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AUTOMATIC SOLAR GRASS CUTTER MACHINE

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ABSTRACT

This paper will give idea about how we have did study of automatic solar grass cutter. Nowadays grass cutter machines are becoming very popular today. Pollution is manmade, which we can be see in our daily life. In old model of grass cutter IC engine was used and hence because of its environmental impact pollution level rises engine driven cutter is more costly. Maintenance of such such conventional machine is more. To avoid these drawbacks we plan to built new type of grass cutter which runs on solar energy and this model is also economical. The aim of our paper is to make the grass cutter which operates on solar energy hence save the electricity, avoid use of fuel and reduces manpower. The aim of our paper is to make the grass cutter which operates on solar energy hence save the electricity and reduces manpower. A solar powered grass cutter was designed and developed, based on the general principle of mowing . This seminar is deal with designer of solar powered grass cutter comprises of direct current (D.C) motor, are chargeable battery, solar panel, a stainless steel blade and control switch. The solar powered grass cutter is operated by the switch on the board which closes the circuit and allows the flow of current to the motor which in turn drive the blade used for mowing. The battery recharges through the solar charging controller. Performance evaluation of the developed machine was carried out with different types of grasses.

Keywords*:* Solar Grass Cutter, Solar panel, Dc motor and Cutter blade

1. INTRODUCTION

Due to the continuous increase in the cost of fuel and the effect of emission of gases from the burnt fuel into the atmosphere, this necessitated the use of the abundant solar energy from the sun as a source of power to drive a lawn mower. A solar powered lawn mower was designed and developed, based on the general principle of mowing. Mowing is achieved by the D.C motor which provides the required torque needed to drive the stainless steel blade which is directly coupled to the shaft of the D.C motor. The solar powered lawnmower is operated by the switch on the board which closes the circuit and allows the flow of current to the motor which in turn drive the blade used for mowing. The battery recharges through the solar charging controller. Performance evaluation of the developed machine was carried out with different types of grasses. The sun provides sustainable amount of the energy used for various purposes on earth for atmospheric system. The difference is just the application of the energy source. It is assumed that a lawnmower using solar as the energy source will address a number of issues that the standard internal combustion engine and electric motors lawn mowers do not. A lawnmower with solar energy will be easier to use, it eliminates down time byfrequent trips to the gas station for fill-ups and danger associated with gasoline spillage. The dangerous emissions generated by the gasoline spillage and that ofthe internal combustion engine into atmosphere are eliminated. The solar powered lawnmower will help to reduce air pollution. Thus, it is used.

2. LITERATURE REVIEW

Nikhil Bhujbal [1] focused much on environmental friendly solar grass cutter. There are studies and experiments going on for human enlargement in many countries on the solar energy, so they made concept of solar energy. They explained that the machine will include DC motor, rechargeable battery, solar panel, a stainless steel blade and control switch.

Hitesh Ritolia [2] is explained a fully automated lawn cutter using solar panel. This paper explained that design and automatic lawn mower which operates on solar energy and avoids drawback of old lawn mowers. It is cleared that powered is made from renewable source energy i.e solar enery hence consumption of fossil fuel is reduced.

Monika Patil [3] explained about automated solar grass cutter. It will be easier for the people who are going to take the project for the further modifications. This project is more suitable for a common man as it is having much more advantages i.e, no fuel cost, no pollution and no fuel residue, less wear and tear because of less number of moving components and this can be operated by using solar energy. This will give much more physical exercise to the people and can be easily handled.

Yogita Amberkar [4] explained about solar based grass cutter. Grass cutter occupy less space and light in weight and as it uses nonconventional source of energy hence running cost is zero. It has facility of charging battery while grass cutter is in the working condition. The cost of solar based

grass cutter is less than the market grass cutter. Grass cutter is used to keep the lawn clean and uniform in schools, gardens and playgrounds.

Mothibeli Pita [5] focused on design of solar-powered grass trimmer. It is environmentally friendly, produces less noise and affordable was achieved. Trimmers works up to 10 m away from charging station, it is 1.5 m long and weights about 6 kg. charging station is movable and can be pulled to any place and distance.

Vijaykumar Ghorade [6] studied on design and fabrication of solar grass cutter. From this paper we conclude disadvantages of grass cutter like eventually disposal of batteries, large time required to remove the grass, difficult to operate in rainy season and low power in dark and cloudy environment.

Shreyas Zopate [7] focued on smart solar grass cutter with lawn coverage. From this paper conclude future scope of the project. Project is useful at the basic level of grass cutting.

U. V. Patil [8] studied on solar based automatic grass cutter. This paper explained that project can also used in night time. And there is a facility to charge the battery in day light i.e we can recharge the battery in day time only.

Abdul Manal [9] studied on solar powered automatic grass cutter. A workable solar powered automatic grass cutter prototype is focusing on the renewable energy as primary sources of energy have been successfully fabricated with high working efficiency.

A. Zukipli [10] focused on design and development of solar grass cutter. It explained few types of blade to be considered to cut different types of grasses. It gives short time to cut the grass.

3.PROBLEM STATEMENT AND OBJECTIVE

1. Electricity is saved as utilize solar energy and is present in abundance.

2. Solar grass cutter required low maintenance.

3. It is eco-friendly

3.1 Objectives

1. Design grass cutter which operates on solar energy and avoids the drawback of old lawn mowers.

2. It keeps environment clean and healthy.

3. It avoid energy crisis, reduces human efforts and operating cost.

4. It works with the help of solar renewable energy source which stored in the battery.

5. Body is made by pipes i.e. Model is light in weight that means we can move easily

3.2 METHODOLOGY

This machine is made up with solar panel, wires, battery, motor, blade, PVC pipe, castal wheel, fibre sheet, switch, and normal wheel as shown in given fig. The solar grass cutter is a simple design which is optimizing the usage of the materials. Overall dimensions are depending on the size or the dimensions of solar panel. Solar panel used to charge the batteries which are rechargeble. After our research or calculation, the solar panel gives maximum 12v and 420 mA current (tentative). Battery will be connected to motor the blade and it start rotating when switch will be ON. To cut any type grass we need high RPM motor. So we need to used 1100 rpm motor for cutting blade (tentative). We will be finalise rpm of motor, volt of battery and current in next semester. Motors are also used to move tires.

4. AUTOMATIC GRASS CUTTER MODEL

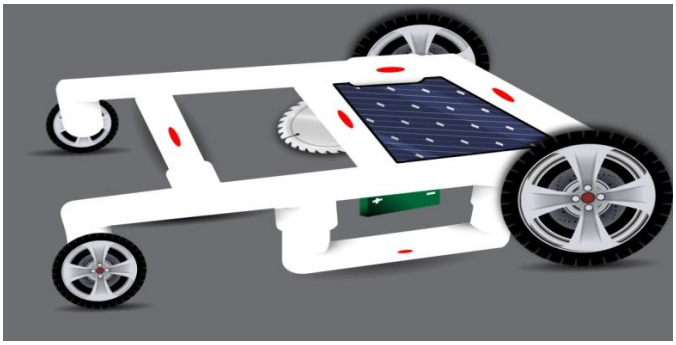

Fig -1: (solar grass cutter)
(Design on illustrator)

4.1 DESIGN COMPONANTS

1. Solar panel
2. Battery
3. Motor
4. Blade
5. PVC pipe
6. Coupling and reducer
7. Caster wheel
8. Fiber sheet
9. Switch wire
10. Normal wheel

4.2 DESIGN CALCULATION

F=T/R

Where T = shaft torque

R= Radius of cutting blade

But shaft of torque is given by T = P/2*3.14*N

Electrical Powrr is given by P = I*V

Torque of the motor is given by T = (P*60)/(2*3.14*N)

5. MOTIVATION

Grass cutter moving with engine and engine creates noise pollution due to loud engine and local air pollution due to the combustion in the engine also a motor power engine requires a periodic maintenance such as changing the engine oil. In the conventional grass cutter, we are adding so many things new. Now there is no any fuel consumption and maintenance part. Grass cutter is totally operated on solar energy, so that the pollution and usage of fuel controlled. The solar panel recharge the battery and when switch will be ON the DC motor of stainless steel blade will be start spinning and it is used in various applications such as various type of ground. There various types of grass cutter to cut different type of grass so we trying to made one grass cutter which can be used to cut every grass

6. EXPECTED OUTCOMES

We will be completed our paper successfully with the available sources. But the results and modifications are not up to the expectations. This can be further improved by incorporating the following modifications to obtain better results. The mechanism which we will be used i.e scotch yoke mechanism does not given excepted efficiency. This efficiency can be increased by using some other mechanism and speed of motor is reduce because we have used heavy material and this material can be replaced by using light weight material and design of blades should be done based on types of grass is used to cut. The project which we have done surly reaches the average familes because the grass can be trimmed with minimum cost and with minimum time Finally this paper may give an inspiration to the people who can modify and can obtain better results

7. CONCLUSIONS

In the world today, all machines are designed with the aim of reducing or eliminating green house gas emissions which is the major causes of climate change. This solar powered grass cutter will meet the challenge of environmental production and low cost of operation since there is no cost for fuelling. A solar powered lawn mower has been developed for the use of residences and establishments that have lawns where tractor driven mowers could not be used.

The machine's capacity is adequate for its purpose. The machine has proved to be a possible replacement for the gasoline powered grass cutter. 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. Secondly, using highly advanced IC's with the help of growing technology, the project has been successfully implemented. Thus the project has been successfully designed and tested.

8. REFERENCES

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