

Manufacturing Of Solar Operated Grass Cutter Machine

ISSN 2395-1621

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ABSTRACT

A Solar grass cutter is a machine that uses blades to cut a lawn at an even length. Even more sophisticated devices are there in every field. Power consumption becomes essential for future. Solar grass cutter is a very useful device which is very simple in construction. It is used to maintain and upkeep lawns in gardens, schools, college's etc. We have made some changes in the existing machine to make its application easier at reduced cost. Our main aim in pollution control is attained through this. Unskilled operation can operate easily and maintain the lawn very fine and uniform surface look. In our project, solar grass cutter is used to cut the different grasses for the different application.

Key Words: Solar plate, Battery, DC motor, Blades.

ARTICLE INFO

Article History

Received: 22nd March 2017

Received in revised form :
22nd March 2017

Accepted: 24th March 2017

Published online :

4th March 2017

I. INTRODUCTION

This project emphasizes on minimization of harmful efforts of using the manual grass cutter. The new developed grass cutter is operated on the solar power and it consist of different parts likes solar plate, Battery 12 Volt D.C., Motor, Cutting blades and wheel. In the new modified grass cutter the rotar is fixed between the bearings is attached with the frame of grass cutter and Motor is attached to the rotor and motor is fixed the grass cutter frame. Solar plate is fixed on the upper part of the grass cutter because of sun ray is directly on the solar plate and solar plate is directly connected to the motor. Then start the rotating the motor is clockwise or anticlockwise depend upon the connection or as per our requirement.

Now the project mainly concentrates on designing a suitable operating system. To maintain simplicity and economy in the design the locally fabricated unit has been used.

Our project achieves higher safety, reduces human effort, increases the efficiency of the grass cutter, reduces the work load, reduces the fatigue of workers and reduces maintenance cost.

1.1 components used

Solar panel
Charge controller
Battery
Relay Switch
DC Motor

Blades
M S Rod
Wheels

1. SOLAR PANEL:

The solar panels are used to generate electric power. A panel designed to absorb the sun's rays as a source of energy for generating electricity. Photovoltaic modules use light energy (photons) from the Sun to generate electricity through the photovoltaic effect.

Maximum Power: 25 W
Maximum Voltage: 17.60 V
Maximum Current: 1.4 Amp
Tolerance: $\pm 5\%$
Dimensions: 55*35 cm



Fig 1:solar plate

2. Charge controller:

It limits the rate at which electric current is added to or drawn from electric batteries. It prevents overcharging and may protect against overvoltage, which can reduce battery performance or lifespan, and may pose a safety risk. It may also prevent completely draining (“deep/fully discharging”) of battery.



Fig 2 Charge controller

3. Battery:

The batteries are used as a storage device for solar energy which can be further converted into electrical energy. Batteries can be in the interior of the lawn mower or on the outside.

Specifications:

Cycle use: 14.4-15 V

Max charging current: 2.25 Amp

Charging Capacity: 7.5 AH



Fig 3 Battery

4. DC Motor

It is the rotary electrical machine that converts direct current electrical energy into mechanical energy. Brushless DC electric motor also known as electronically commutated motors are synchronous motors powered by DC electricity via an inverter/switching power supply which produces an AC/bi-directional electric current to drive each phase of the motor via a closed loop controller,



Fig 4: DC Motor

5. Blades:

A) Nylon blade

Length of wire:10cm

Internal diameter:10mm



Fig 5 Nylon Blade

B) Steel blade:

Diameter of blade: 12.5 cm

Internal diameter:10mm



Fig 6 Steel Blade

1.2 Grass Cutter Machine



Fig 7: Grass cutter machine

II. CONSTRUCTION & WORKING OF PROJECT

The new developed solar grass cutter is operated on the solar power and it consist of different parts likes Solar plate, Battery 12 Volt D.C., Motor 12 Volt D.C, cutting blade for the cutting the grass Solar plate is fixed on the upper part of the solar grass cutter because of sun ray is directly on the solar plate and solar plate is directly connected to the battery for charging the battery. Then start the rotating the motor is clockwise or anticlockwise depend upon the connection or as per our requirement. Then we are attaching round shaft to the motor. motor is connected rom the round shaft & round shaft is connected from cutting blade. The round shaft is transfer the motion motor to cutting blade.

Now the project mainly concentrates on designing a suitable operating system. To maintain simplicity and economy in the design the locally fabricated unit has been used.

Solar power is quickly turning into one of the leading alternative sources of energy to fossil fuels, with many manufacturers offering solar-powered cutter. Solar panels work with silicon mounted under non-reflective glass to produce panels that collect photons from the sun and convert them into DC power. When the cutter is not in use, a battery stores the power. When switch is Motor start rotating clockwise direction due to the Crank for converting the rotary motion into reciprocating motion and then hack frame also rotating like reciprocating motion. In the bench

wise wood is holding and cutting the wood is possible and supporting frame.

Now the project mainly concentrates on designing a suitable operating system. To maintain simplicity and economy in the design the locally fabricated unit has been used.

Working principle of the grass cutter is providing a high speed rotation to the blade, which helps to cut the grass. The blade will get kinetic energy while increasing the rpm. The cutting edges are very smooth and accurate. Also Electric Grass Cutting Machines are much easier to be used in garden, lawn and grass fields. In order to enhance the beauty of home-lawns and gardens, Grass cutting machines are the best available option in the industry. With the help of a lawn mower which is a machine with revolving blades to help us cutting lawns at even length, people can easily maintain and beautify their lawns and gardens without any hassle.

Now-a-days, there are plenty of options starting from the simplest push along mower to the most advanced electric grass cutting machine. According to world energy report, we get around 80% of our energy from conventional fossil fuels like oil (36%), natural gas (21%) and coal (23%). It is well known that the time is not so far when all these sources will be completely exhausted. So, alternative sources should be used to avoid energy crisis in the nearby future.

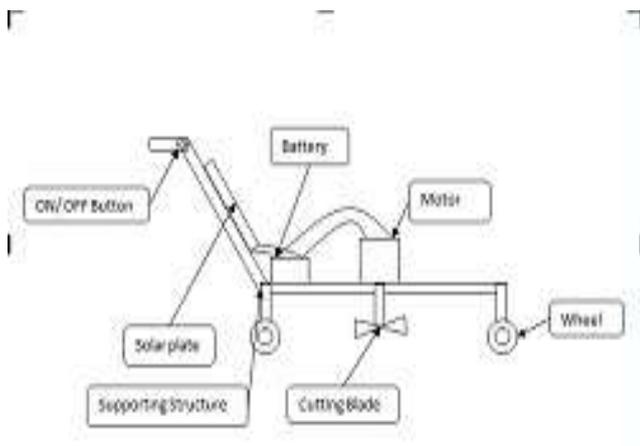


Fig 7: configuration diagram

The solar panel generate the electricity which stores in the battery with the help of charge controller. Basic principle of charge controller is to resist the extra voltage provided to battery by the solar panel. The next step to provide rotation to cutter by using motor and motor requires current so the current stored in battery is supplied to motor and it will help to rotate cutter with required rpm to cut the grass. Also we can use remaining power for home appliances which will shows multiuse of system.

Table -1: Difference between solar and fuel system

Sl.No	SOLAR SYSTEM	FUEL SYSTEM
1	Totally free from pollution	Pollution is a great factor
2	No fuel consumption	Fuel is the important need
3	No. of reciprocating parts are less	No. of reciprocating parts are more
4	Friction is greatly reduced	Frictions between the parts are high.
5	Low cost and maintenance	Maintenance is difficult & costly
6	Load carrying capacity is low	Load carrying capacity is high
7	Continuous ride for hours together is not possible	Continuous ride is possible
8	Ratio of speed reduction more	Speed reduction ratio is less and it does not vary

III. MANUFACTURING PROCESS

1. Measurement of the material required dimensions:

After designing the system it is important to manufacture the machine with proper dimension to which will affect to lower the cost and size with increase an efficiency of machine.

2. Cutting operation as per dimension:

In the cutting operation part is held in a fixture, and cut the work-piece as per the given dimensions. MS square rod is cuts with the help of motorized cutting machine. MS square rod with dimension 0.75" cuts with required dimension and used to assemble a support frame.

Motorized abrasive cutting machine is widely used in fabrication and structural industries for cutting metal. It's heavy cast iron body provides accurate and easy cutting of metal.

3. Drilling operation:

Drilling is a cutting process that uses a drill bit to cut a hole of circular cross section in solid materials.

4. Welding and Grinding operation on required parts:

For welding process, 3.15*350mm size rods are used to join the MS bars as per the given dimensions. After the welding process, grinding is necessary for remove extra material.

The arc welding machines are convenient to operate and require very less maintenance. An exclusive range of Arc Welding Machine that is useful in fixings objects or welding any two metallic body parts.

IV. CONCLUSION

Our project works on the solar power due to the operating cost is zero. In the presented paper provides the fabricated information about the "Fabrication of Solar grass Cutting Machine" which was designed such that the solar plate generates solar energy and utilizing this energy for running the grass cutter motor. Integrating features of all the hardware components used have been developed in it. Presence of every module has been reasoned out and placed

carefully, thus contributing to the best working of the unit.

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