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Fabrication of Solar Power using Vehicle

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Abstract: ***Now a days without electrical energy there is nothing in the world. Electrical energy can be taken from various methods like wind mills , power plants. But the raw materials which are used for producing electrical energy is not sufficient for upcoming years. In order to overcome the problem solar energy is necessary. It is an renewable, evergreen and everlasting energy. In our project we construct a solar powered vehicle prototype which convert the solar power converted into electrical power by the help of components like DC motor, Solar panel, DC battery***

Keywords: Electrical, DC motor, Solar panel, DC battery.

I. INTRODUCTION

Any equipment without power is an idle bunch of components. It is very prominent with those dependable upon the non renewable sources. It's a pro active approach to shift our source of energy to renewable source. This paper details the study of designing a Solar Powered Motor Driven Electric Vehicle which is one of the solutions for the oncoming crisis. The approach of selecting the appropriate components for this application is studied and each of them are simulated and subjected to various tests in real time environment. The integrated system consisting of the solar module, self motor, Dc battery, Dc charger

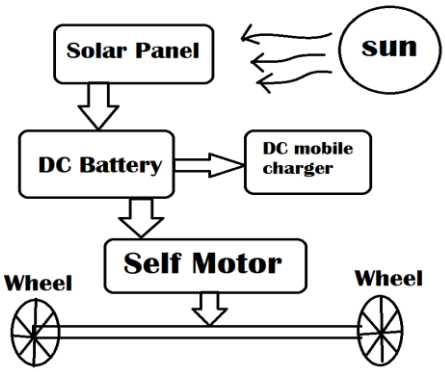

Fig 1.1Block Diagram of Vehicle

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1.1. Solar Panel

Fig 1.2 Solar panel

Solar panel refers to a panel designed to absorb the sun's rays as a source of energy for generating electricity or heating. A photovoltaic (PV) module is a packaged, connect assembly of typically 6×10 photovoltaic solar cells. Photovoltaic modules constitute the photovoltaic array of a photovoltaic system that generates and supplies solar electricity in commercial and residential applications. Each module is rated by its DC output power under standard test conditions (STC), and typically ranges from 100 to 365 watts. The efficiency of a module determines the area of a module given the same rated output – an 8% efficient 230 watt module will have twice the area of a 16% efficient 230 watt module. There are a few commercially available solar modules that exceed 22% efficiency and reportedly also exceeding 24%. A single solar module can produce only a limited amount of power; most installations contain multiple modules. A photovoltaic system typically includes an array of photovoltaic modules, an inverter, a battery pack for storage, interconnection wiring, and optionally a solar tracking mechanism.The most common application of solar panels is solar water heating systems. The price of solar power has continued to fall so that in many countries it is cheaper than ordinary fossil fuel electricity from the grid (there is "grid parity

1.2 Theory and Construction

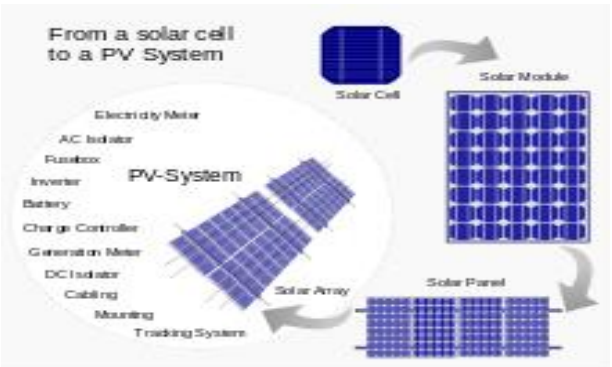

Fig 1.3 Solar Module

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Photovoltaic modules use light energy (photons) from the Sun to generate electricity through the photovoltaic effect. The majority of modules use wafer-based crystalline silicon cells or thin-film cells. The structural (load carrying) member of a module can either be the top layer or the back layer. Cells must also be protected from mechanical damage and moisture. Most modules are rigid, but semi-flexible ones are available, based on thin-film cells. The cells must be connected electrically in series, one to another. Externally, most of photovoltaic modules use MC4 connectors type to facilitate easy weatherproof connections to the rest of the system. Modules electrical connections are made in series to achieve a desired output voltage and/or in parallel to provide a desired current capability. The conducting wires that take the current off the modules may contain silver, copper or other non-magnetic conductive [transition metals]. Bypass diodes may be incorporated or used externally, in case of partial module shading, to maximize the output of module sections still illuminated. Some special solar PV modules include concentrators in which light is focused by lenses or mirrors onto smaller cells. This enables the use of cells with a high cost per unit area (such as gallium arsenide) in a cost-effective way. Solar Chargers Convert Light Energy Into DC Current. They Are Generally Portable, But Can Also Be Fixed Mount. Fixed Mount Solar Chargers Are Also Known As Solar Panels. Solar Panels Are Often Connected To The Electrical Grid, Whereas Portable Solar Chargers Are Used Off-The-Grid

1.3 Electric Motor

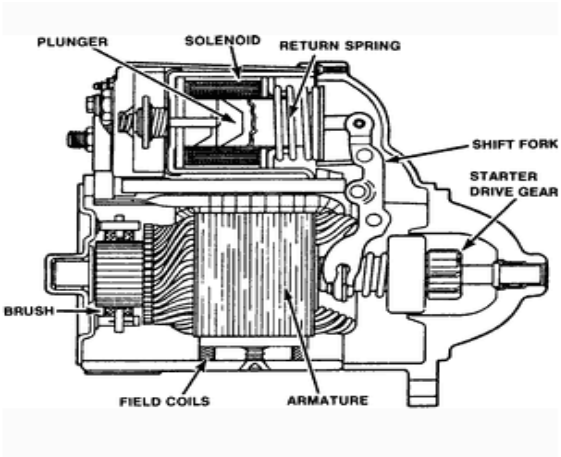

Fig 1.3 Electric Dc Motor

The electric **starter motor** or **starting motor** is the most common type used on gasoline engines and small diesel engines. The modern starter motor is either a permanent-magnet or a series-parallel wound direct current electric motor with a starter solenoid (similar to a relay) mounted on it. When current from the starting battery is applied to the solenoid, usually through a key-operated switch, the solenoid engages a lever that pushes out the drive pinion on the starter driveshaft and meshes the pinion with the starter ring gear on the flywheel of the engine.

The solenoid also closes high-current contacts for the starter motor, which begins to turn. Once the engine starts, the key-operated switch is opened, a spring in the solenoid assembly pulls the pinion gear away from the ring gear, and the starter motor stops. The starter's pinion is clutched to its drive shaft through an overrunning sprag clutch which permits the pinion to transmit drive in only one direction. In this manner, drive is transmitted through the pinion to the flywheel ring gear The starter's pinion is clutched to its drive shaft through an overrunning sprag clutch which permits the pinion to transmit drive in only one direction. In this manner, drive is transmitted through the pinion to the flywheel ring gear, but if the pinion remains engaged (as for example because the operator fails to release the key as soon as the engine starts, or if there is a short and the solenoid remains engaged), the pinion will spin independently of its drive shaft. This prevents the engine driving the starter, for such back drive would cause the starter to spin so fast as to fly apart.

1.4 DC Battery

Fig 1.4 Dc Battery

An automotive battery is a rechargeable battery that supplies electric energy to an automobile. Traditionally, this is called an SLI, for starting, lighting, ignition, and its main purpose is to start the engine. Once the engine is running, power for the car is supplied by the alternator. Typically, starting discharges less than three per cent of the battery capacity. SLI batteries are designed to release a high burst of current, measured in amperes, and then be quickly recharged. They are not designed for deep discharge, and a full discharge can reduce the battery's lifespan. A 10 amp-hour battery could take 15 hours to reach a fully charged state from a fully discharged condition with a 1 amp charger as it would require roughly 1.5 times the battery's capacityLead–acid batteries will experience substantially longer life when a maintenance charger is used to "float charge" the battery. This prevents the battery from ever being below 100% charge, preventing sulfate from forming. Proper temperature compensated float voltage should be used to achieve the best results.

1.5 Battery Charger

Fig 1.4 Battery Charger

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A simple charger equivalent to an AC/DC wall adapter. It applies 300mA to the battery at all times, which will damage the battery if left connected too long.A battery charger, or recharger, is a device used to put energy into a secondary cell or rechargeable battery by forcing an electric current through it.

II. EXPERIMENTAL SETUP

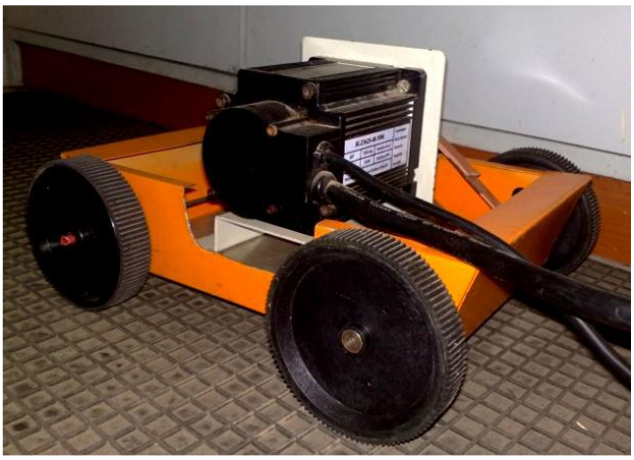

Fig 2.1 Solar Powered Vehicle

We Develop A Prototype Which Contains Solar Module, Self Motor Dc Battery Dc Charger. Based on a atmospheric temperature the power output from solar panel is changed. the temperature changes play a major role in motor power the power which is taken from solar panel is stored in a battery and the battery is used to rotate the motor which is connected to wheels. the power generation due to rotation of motor is also saved in a battery. the power generation of for different atmospheric temperature is listed below table 2.1

S. No	Temperature output	Solar panel power	Battery Power
1	20ºC	10V/sec	8V/min
2	25ºC	10.5V/sec	9V/min
3	30ºC	11V/sec	9.8V/min
4	35ºC	12V/sec	10V/min
5	40ºc	13V/sec	11V/min

2.1. Advantages of The Vehicle

The solar vehicles are the future of the automobile industry. They are highly feasible and can be manufactured with ease. The main advantages of a solar vehicle are that they are pollution less and are very economical. Since they cause no pollution they are very eco-friendly and are the only answer to the increasing pollution levels from automobiles in thepresent scenario. By harvesting the renewable sources of energy like the solar energy we are helping in preserving thenon-renewable sources of energy. The other main advantages of the solar vehicle are that they require less maintenance as compared to the conventional automotives and are very user friendly.

III. CONCLUSION

The solar vehicle solves many problems related to the environment and is the best pollution free method. We needto make use of them so that we can reduce our dependence on fossil fuels. Solar vehicles do have some disadvantages like small speed range, initial cost is high. A solar panel of 50x50 cm dimension and 30ºC to 35ºC atmospheric temperature we have obtain a constant power 10 v which is used to run a 5 kg weight of solar vehicle. based on weight and power consumption of motor we have to increase the solar panel dimension and battery capacity.

REFERENCES

1. Jain A. Anderson, Ioannis A. Mitropoulos, Thomas McKay, Benjamin O'Brien, And Chris Melhuish, "Power For Robotic Artificial Muscles" IEEE/ASME Transaction son MechatronicsVol.16, No. 1,Feb 2011
2. J.H. Lever A. Streeter And L.R.Ray "Performance Of A Solar-Powered Robot For Polar Instrument Networks". Cold Regions Research And Engineering Laboratory Thayer School Of Engineering US Army Engineer Research And Development Center Hanover
3. Tom´As De J. Mateo Sanguine And Justo E. Gonz´ Alez Ramos "Smart Host Micro Controller For Optimal Battery Charging In A Solar-Powered Robotic Vehicle" IEEE/ASME Transactions On ISSN (Online) 2278-1021ISSN (Print) 2319-5940
4. Theodore Amissah OCRAN, CAO Juny, CAO Binggan g, SU NXinghua,"Artificial Neural Network Maximum Power Point Tracker for Solar Electric Vehicle"Tsinghuascienceand technology, ISSN1007-021412/23 pp204-208 Volume10, , April 2005
5. Nicolet-Irina Tatu, Catlin Alexandra "Modeling and Simulation of the Tracking Mechanism for a PV String" Department of ProductDesign, Mechatronics and Environment Transylvania University ofBrasov Romania
6. Dr. R. C. Prasad "Design and Implementation of MPPT Algorithm for Solar Energy System "International Journal of Advanced Research in computer science and software engineering. Volume 3,Issue 10, October 2013
7. N. Kemal Ure, Girish Chowdhary, Member, IEEE, Tuna Toksoz,Jonathan P. How, Senior Member, IEEE, Matthew A. Vavrina, and John Vian,"An Automated Battery Management System to Enable Persistent Missions With Multiple Aerial Vehicles" IEEE/ASME transactions on mechatronics 2013.

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