Ecofriendly New Method Of Electricity Generation

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Abstract—**This theoretical paper presents a new idea of Electrical Energy Generation through Hydro Power Method. This is entirely a new method and pollution free. This process can be implemented anywhere in Micro to Macro level since it does not use Coal, Oil, Gas or Atomic energy. This method will use Torricelli's Vacuum Principle as Natural Pump to lift water from an optimum height to an overhead tank and then allowing the same water to fall on a Turbine to generate Electricity. Part of the generated Electricity will be used to pump water to the optimum height which will make the system CONTINUEOUS with a fixed quantity of water. Apparently it appears that the system is creating energy which is against the law of conservation but truly it is not as shown in the drawing. This method can be used commercially to cater the growing need of Electrical Energy.**

Keywords—*Torricelli's vacuum, Natural Pump, Turbine, Pump, Leak proof, Diesel generating set (DGS), Feed tank, Steady state, Pump quality.*

Introduction:

Electricity is a part and parcel of human being in its day to day social life to fulfil essential needs from age old time. This need started its journey after the discovery of ELECTRICITY BY Michael Faraday in the year 1865. Presently ELECTRICITY is produced in many ways and the demand is increasing day by day. Most important of electricity generation methods are:

Conventional type:

1. Thermal power, 2. Hydro power, 3. Nuclear power, 4. Gas based power, 5. Oil based power

Non-conventional type:

1. Wind power, 2. Solar power

In the Non-Conventional type Natural Energy is converted into ELECTRIC energy without using any Raw Material. The NEW METHOD (Invention) will generate ELECTRICITY based on the principle of Torricelli's Vacuum which is also a natural source.

Principle of this new method:

According to Evangelista Torricelli, an Italian physicist, if a one side closed glass tube of 1 meter length completely filled with Mercury is placed vertically in a Mercury trough with open end inside the trough, the Mercury level inside the glass tube will come down and rest at a height of 76 cm from the top level of the Mercury trough, Fig.-1. This is due to atmospheric pressure on the open trough which can hold 76 cm height of Mercury in a closed tube, Fig.-1a.

The gap above the Mercury level inside the glass tube is under VACUUM. This is called Torricelli's Vacuum.
If water is used instead of Mercury, the water height would be 10.36 meter which will be hold by 1 atmospheric pressure in a one side closed tube analogues to Mercury proof. This 10.36 meter and 76 cm heights is corresponding to their density.

Schematic presentation of the Mercury experiment is shown in Fig. 1 & 1a below:

My concept is to utilize this Torricelli's Vacuum as a *NATURAL PUMP* to generate *HYDRO ELECTRICITY*. This new method is explained in Fig.-2.

New Concept details as shown in Fig.-2:

1. This new electricity generation process will have a leak proof, airtight overhead water Tank (1) made of metal. The bottom height of the tank from ground level should be > 10.36 meter. A pipe line (2) from the bottom of this tank will go down. The length of this pipe line also should be > 10.36 meter with a Valve (V2) at the end of the pipe line. There will be a short water filling and vacuum release pipe with Valve (V1) at the top of this Tank.

2. Tank (8) is an open water tank at an optimum height connected to Tank (1). This tank will act as water feed to Tank (1) when needed. The height of Tank (8) from Ground Level as well as the length of the suction pipe line should be < 10.36 meter.

3. A Turbine (3) is placed below the pipe line (2) which is connected to the Electric Power Generator (4) through the Shaft.

4. Water which will pass through the Turbine will be hold in Tank (5).

5. The accumulated water in Tank (5) will be pumped by Pump (7) to feed Tank (8) to complete the circuit.

Thus Electricity will be generated by the potential energy of water in Tank-1 and potential energy in Tank-1 will be maintained by supplying water from Tank-8 through Torricelli's Vacuum in Tank-1. Hence the lower the height of Tank-8 from Tank-1, minimum Electricity will be needed to pump water from drain water storage Tank-5 to feed Tank-8. The optimum height of Tank-8 is to be established by experiment.

If the generated electricity = X, Watt.
Electricity needed to pump water from Tank-5 to Tank-8 = Y, Watt.

The extra Electricity available is = X – Y = Z Watt This Z Watt can be used for mankind / commercial purpose.

Operation of the System:

Step 1: First the Valve in Pipe Line (2) will be closed. Valve on Top of Tank (1) and in Suction Line from Feed Tank (V3) will be opened.

Step 2: Then water should be filled in Tank (1) through Valve (V1) from outside source through using a separate pump for Macro unit. The pump will be run by a Diesel Generator Set (DGS). When Tank (1) will be filled with water, water will drain through the Suction line into Tank (8). Once Tank (8) is also filled, water filling from outside will be stopped. Valve (V1) is closed. Once this system is filled with water, no more water is needed from outside.

Step 3: Now Valve on pipe line connecting Tank 5 and Pump (V4) is opened. Then Valve on Pipe line 2 is opened. After the 2nd Valve is opened water will start falling on the Turbine. Water will fall from Tank 1, though it is not connected to air, following Torricelli's principle because water column height is >10.36 meter (Pipe 2 + Tank 1 height).

Step 4: The falling water will rotate the Turbine which in turn will Generate Electrical Energy through the Generator 4. The generated electricity will be distributed through the Transformer.

Step 5: When the water will fall down from Tank 1, a Vacuum will be created in it. After sufficient Vacuum is created, the Valve in Suction line from Tank 8 will be opened and water will start flowing to Tank 1 from Tank (8) since the suction height is < 10.36 meter. This water flow will be due to Vacuum in Tank 1 + atmospheric pressure on Tank 8. The supply of water from the FEED TANK (8) to the VACUUM TANK (1) is very important. If water in the FEED TANK is depleted, AIR WILL BE SUCKED IN THROUGH THE SUCTION PIPE LINE IN THE VACUUM SPACE AND THE VACUUM in Tank (1) WILL BE LOST. As a result the system will stop generating ELECTRICITY since water in TANK (1) will also deplete with time. Thus it is required that the water in FEED TANK does not deplete. To do so water should be supplied to FEED TANK from some source so that its volume remains constant.

Step 6: To make the system continuous water from Tank-5 should be pumped to Tank-8 by using Pump-7. For this initially the Pump will be run by an external Diesel Generator Set (DGS) because the electricity generated by the system will take some time to stabilize before it is supplied to the Pump-7. Once the system attains Steady State, i.e., (a) vacuum in Tank-1 is constant, (b) water level in Tank-8 is constant and (c) frequency and voltage of generated electricity stabilizes, the DGS will be cut off and part of the generated electricity from Generator (4) will be supplied to Pump (7) to run it.

Since water should be continuously supplied to Tank-8 day after day, month after month, there should be minimum 2 Pumps which will run in stages. Also the Pump Quality should be of high standard. The TIME TO REACH STEADY STATE should be experimentally decided.

Most critical part of this CONCEPT is:

1. To calculate the size of TANK-1 to create sufficient VACUUM which will suck water from FEED TANK-8 at a maximum lower level from Tank-1.
2. The length of the PIPE LINE-2 so that water can drain out on TURBINE-3 without back suction in the PIPE LINE-2.
3. Diameter of the PIPE-2 so that proper impact is created on the TURBINE to rotate it.
4. Height of the TURBINE below the end of PIPE LINE-2.
5. TURBINE blade designs so that maximum energy can be generated with the available water impact.
6. Maximum height of FEED TANK-8 below Tank-1 from where Tank-1can suck water due to VACUUM as well as Pump-7 will use minimum Generated Electrical Energy to pump water from drain water storage Tank-5 to Tank-8.
7. Type and Size of GENERATOR so that maximum ELECTRICITY can be generated by using the ENERGY of the drained water.

Conclusion:

I would be very glad if any engineering institute or other organization feels this project is possible and give it a practical shape. I do not have the required expertise to complete the idea.
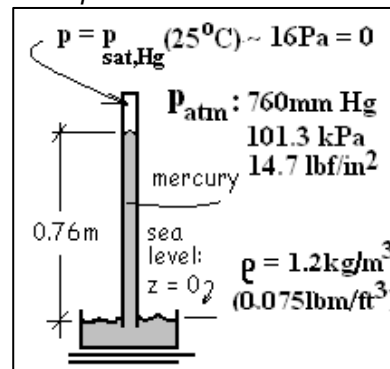

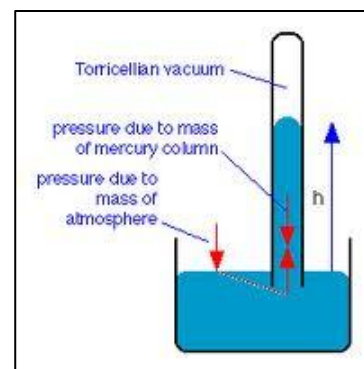Fig. 1: Torricelli's Barometer
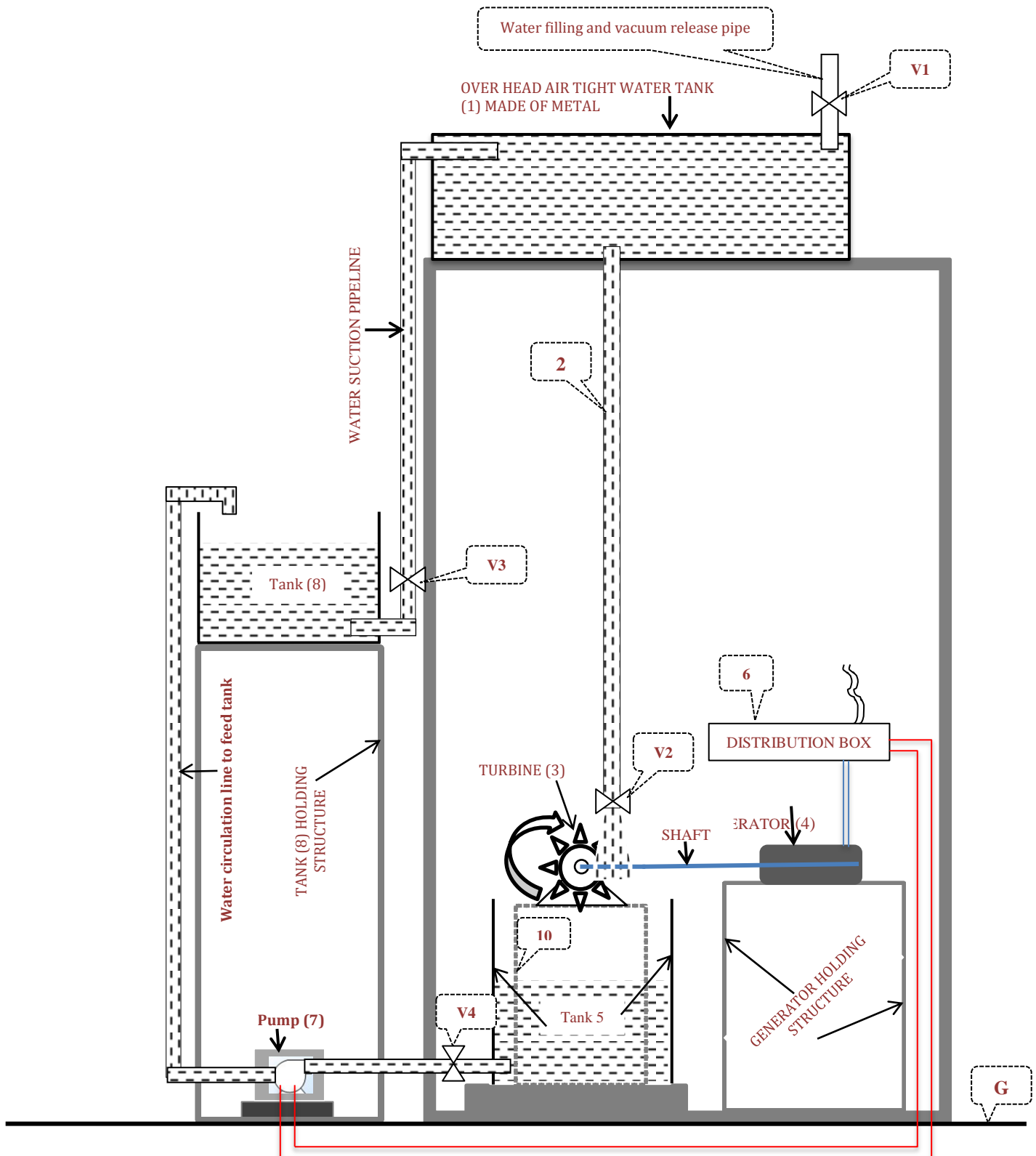**www.THERMOspokenhere.com**

Fig. 1a: Fluid Pressure
http://www.cs.uml.edu/teamsacademy/ index.php/ITOP/FluidPressure

Fig.-2: Sketch of new method of electricity generation

(2)	= Pipe line to guide water to Turbine
Tank 5	= Storage Tank of Drain water through Turbine
Tank 8	= Feed tank to vacuum tank
(V)	= Valves
(10)	= Turbine holding structure