

SOLAR OPERATED GRASS CUTTER

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Abstract:

From time immemorial, the sun has been the major source of energy for life on earth. These days we are facing the problems like pollutions, power cut problem etc. In order to overcome these problems, we have thought about the device, which can be performing its functions without causing any of these problems. So we have thought of doing the project on cutting grass in Lawns, Garden, School, etc. This uses the renewable source of energy for its operation like solar energy. The aim of our project is to make the grass cutter which operates on solar energy hence save the electricity and reduces Manpower. We have made some change in the vacant machine to make its application easier at cheap cost. This Grass cutter does not require proficiency person to operate.

Keywords: Battery, Solar charger, DC Motor, Wire rope, Solar Panel.

Introduction

A Solar operated grass cutter is machines that use sliding blades to slice a grass to bring at an level measurement lengthwise. Even more refined devices are there in every field. Power consumption becomes vital for future. The solar grass cutter consists of the photovoltaic cell for the effectiveness power from solar panel. It is an programmed system for the purpose of grass cutting. Moving the standard grass cutter in lawn with a standard motor is problematic, and may cause energy and no one takes delight in it. Standard grass cutter with heavy engine create clutter pollution and air pollution due to ignition of fuel in engine. If the electric grass cutter were to use or considered, moving around prove to be knotty and dangerous. Solar ways grass cutter are eco-friendly. This archetype will charge from the sun using solar panel.

Related Work

A solar cutter gets the energy it needs to move from sunlight. If you just look at the solar plate over the top you can see that much of its plane looks black. This helps it to exude the sunlight-black objects absorb most of the light that falls ahead them. Usually, black objects just get warm in the sun. But in a solar cutter, some of the light is rehabilitated to

electricity by a device called a "solar cell." Each of the dark panels that you can see in the snap contains many such solar cells. The electricity is used to impel the DC motor. Excess electricity is stored in a battery for cloudy periods.

Solar Panel: Solar energy begins with the Sun oriented boards (otherwise called "PV panels") are utilized to change over light from the sun, which is made out of particles of vitality called "photons", into power that can be utilized to control electrical burdens. The sun based cell is the uncomplicated building square of the photovoltaic innovation. Sun oriented cells are made of semiconductor matters, for example, silicon. One of the other properties of semiconductors is that makes them most practical is that Solar panels are comprised of several individual solar cells which are themselves made out of layers of silicon, phosphorous (which gives the negative charge), and boron (which gives the positive charge). Sun powered boards ingest the photons and in doing as such start an electric current. The subsequent vitality produced from photons striking the surface of the sunlight based board enables electrons to be thumped out of their nuclear circles and discharged into the electric field created by the sun based cells which at that point maneuver these free electrons into a directional current bound valence electrons at the silicon material, making overindulgence negative charge transporters. On the other side, atoms made

up of boron with three valence electrons (p-donor) generally create a greater resemblance than silicon to catch the attention of electrons. Because the-type silicon is in intimate get in touch with with the n-type silicone p-n junction is established and a dissemination of electrons occurs from the region of the high electron focus (the n type side) into the area about low electron concentration (p-type side). Though, the diffusion of carriers does not even occur until further discern, because the imbalance of charge ringht away on moreover sides of the junction originates an electric field. This electric field forms a diode that promote current to flow in only one direction. When photons of light fall on the upper portion of cell, they change place their energy to the charge carriers. The electric field from corner to corner the junction separate photo-generated positive charge carriers (holes). From their part of negative counterpart (electrons). In this way an electrical current is pull out once the circuit is about to closed on an external load. There are quite a few types of solar cells. By my Knowledge about more than 90 % of the solar cells currently prepared all over worldwide consist of wafer-based type silicon cells.They are either cut from a solitary gem bar or on or after a piece made out of number of precious stones and are separately called mono-crystalline or multi-crystalline silicon sun based cells. Wafer-based silicon sun oriented cells are around 200 m thick. Another noteworthy group of sunlight based cells depends on thin-films, which are around 1-2 m thick and subsequently require essentially less dynamic, semiconducting material. Thin-film solar cells can be pretend at lower cost in large production quantities; hence their market share will likely raise in the future. A number of solar cells electrically connected to each other and mount in a single support structure or frame is called a “photovoltaic module”. More than 90 % of photovoltaic systems all-inclusive are at this time implemented as grid-connected systems. The power conditioning unit also monitor the vital functioning of the system for which the grid and switches off the system in case of slip-up.

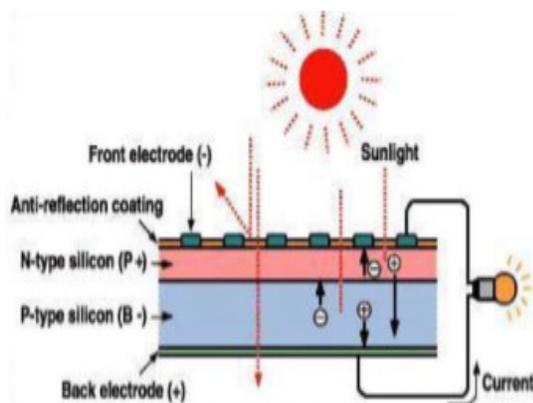


Fig.1: Solar Panel

MOTOR: The Brushless type DC (BLDC) motor is worn out as the drive motor for the vehicle. BLDC motor that uses outlook directly of the rotor against the angular position so that the input carcass current in the motor can be switched in the middle of the motor phases in accurate synchronization around the rotor motion.The reason for opting is that for the BLDC motor is for the reason that of its effectiveness, noiseless operation, dynamic reaction and high torque to initial weight ratio. Brushless DC electric engine (BLDC engines, BL motors)are otherwise called electronically commutated engines (ECMs, EC motors)are the easiest sort of engine is the brushed DC engine. In this sort of engine, electrical current is gone through curls that are organized inside a settled attractive field. The current produces attractive fields in the loops; this makes the curl gathering pivot, as each curl is pushed far from the like shaft and pulled toward the dissimilar to post of the settled field. To look after revolution, it is important to ceaselessly turn around the current so that curl polarities will persistently flip, making the loops keep chasing the dissimilar to settled shafts. Energy to the curls is provided through settled conductive brushes that reach a rotating commutator; it is the pivot of the commutator that causes the inversion of the current through the loops. The commutator and brushes are the key segments recognizing the brushed DC engine from other engine writes.

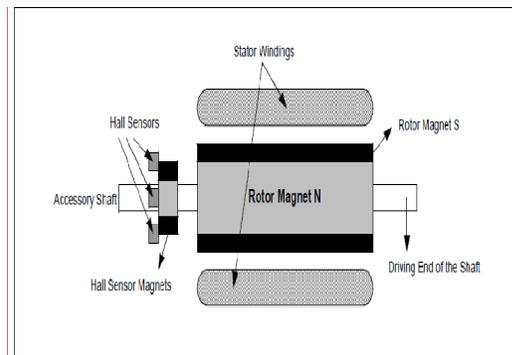


Fig:2-Motor

Batteries: In our everyday life Lead corrosive batteries are a standout amongst the most practical acknowledged sorts of battery in gadgets. The basic power unit inside a battery is known as a cell, and it involves three major bits. There are two electrodes(electrical terminals) and a blend called an electrolyte in the middle of them. For our advantage and security, these things are normally stuffed inside a metal or plastic outer case. For our benefit and wellbeing, these things are typically packed inside a metal or plastic external case. There are two more helpful electrical terminals, set apart with an or more (positive) and less (negative), on the outside

connected to the anodes that are inside. The distinction between a battery and a cell is just that a battery comprises of at least two cells snared so their energy includes. When you interface a battery's two anodes into a circuit (for instance, when you place one of every a spotlight), the electrolyte begins humming with action. Gradually, the chemicals inside it are changed over into different substances. Ions (atoms with excessively few or an excessive number of electrons) are shaped from the materials in the anodes and partake in concoction responses with the electrolyte.

In the meantime, electrons walk from one terminal to the next through the external circuit, driving whatever the battery is associated with. This procedure proceeds until the point when the electrolyte is totally changed. By then, the particles quit traveling through the electrolyte, the electrons quit moving through the circuit, and the battery is level.

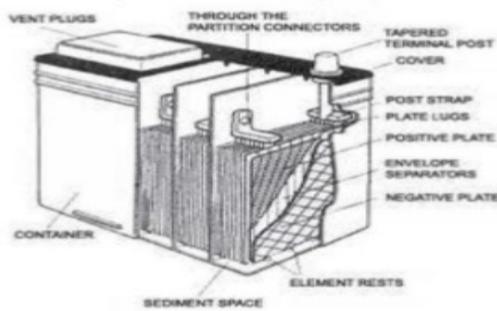


Fig. 3: Lead Acid Battery

Solar Charge Controller: A MPPT which is well known solar charge controller which is chosen for the solar power system of the solar grass cutter to pull out utmost power from solar panel right through during the day time. It guarantees that the profound cycle batteries are not cheated amid the day, and that the power doesn't run in reverse to the sun powered boards overnight and deplete the batteries. Some accuse controllers are accessible of extra capacities, such as lighting and load control, yet dealing with the power is its essential employment. A sun based charge controller is accessible in two distinct innovations, PWM and MPPT. How they perform in a framework is altogether different from each other. A MPPT charge controller is more costly than a PWM charge controller, and it is regularly justified, despite all the trouble to pay the additional cash. Here, when it gathers charges from sun powered boards and charges the 12 volt lead-corrosive battery. It has LED bar readout to appear about the greatness of the sunlight based charging framework and batteries. By the assistance of the MPPT sun oriented charge controller where around 20 to 30% more vitality which can be produced than that of a conventional kind charge controller.

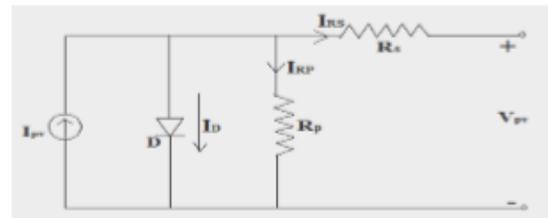
Wire Rope: A Wire rope is a bit of an apparatus, warhead, or machine with an edge that is intended to cut or potentially cut,

cut, slice, cleave, cut, push, or rub any sort of surfaces or materials. A wire rope might be make from a fiber, plastic or other material.

Proposed System:

1.Solar panel specifications:

Solar cells are solid state semiconductor devices which convert light energy directly into electrical energy. A solar cell contains a low voltage typically about 0.45 volts per cell; cells are connected in series to increase voltage. The model of solar cell which can be characterized as P-N semiconductor junction, when uncovered to light area, the DC current is generated. The created current relied upon the sun oriented irradiance, temperature and load current. The normally proportionate circuit of PV cell is appeared in Fig.1/



The Solar Module mounted on the pinnacle of vehicle is to be utilized to charge the batteries by means of charge controller. The upper frame of this solar element is converted with thick glass to stay away from any type of breakage of the solar panel so that its quit usable.

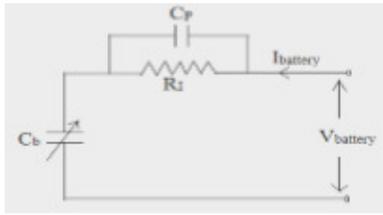
The specification of solar module used in this paper are represented in TABLE II

S.No	Specifications	Range
1	Maximum Power (Pmax)	230 watt
2	Maximum Power Voltage (Vpm)	24 volt
3	Maximum Power Current (Ipm)	5.10A
4	Open Circuit Voltage (Voc)	37.20A
5	Short Circuit Current(Isc)	8.55A
6	No load current	24.2%

2.Charge controller and battery stipulation :

Charge controller is limited by the pace at which electric current is to add it or drained from the electric batteries. The major purpose by using the charge controller is to avoid next so that to overcharging and deep charging of a battery

Charge controller consists of a circuitry in which it controls the DOD of the battery. The DOD and the battery life have inverse relationship. The battery that is discharged more has lesser life than that which is discharged less. The charge controller prevents the battery to be overcharged (or) over discharged



The proper dimensions of battery were established for the Solar grass cutter. The goal for a suitable next of kin among weight, volume, life time, cost, energy density and environmental impact.

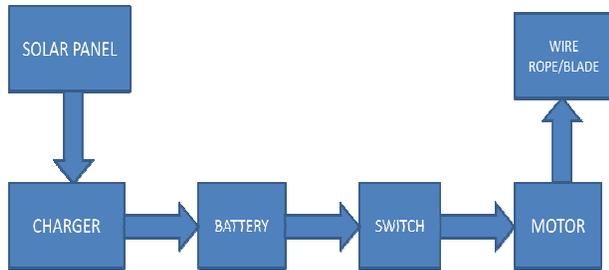


Fig.3 Overall view of working of grass cutter from solar energy and battery.

3. CONCLUSION

The results reveal that a solar powered grass cutter is a feasible alternative for Classical Grass cutter. The following conclusions are drawn from the results.

1. This sun oriented controlled Grass shaper later on will meet the go up against of natural generation and low shed of task since there is no rate of filling.
2. A sunlight based fueled grass trimmer in late time has been urbanized for the utilization of habitation and venture that have yard where tractor driven mover couldn't be utilize.
3. The machine's capacity is tolerable for this purpose.
4. The machine has proved to be a possible substitution for the gasoline powered lawn movers.
5. This grass cutter inhabit less space and light in weight and whereas it uses nonconventional source of energy hence running price is zero.
6. It has provision of charging battery when grass cutter is in the working condition.

7. The cost of solar based grass cutter is much cheaper than the market grass cutter.
8. Grass cutter is used to keep the lawn more clean and standardized in schools, gardens and playgrounds.
9. Non skilled person who is not able to work can also handled it easily.

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