International Journal on Emerging Technologies (Special Issue NCETST-2017) **8**(1): 582-584(2017)
(Published by Research Trend, Website: www.researchtrend.net*)*

ISSN No. (Print) : 0975-8364
ISSN No. (Online) : 2249-3255

Electricity Generation using Flywheel

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ABSTRACT: Flywheel Energy Storage (FES) technology works by accelerating a flywheel to a very high speed and maintaining the energy in the system as rotational energy. Most FES system uses electricity to accelerate the flywheel. In this work we use mechanical energy. To achieve our target in this work we use a DC generator to convert a rotational energy into DC electrical output. This paper presents an analysis which shows that FES is a promising alternative for mitigating energy storage problem.

Keywords: Flywheel Energy Storage, DC Generator, Rotational Energy, Inverter Circuit, Battery

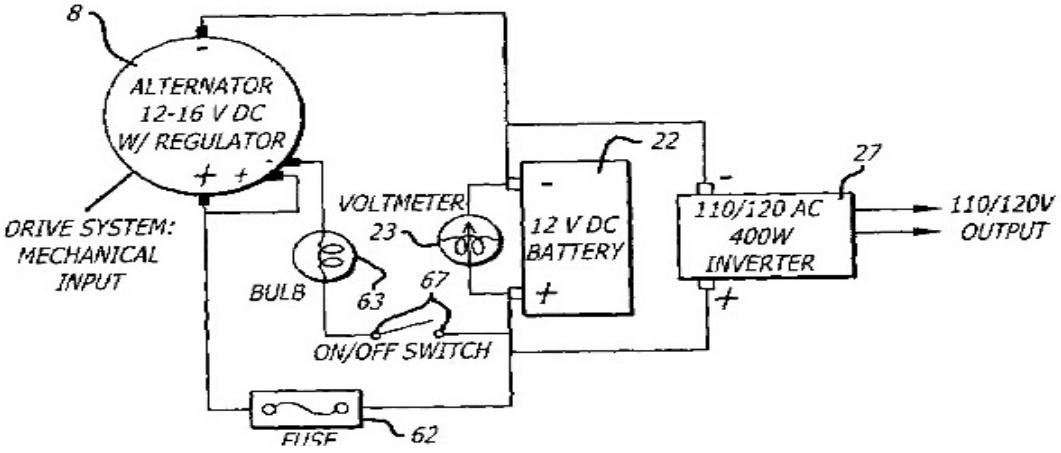
I. INTRODUCTION

Electricity is critical to fuel the economic growth of Nation. The global energy crisis has been aggravated by a lack of innovation. This work is introduced to reduce pollution and broaden access to energy around the world.

Flywheel Energy Storage is a new concept that is being used to overcome the limitations of intermittent energy supply. A FES system is described as a mechanical battery, it does not create electricity it simply converts and stores the kinetic energy. The flywheel rotates in frictionless magnetic levitated environment which has very low energy loss over time. Fly wheels are relatively simple technology as compared to counterpart such as rechargeable batteries in terms of initial cost, ongoing maintenance, environmental friendly and are very quick to get up to the speed. In this work we use DC generator along with battery and inverter. The flywheel is rotated manually. The rotational energy stored by flywheel is transferred to the generator by shaft. The generator converts the rotational energy into electrical DC output. This DC output is fed into the inverter circuit and converted into AC form. Then the AC supply is taken from transformer to operate appliances faithfully.

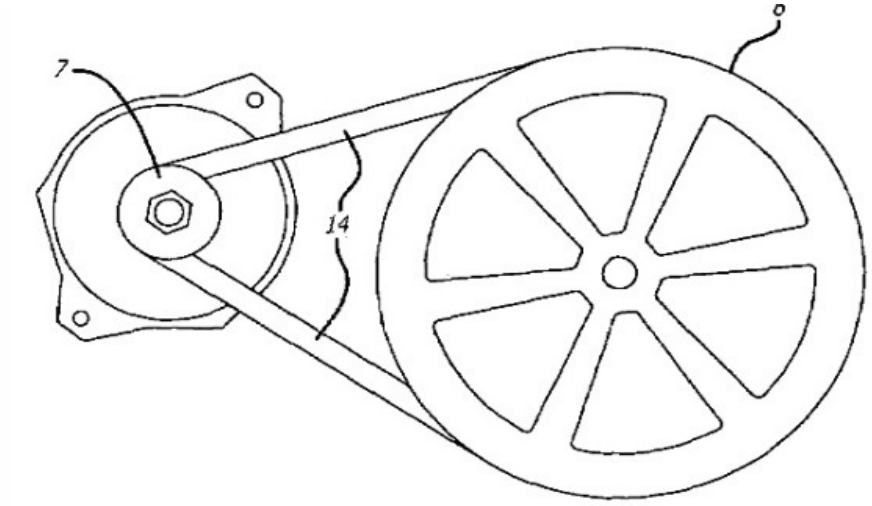
II. METHODOLOGY

Flywheels of various forms have been used in industry for hundreds of years, both first generation (iron or steel) and second generation (composite) flywheels are now used for electricity storage. In flywheel, the rim is attached by spokes or a hub to a central shaft, which is supported by bearings.



When the person rotates the wheel manually, the rotational motion of flywheel is transferred to the dc generator shaft through belt. The rotor consist of armature winding i.e; armature conductors. Hence rotor starts rotating with the same speed as that of geared wheel.

As rotational velocity increases, the rotor experience increasing radial force causing it expand faster than the shaft. The spoke or hub assembly must compensate for this differential growth while maintaining a secure bound with the rim. Then in accordance with the principle of electromagnetic induction, current starts flowing in the rotor of dc generator. The output so obtained is in dc form. Now we can store this dc output in battery to supply dc operated instrument as well. Further we use a step-up transformer to get 220V ac supply.



III. COMPONENT USED

S.N.	NAME OF COMPONENTS	QUANTITY	SPECIFICATION
1	Transformer	1	11/220V
2	Battery	2	12V
3	Resistor	2	220Ω
		2	1K
		1	330Ω
		1	390KΩ
4	Capacitor	1	0.1µF
		1	2200µF
		1	0.01µF
5	Flywheel	1	6 inch
6	MOSFET	2	IRF540
7	DC GENERATOR	1	
8	SOCKET	1	
9	IC	1	CD4047
10	DIODE	1	IN4007
11	LED	1	

IV. CONCLUSION

It is concluded from this paper that it is possible to build a low cost power system with minimal losses. Ongoing research however, suggest that humidity has yet size the true potential of flywheel when spun up to very high speed a flywheel becomes a reservoir for a massive amount of kinetic energy, which can be stored or drawn back at will.

The capabilities of such device are as extraordinary as its unique design. The device is one of the humidity's oldest and most familiar technologies. It was in the potter wheel 6000 years ago as a stone tablet with enough mass to rotate smoothly. Human power self generator provides and occupy less space than other renewable. Overall from this project it is explain better utilization of human power result in a efficient power

generation. Thus usage of flywheel will reduce the loss of rotational energy by storage of maximum energy in it.

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