma
[2] A textbook of Electrical Technology IN S.I. UNITS volume II AC & DC Machines by B.L. Theraja, A.K. Theraja.

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