

# Magnetically Levitated Solar Powered Generator

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**Abstract**—Our previous reports have shown the significance of increasing the efficiency in energy production using concepts like magnetic levitation and enhanced bearings, etc. We have now made an attempt to bring these concepts together. In our current attempt, the elliptical V-format of the drum magnets and external magnets along with its coil and reed switch combination creates push and pull effect which makes the magnetically levitating drum turn. This facilitates the continuous rotating of the magnetically levitated drum.

**Keywords**—Stator, rotor, elliptical V-format, neodymium magnets, magnetic levitation,

## INTRODUCTION

In the current scenario, there is a need to meet energy requirements. In this pursuit, recent devices like induction generator, double fed-induction generator, electrically excited synchronous generator, permanent magnet synchronous generator, etc, are popular among researchers, investors, because of these devices exhibit higher power density, reliability and appropriately controllable nature [1]. Generators, devices based on 'axial-flux' are comparatively reliable and perform better, specifically, in low speed power generators such as water and wind turbines and are cost effective too [2]. Coreless forms of axial-flux generators are still efficient in regards to the distribution of power, because of direct attraction between stator and rotor. These are found to be more compatible with respect to mechanical integration [3]. The cores-less axial-flux permanent generators work at low speed but have increased out-put of power. When additional buck, booster battery charger or suitable solar panel, is applied, stable performance is affirmed [4, 5, and 6]. Earlier, we have reported on the core-less generator coupled with solar panel exhibiting highly reduce friction and increased energy production. This is followed by a publication on the coreless generator in which the impact of gravitation is eliminated [7 and 8]. In our current attempt, the elliptical V-format of the drum magnets and external magnets along with its coil and reed switch combination creates a push and pull effect which makes the magnetically levitating drum turn. In this device, electricity is supplied only once during a fraction of one rotation and the rest of the rotation is

maintained by the push and pull dynamics of the igniter and drum magnets.

## CONSTRUCTION

Neodymium permanent magnets are arranged in an elliptical V-format around a drum that is magnetically levitated. Magnetic levitation is accomplished using bearing exhibiting vertical and horizontal movements. An external permanent magnet (hereafter, referred to as igniter magnet) is brought closer to the start of the V-format, It causes repulsion. The electromagnet is triggered using a magnetic 'reed switch'. This, in turn, is charged with solar powered batteries. (Refer photo no. 1, 2, and 3).

## WORKING

In this set up, permanent magnets are arranged in a V-format with the same poles facing out-wards on the outer circumference of a drum. An external permanent magnet (hereafter referred to as igniter magnet) is brought closer to the start (photo no. 4#) of the V-format, it causes repulsion. Due to magnetic levitation and enhanced bearings on the drum, this repulsion causes the drum to spin. As the igniter magnet now comes in the center part of the V-format, it now starts to pull the permanent magnets on the drum. This is because the vertical sides of the drum magnets are exposed to the igniter magnet. This action keeps on going till the end of the V-format, making the drum to have one full revolution.

The drum would come to a complete stop, unless, the igniter magnet is lifted out of the magnetic range of the drum magnets to make it 'jump' at the starting point of the V-format. In order to overcome this, the igniter magnet has an electromagnet which is activated by a reed switch at the start of the V-format. This electromagnet is stuck to the igniter magnet and when electricity is passed in the coil of the electromagnet, it creates an opposing magnetic field, hence, neutralizing the force of the igniter magnet. This creates the "jump" required to overcome the starting point of the V-format. Thus, the drum keeps rotating continuously and the speed and force of the rotation are directly determined by the gauss strength of the drum and igniter permanent magnet. It is important to note that in this entire rotation, electricity is supplied only once and the rest of the rotation is caused by the push and pull dynamics of the igniter

and drum magnets. Moreover, if the diameter of the drum is increased, this device would still need energy input at one point only. Hence, this device has the potential to be scaled-up depending on the requirements.

In the videos, the output from the device is fed to the multimeter. The readings on multimeter indicate the continuous output of electricity. The input is only at one point, at the start of the V-format and there is no other point for input to complete the rest of the rotation.

Use of 'peltier module' in this device will help to charge the battery and can be used as a supplement for recharging. This module directly converts solar heat into electricity. The iron filings kept in the inner tube are heated by solar energy using 'Fresnel lenses' (Photo 5 and 6). This can be used to supplement the recharge the bigger unit or used in combination. In our videos, we have connected a DC coreless motor which is using the torque generated by the drum that produces electricity.

## CONCLUSION

As described in our previous papers [7 and 8], our efforts focus on increasing the efficiency of our device. This has been attained using magnetic suspension and enhanced bearing. These functional concepts have been incorporated into the working of this device. Since this device uses energy only at one point (which can be easily replenished by solar panels), we find that this device can be of multiple applications. Further, this device will enhance the power output of solar panels and the rotating motion can be used to replenish battery banks in houses and other grid and off grid energy systems.

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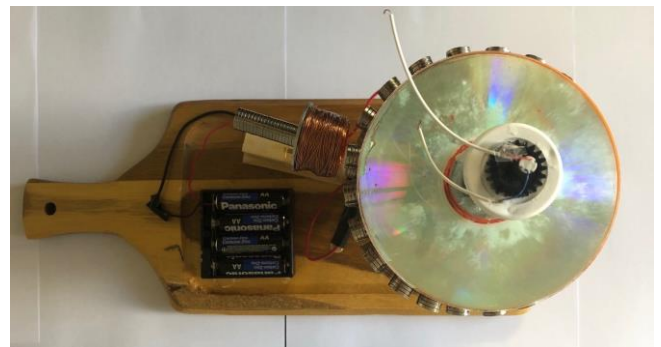


Photo 1: Top view of the device.

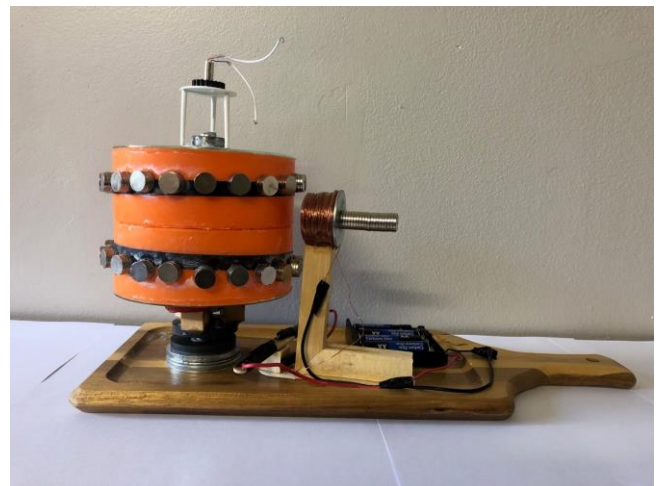


Photo 2: Over all side view of the device.



Photo 3: Side view of the device. Starting of V-format of magnets on drum



Photo 4: Side view of the device. Middle zone of V-format of magnets on drum

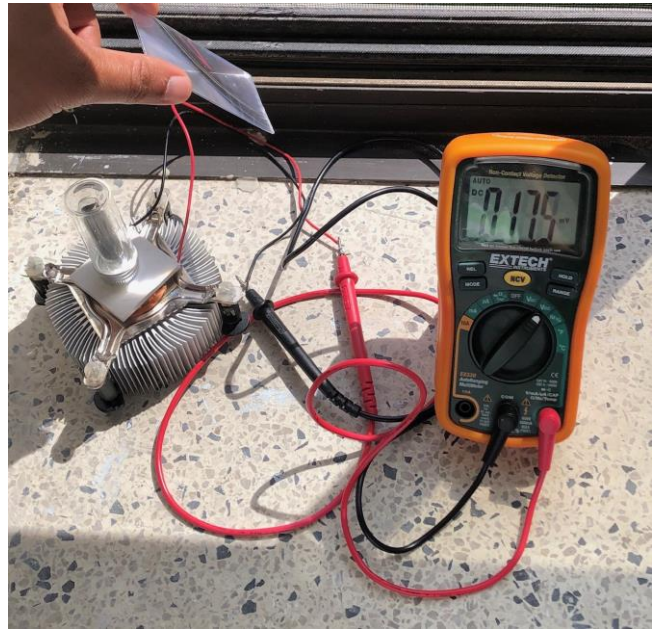


Photo 5: Peltier module' to be used for charging

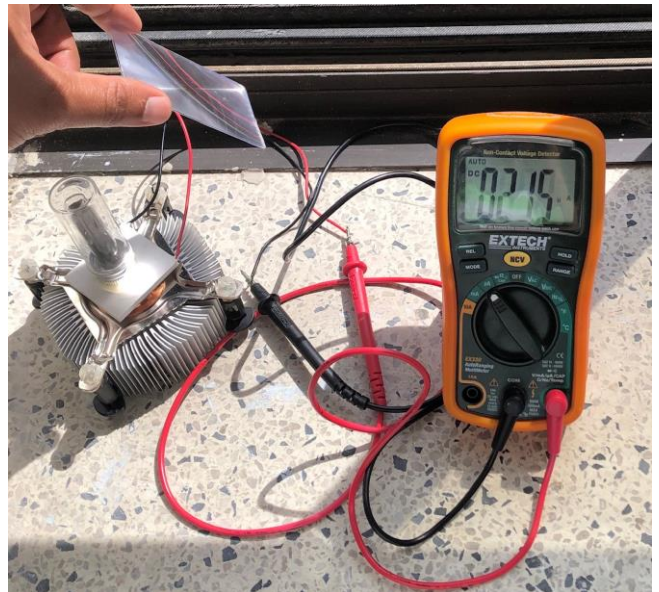


Photo 6: Peltier module' to be used for charging



Video showing continous Amps output.MOV



Video showing continous Volts output.MOV