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Energy Generation using Interconnected Motor in a Closed Loop

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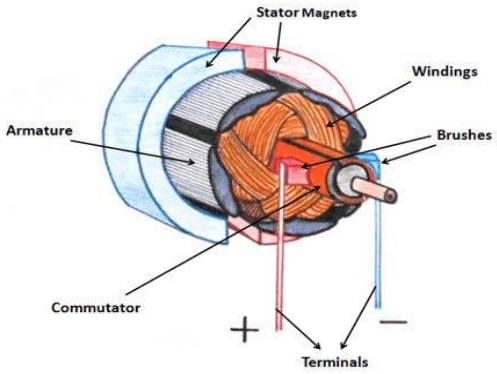
Abstract: This work is based on "Electricity Generation in a Closed Loop". As number of motors are coupled to each other as motor generator set for the generation of electricity. In this project we are going to regenerate energy in a close loop with the help of PMDC Motor whose shaft are interconnected to each other. This technology can be used in electric vehicles to regenerate the electricity to increase the efficiency of the system which can be used in the electric vehicles.

Keywords: PMDC motor, diodes, converter, Plugin Hybrid Electric Vehicle (PHEV) and Electric Vehicle (EV)

I.INTRODUCTION

As we know that, the environmental pollution caused by fossil fuels and the depletion of fossil fuels are greatly hot issues around the world in the recent years. Over the last decade the understanding of the environmental problems has grown. The electric vehicle is considered to be an effective solution of these problems which are expected to reduce the pollution and fuel cost. In order to fulfill the aim new technologies have been launched and rolled out like Plugin Hybrid Electric Vehicle (PHEV) and Electric Vehicle (EV).[1]

Fig: PMDC Motor



In above figure shows PMDC motors has an armature which rotates with in a magnetic field, PMDC consists of stator magnets, armature, commutator, windings and brushes. The construction of PMDC motor can be done by establishing a magnetic field with any kind of magnet like electromagnet otherwise a permanent magnet. A PMDC motor is a kind of motor that includes a permanent magnet to form a magnetic field necessary for the DC motor operation.

In this technology, we are using Permanent Magnet Direct Current (PMDC) motor which are connected in closed loop. As we know that the working of PMDC motor is similar to the general working principle of DC motor. That is when a current carrying conductor comes inside the magnetic field, a mechanical force will be experienced by the conductor and the direction of this forces is governed by Flemming's left hand rule.as in PMDC motor, the armature is placed inside the magnetic field of permanent magnet, the armature rotates in the direction of the generated force. The advantages of PMDC motor are,

1) No need of field excitation arrangement.
2) No input power is consumed for excitation which improves the efficiency of PMDC motor.
3) No field coil hence space for field coil is save which reduces the overall size of motor.
4) Cheaper and economical for fractional KW rated application

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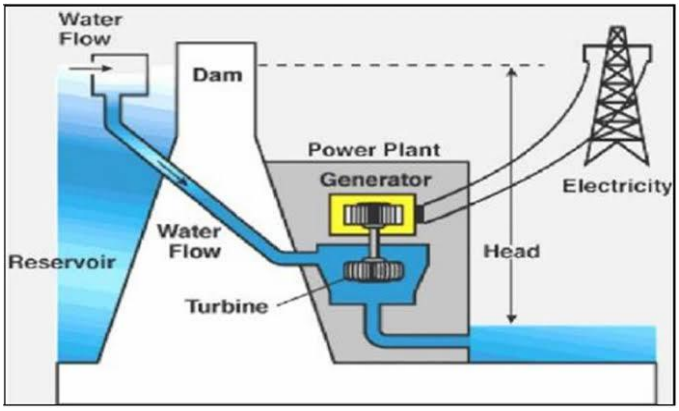
Fig: Hydro power plant



II. METHODOLOGY

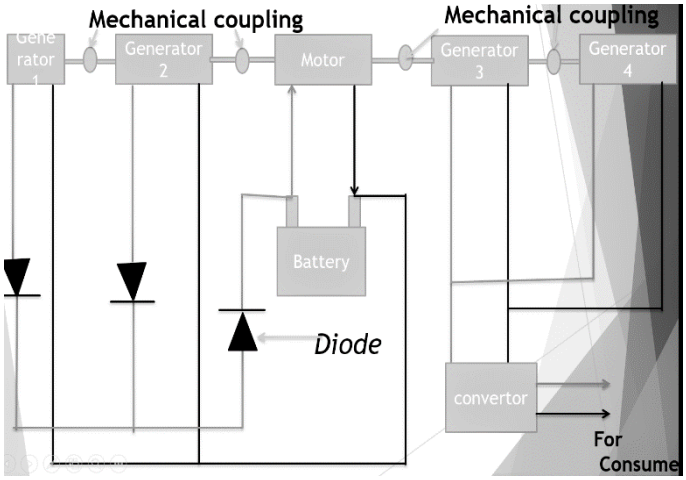
(a)Traditional topology

Electricity is most often generated at a power plant by electromechanical generators, primarily driven by steam engine fueled by combustion or nuclear fission but also other means such as kinetic energy of flowing water and wind. Other energy sources includes solar photovoltaics and geothermal. In traditional way, we generate the energy by using the turbine generator assembly. First we create the steam by heating the water then we fed it on the blades of turbine and turbine starts rotating. And we know that turbine and generator are coupled to each other than generator starts rotating and generating electrical energy this is the traditional way of generating electrical energy. In hydro power plants capture the energy of falling water to generate electricity. A turbine converts the kinetic energy of falling water into mechanical energy from the turbine into electrical energy. When watching a river roll by, it is hard to imagine the force it is carrying. If you have ever been white-water rafting, then you have felt a small part of the rivers power. White water rapids are created as a river, carrying a large amount of water downhill, bottlenecks through a narrow passageway.

(b) Proposed topology

As shown in the diagram, there are 3 motors are coupled to each other, are 4 switches S1,S2, S3 and S4, there are 4 SCR and diodes which are used for safety purpose to oppose

Fig: Block diagram of motor interconnected in a close loop.



The flow of battery current. As shown in the figure there are three motors are coupled to each other. The RMS rating of Motors are as, the middle motors RMS rating is 1500rpm and the RMS rating of remaining two motors are 1200rpm.

When we provide the supply to the main motor whose RMS speed is 1500rpm, and the motor run at its RMS speed, at the same time the coupled motors are also runs at same speed, as per theory, when the motors run at its speed above RMS speed it will act as a generator then it will give electric energy.

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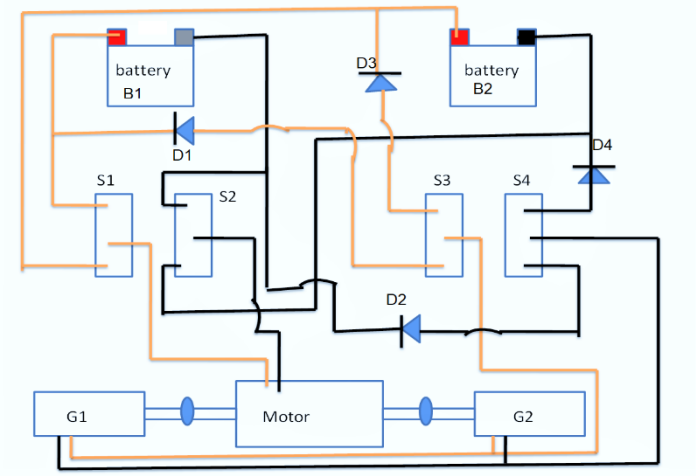
At the same conditions occurs over there, when the motor runs at 1500 rms the other two motors are also run at same speed .As per Law of theory the other two motors act as a generator and it will generated an electricity which will be stored in the battery.

III. WORKING

The assembly consists of four switches S1, S2, S3 and S4.
Switch S1 and S2 are used to change the connection of the
battery towards the main motors and switch S3 and S4 are used to change the connection of battery to store the energy.

Fig: Working of proposed work



The switches are three point switches when the direction of switch is in downward direction then the main motor takes supply from B1 and generator charged B2 battery and the vice versa. When the switch is in upward direction the main motor gets supply from B2 and generator charged B1 battery in this way the connection are done of
the switches.

III. FUTURE EXPANSION

In future, we could give more than 200miles of charge in as little as 10 minutes according to new research. Lithium batteries have had a dramatic impact because of their ability to store a large amount of energy in a compact battery and be recharge again and again however, lithium ion batteries also present a worry for drivers: that their vehicle will run out of power mid journey and leave them potentially facing a lengthy recharge.
Now developer said that they are addressing the issue by making it much quicker and easier to charge the battery, meaning car will spend less time at charging point and get back. We can use the solar panel for generating the solar power and given it to the battery for storing the energy therefore efficiency of the system also increases.

IV. FUTURE SCOPE

(1) We can used this technology in electric vehicles in a efficient way by making it fully automatic by using electronic controller.
(2) We can also implement the solar panel on body of the vehicle to generate solar power which increases the generating power of the circuit or assembly which also increases the efficiency of the circuit.

V. CONCLUSION

In this presented work we demonstrates a unique approach to generate the electrical energy by using a motor interconnected in a close loop, here we are using two batteries i.e. B1 and B2.when the motor starts generating the electrical energy, first battery get charge and when first battery is fully charged then we switch the terminal of the motor towards battery B2 then Battery B2 start charging. The supply of this batteries is given to the electrical vehicle and electrical vehicle start running.in this way, we generate the electrical energy in a close loop and give it to the electric vehicle to run.

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REFERENCES

[1]. K.W.Cheng,"Developments in Electric Vehicle",Department of EE ,third international conference on Power Electronics System and applications.
[2]. Dr.chokri Mahmoudi,Dr.Aymen Flah,Lassad Sbita,"An overview of Electric Vehicle concept and power management strategies."ENIG National school of Engineering,Universities of Gables, January 2015
[3]. Austin Hughes,"Electric Motors and Drive-Fundamentals,types and Application",University of Leeds,2006
[4]. R.A.Elmoudi,M.R.Abuzeid,N.E.Shtawa," Speed control od dc motor based on model reference adaptive controller ."Journal JAUSES,2007.
[5]. VK Mehta, Rohit Mehta; Book-"Basic electrical engineering".
[6]. S.K Sahdev; Book- "Electrical machines".
[7]. Ashfaq Husain, haroon ashfaq; Book- Electrical machines