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КАПЕЛЬНИЦА КЕЛЬВИНА КАК АЛЬТЕРНАТИВНЫЙ ИСТОЧНИК ЭНЕРГИИ

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In 1786 aroundthewaterfallsofSwitzerlandwasdiscoveredtheelectrificatio-nofwaterdue to its fragmentation into droplets under natural conditions.This effect is most clearly seen around the largest waterfalls in the world.For example, at the Victoria Falls (180 m high, 1800 m wide) the intensity is up to 25 kV / m.

Kelvin's water dropper is a generator of electricity.Despite the fact that this device was invented in the XIX century, it has not been seriously considered as an alternative source of electrical energy.

The planet is rapidly running out of fuel resources, consequently the exploration of alternative sources of energy at presentis becoming of great importance. We believe our research of Kelvin's water dropper as an alternative source of energy isextremely important.

A prior hypothesis was put forward if Kelvin'swater dropper can be used as an alternative source of energy.In this regard the goal was set: to investigate the possibility of converting a static charge that is generated by the dropper into electrical current.

To achieve the goal the following tasks were set.

1. To study the theoretical aspects of the dropper.
2. To design the experimental device.
3. To measure the created voltage.
4. To investigate thefactors whichdetermine the created voltage and maximize its value.
5. To improve the apparatus in order to convert static charge in electric current.

The principle of operation of the device.

Kelvin's dropper represents two pairs of cans. In each pair, the cans are located one above the other and are connected criss-cross by wires. Above the upper cans is located a reservoir with outlet pipes from which water drops can pass through the upper cans and get collected in the bottom. When the water starts to drip, one of the cans has a slightly higher negative charge than the others. Let us assume that the larger positive charge is in the lower left-hand can. Then, as the cans are connected crosswise by wires, the upper right can will also have a greater positive charge than the upper left can.

Due to the phenomenon of electrostatic induction, the right stream of water passing through the right can is getting charged. If the drop is formed in the space of the upper can, it becomes negatively charged, since the positive charge is repulsed by the positively charged can up the jet. Further, these drops of water fall into the lower right-hand can, and its negative charge increases. Similarly, the positive charge increases and in the lower-left can. Thus, the voltage between the cansrises.

To create the experimental apparatus laboratory tripods were installed, as well ascans, a plastic reservoir andinsulating tape. Attempts to use a multimeter to measure the resulting voltage have not been successful because the device is not designed to measure the static voltage. Then, a storage oscilloscope C8-17 with 1:200 divider was used. If you use a divider, the maximum allowable voltage for the oscilloscope is 7000 V. In this case the input resistance of 1 MOhm to 10 MOhms also increases. The effect of the device on the circuit decreases. Maximum voltage of 800V has been reached.

In addition to that, in our experiments it was observed that not all droplets fall to the bottom of the can, but flow in different directions. The reason is a high electric intensity of the lower cans. Thus the field deflects the droplets from the vertical trajectory.

However, the device had some disadvantages: the cans were with sharpened edges, causing leakage of the stored charge, low quality of insulation of tripods, which also caused the leakage of the charge. These shortcomings were eliminated by improving the apparatus.

1.The upper cans were replaced by pieces of polished metal pipe, mounted on foam plastic holders, and the lower cans were mounted on a pallet of foam plastic.

2.The feeder reservoir was fixed in such position in which the jet bursts into droplets exactly in the space of the upper segments of the tubes.

3.We also designed our own divider 1:75 with 76 MOhm input impedance was designed thanks to which an oscilloscope had even less impact on the system.

In our experiment, we did not change the rate of the water supply. This was done so that the water jet in all experiments burst in one place. If we change the diameter of the outlet (which will affect the droplet diameter), the fracture of the jet will be altered, or it will be absent at all, resulting the installation becoming idle.

The results obtained. In the process of the device operation the split into smaller droplets was observed, indicating the presence of a strong electric field.

In order to determine the dependence of the created voltage on dropper’s operation time, a series of experiments were made. At each of the 10 time intervals, 5 times without interruption we measured the voltage in the Kelvin’s water dropper (other conditions being constant).Having made a plot, we noticed that there exists a "peak" of the voltage obtained in the 60-63sinterval. The reduction of the voltage produced by the dropper after the "peak" is probably caused by the leakage of charge from the apparatus into the air (air ionization).

Then, accepting as standard 60s time "peak" we changed the distance between the upper tubes and lower cans. We chose 10 different distances, at each distance the experiment was performed five times. Based on the average values of the voltage we built a plotandobserved that there exists also a "peak" of the resulting voltage of around 55-63mm.This pattern can be explained as follows: the small distance between the upper tubes and lower cans cause the charge leakage between them, while increasing the distance a drop gives its charge into the air.

The above mentioned factors will maximize the voltage to 1600 V.

Converting a static charge in AC. Using the dropper in conjunction with the oscillator circuit and a spark gap allowed to slightly smootha pulse signal, giving it a shape close to sinusoidal. Thus we transformed the static charge accumulated in the Kelvin's dropper into alternating current.

Conclusions.

Two experimental installations were designed. In the 1st model the maximum voltage value of 800V was achieved. In the process of testing the 1st model were determined the factors affecting the potential difference created by the dropper. The results of the research were used to create the 2nd model. This way the research was carried out defining the most important factors which influence the installation performance, such as: place of the jet rupture into droplets; distance between upper tubes and lower cans; operation time of the device; diameter of the upper tubes.

We also developed our own voltage divider 1:75 with 76 MOm input impedance. The maximum voltage value of 1600V was reached in the new dropper model. The apparatus combined with the oscillatory circuit and spark gap approved the possibility of converting the static charge to AC.

We consider the main advantage of Kelvin's Water Dropper to be the absence of moving parts and accordingly its wear resistance reaching the infinity. Having installed the dropper once its owner may forget of its control and repair for good.

In the future we are planning to create the dropper model which can demonstrate its operation e.g. to strike a discharge lamp. We have also created the Kelvin's dropper draft modified in such a way that water from the lower cans may be removed without the voltage leakage whist in its turn will rise the potential difference and allow to employ the device for an infinite time period.

The experiments on increasing the installation efficiency have already been started.

At present Kelvin's Water Dropper has demonstrated the possibility of its application as an alternative energy source. We're absolutely confident that in the nearest future each and every person around the world will be able to possess in their courtyard a small scale Kelvin's dropper and consequently use its power e.g. for lighting their own living place.