

DESIGN AND FABRICATION OF CONTACTLESS ENERGY GENERATION USING FLYWHEEL FOR ELECTRIC VEHICLE

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ABSTRACT

As per the Government announcement of electrifying the vehicles upto 2030 there will be need of Charging Stations everywhere from metropolitan cities to remote areas. The practical scenario is that there will be many problems in fully development of charging stations across the country. This is the main reason the idea behind the generation of energy within the vehicle itself without any contact and to avoid the pollution.

Keyword: Freewheel, Flywheel, Neodymium Magnet, 36 gauge copper coil.

1. INTRODUCTION

This is a mechanical device, which uses the flywheel to store energy in the form of inertia. In this system, we applied an additional energy source to start the main motor like electricity. In this system, main motor is used to drive a series of pulley and belt arrangement, which forms a gear train arrangement which produce a twice/thrice speed at the shaft of generator. The significant thing about the system is that the electricity generated at the output of the shaft is more than that of input. The inertia of flywheel can be increased by increasing the radius of flywheel and weight of flywheel. Firstly, the requirement for an effective system needs to be a suitable flywheel with a large diameter and vast majority of the weight needs to be close to rim. The construction needs to be robust and secure as ideally. The rate of rotation will be as high as possible as the weight on the flywheel is concentrated outward of the rim which needs to be exactly at right angles to the axle on which it rotates and exactly centered on the axle. The main motor is at low speed, low voltage input motor, the generator is high speed, and high voltage output generator. Therefore, when we apply an extra energy to the main motor it starts running, which causes to rotate the flywheel. When the motor is reaches the highest speed (constant speed) we switch the power by applying the electrical energy generated by the generator. We add the extra thing in the system like transformers, rectifier, inverter etc. to run the system and take the efficiency output.

1.1 PROBLEM STATEMENT

To overcome the energy loss in the kinetic energy recovery system i.e. KERS uses dynamometer to generate electricity which is of contact type that creates friction,

1.2 Objectives

- Save energy
- Reduce friction
- No air & environment pollution
- Easy power generation

2. COMPONENTS

Freewheel is main component of our System. Freewheel rotates even though brakes are applied. Flywheel is another main component of assembly. Material of flywheel is selected on basis of energy storage requirements. The component property has indirect effect on output voltage. Therefore, we choose the material wisely. The specification of Components used in system are as follows;

Sr. No.	Component	Specification
1	Motor	1440 rpm
2	Main flywheel diameter	16 cm
3	Small pulley diameter	75mm
4	Large pulley diameter	85 mm
5	Center distance b/w two shafts	400 mm
6	Large sprocket dia & teeth	120 mm & 22
7	Smaller sprocket dia and teeth	80 mm & 14
8	Neodymium magnet	40×20×10 mm
9	Copper Coils	36 gauge

2.1 Experimental Setup

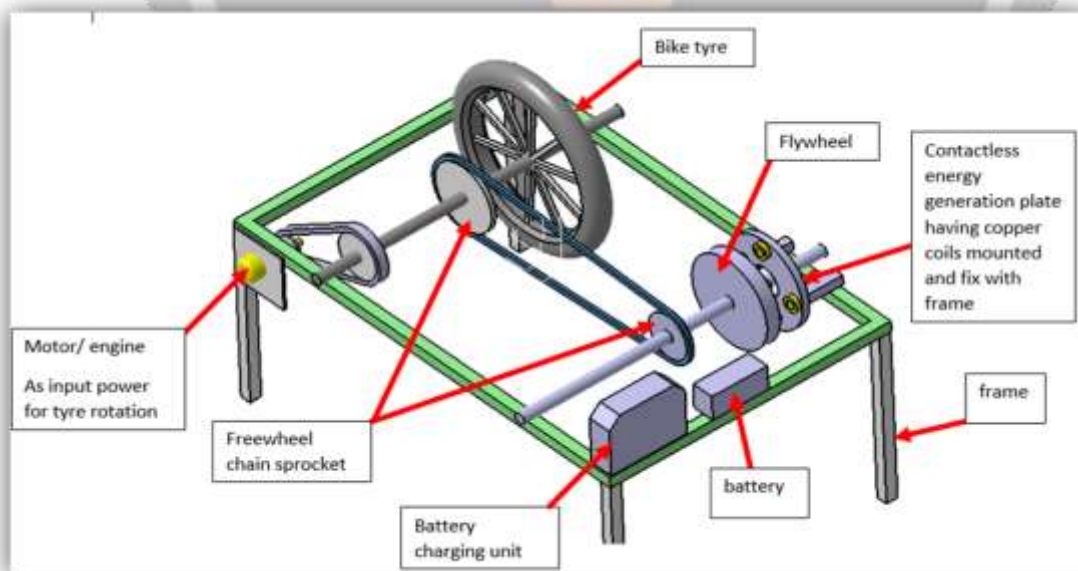


Fig -1 Experimental setup

In this figure it is seen that the the neodymium magnets are attached on flywheel and copper wires are fitted with tightening plastic clips on flywheel which is of wood.

3. METHODOLOGY

We have used the wheel which is connected to the pulley mounted on the same shaft and its diameter is less than the wheel diameter due to which its speed of rotation will be increased. On another shaft connected to the pulley is having the assembly of flywheel and neodymium magnet-coil arrangement. Flywheel will store the kinetic energy while wheel is in running condition and will release the K.E when the brake is applied on the wheel. So the use of flywheel provides such kind of energy which help to run the cycle by less efficient power. Neodymium magnet will start rotating shaft and coil is steady. So here variable e.m.f is produce from magnet and coil arrangement. By this way power will be generated and stored into battery.

4. RESULT

- After rotation of wheel, the magnets rotates about stationary coil, e.m.f. induce which gives output of 0.3 to 0.5 volt.
- So after increasing the thickness of coil of 36 gauge and 6 mm thickness wire, we are now getting almost 1 to 2 volt from 1 coil.
- Number of coils used will give the voltage as per requirement.

5. CONCLUSIONS

We can conclude that , the system arrangement generates electricity without any friction with flywheel and it can be utilized to maximum amount .We have successfully designed and implemented design. The voltage output taken from output is totally depend on rpm of the wheel. A battery connected to generator continuously charged when shaft moves.

6. REFERENCES

1. Magnus Hedlund, Johan Lundin :- "Flywheel Energy Storage for Automotive Applications" by Energies 2015, 8, 10636-10663
2. Akhilesh Barwahe :- "Electricity Generation Using Flywheel" Volume 4 Issue IV, April 2016 IC Value: 13.98 ISSN: 2321-9653
3. http://www.grantadesign.com/education/InDepth/html/indepth/materialinfo/selection_3case3.htm