

Joule thief voltage booster



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The Joule thief is a voltage booster which takes its energy from an almost dead battery and can produce output, while the other circuits consider the battery, to be drained. An earth battery, as the name says, is a kind of battery which takes its energy from the soil or sea, with the help of unlike electrodes buried in them. The idea of this paper is to utilize the earth battery and run the joule thief to lighten up the lights in a walkway, which includes less effort and efficient output.

Introduction and Background:

The earth battery was demonstrated by Alexander Bain in 1841, when he tried to operate a clock. He buried zinc and copper plates in ground a meter apart which resulted in one voltage output and thus, operated the clock. These kinds of batteries were used for telegraphy by early researchers [source: EE]. This dirt setup is similar to Daniell-cell battery. It had two electrolytes: zinc hung freely in zinc-sulphate and copper in copper-sulphate solution. These electrodes exchange electrons between zinc and copper (which are the anode and cathode) and generate current. In the earth battery, the sulphates are replaced by dirt [source: HSW].

The Joule thief circuit was published in November 1999 issue of Everyday Practical Electronics (EPE), by Z. Kaparnik. It was an execution of transformer-feedback single-transistor inverter. A one meter copper wire is wound around a ferrite (toroid core) to make it a transformer and the resistor limits the feedback current into the transistor and the transistor switches on and off about 50,000 times in one second making the LED to light [source: BC/Joule].

Methodology:

The methodology is to use the earth battery, which produces comparatively more energy (unlike the generally used circuits) and ride a Joule thief, which usually takes energy from almost dead batteries and produces output equal as the input. So when used in this scenario, will produce voltage same as input, that is, the energy from earth battery, and can be used to lit LED lights set in a walkway.

The working methodology is the electrodes in earth battery (zinc and copper), exchange ions and produce currents. This battery is connected to a joule thief. In a joule thief, the main components are ferrite (toroid core), copper wire, transistor, and resistor. The copper wire is made two folds and wounded around the core to make it a transformer. The more, the number of turns, the more input it gives. The circuit looks like shown:

The resistor can be taken to be, 512ohms. The inflow and outflow of current from the transistor makes it work like a switch and it goes on and off 50, 000 times a second making the LED to light. So, a series of LED lights setup in a walkway can be run using the Joule thief ridden by an earth battery.

Analysis:

The analysis is that, the earth battery doesn't need any circuitry, and takes its energy from the soil and it can be placed inside the soil with just two wires coming out, which are connected to the joule thief. And, as discussed, the joule thief lights up the LEDs. The LEDs can have a motion sensor attached (if necessary to save energy) and otherwise, the earth battery can be used to charge batteries or perform any other functions. And also, LEDs are better than fluoros, because, they save a lot of energy comparatively.

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LEDs are costly, as of now, but the overall efficiency that they work at, is more than fluoros. If the total energy consumed and the skilfulness is calculated per annum, then LEDs stand first.

Conclusions:

I think that this idea is practically possible. Both are efficient and energy-saving circuits. So, the walkway in the Uni or any other likewise can be lit using this circuitry idea saving more energy and lasting long than the ones now in use.