

Design and Fabrication of Solar Powered ThreeWays Grass Cutter

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ABSTRACT

The grass is mowed uniformly using a solar-powered grass cutter. Future power usage will be substantial. With it, lawns at parks, colleges, schools, and other locations are maintained and taken care of. The highly fine and uniform surface appearance of the lawn is easily operated and maintained by untrained individuals. Modern grass-cutting equipment is becoming increasingly widespread. Our daily lives show us how man-made pollution works. Older lawn cutter models had IC engines, which were bad for the environment and increased pollutants. An IC engine-driven cutter is more expensive. Such commonplace machinery needs considerable upkeep. We plan to develop a new type of solar-powered lawn cutter that is more affordable than the one now in use to get past these problems. Solar energy is the term used to describe the heat and light radiations that we receive from the sun. It is among the most widely used and diverse non-conventional renewable energy sources available on a global scale. It is devoid of contaminants, enters the market right away, and has no value. The use of equipment like solar panels, which are constructed of electrical phenomenon cells, to produce electricity and power from solar energy. This year, solar system has drawn more attention because of its advantages over other renewable energy sources. The demand for and requests for green energy technology derived from renewable energy sources are increasing. The Solar Grass Cutter is a mechanical device that cuts grass with the usage of electricity. Its body is first constructed from PVC pipe, square shape plywood and caster wheels are then positioned under the body of the square plywood. Then, an inclined fibre plate is set on a body with a solar panel attached to it. That transmits solar energy, which is changed into electrical energy, which is changed into mechanical energy at the end of electric motor shaft, which contain the blade setup to cut the grass.

Keywords : Solar Panel, Blade, Battery, Grass Cutter

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I. INTRODUCTION

The fully automated solar lawn cutter is a robotic machine that uses solar energy to cut grass while avoiding obstacles and operating independently of a human operator. The vehicle movement motors and the grass cutter motor on the bot are both powered by 12V batteries. The battery is charged by a solar panel as well, eliminating the need for external charging. A microcontroller from the 8051 family, which controls the operation of all the motors, is interfaced with the mower and vehicle motors. In order to identify obstacles, it is also interfaced with an ultrasonic sensor. Diesel is frequently used in agricultural operations to power generators. While these systems can provide power where it is needed. The energy utilized by the earth's atmospheric system for a variety of uses comes from the sun in sustainable amounts. The only distinction is how the energy source is used. It is anticipated that a lawn mower powered by solar energy will address a number of concerns that conventional lawn mowers powered by internal combustion engines and electric motors do not. It will be simpler to operate a lawnmower powered by solar energy, and it will reduce downtime caused by frequent stops at petrol stations for refills and the risk of gasoline spills. There are no longer any harmful emissions into the atmosphere from internal combustion engines or gasoline spills. Air pollution will be decreased with the aid of the solar-powered lawnmower. Thus, a solar lawnmower.

Radiant energy produced by the sun is referred to as solar energy. The sun emits or radiates enormous amounts of energy every day. In one second, the sun emits more energy than all of human kind combined has ever used. Where does the energy that the sun continuously emits come from? It originates inside of the sun. Similar to other stars, the sun is composed primarily of hydrogen and helium atoms. The sun provides sufficient amounts of energy for the earth's

atmospheric system to use for a variety of purposes. The energy source's use makes the only difference.

THE EFFICIENCY OF SOLAR PANEL

The efficiency is one of the most significant criteria which define the quality of the output of a certain device. There are many factors which alter the efficiency of a solar panel. Efficiency can be described as the ratio of the input energy through the solar cell to the energy of the sun. The efficiency of the solar panel is monitored by the light intensity, material of the solar cell, temperature etc. For the calculation of the energy, we calculate the maximum power, which is defined as the product of open-circuit voltage (VOC)

- The efficiency (η) is then calculated.
- $\eta = \frac{VOC \cdot ISC}{P_{in}}$
- Where, P_{in} is the total input power.

Workers in the agricultural and gardening industries have been using the traditional lawn cutters a lot lately. However, manual grass cutters use a lot of energy and pollute the air, which can be harmful to the health of the workers. The traditional lawn cutters are also producing a lot of noise and vibration, which can lead to major health problems such as carpal tunnel syndrome, diminished hand sensitivity and dexterity, finger blanching, and grip strength [1]. A new model of a lawn cutter machine has been presented to overcome these problems. This technology, known as a "Solar Grass Cutter," includes three major systems: a smart control system, a solar system, and it can be powered by solar energy.

II. WORKING PROCESS

The main area of development for irrigation field appliance control is intelligent information appliances. Along with solar panels, we created a wide and admirable range of solar grass cutters. Since the energy conversation is crucial in the current situation, it should be had to the fullest extent possible whenever possible. However, in order for these mowers and other grass-cutting devices to function properly, they all require a motor, a rotating blade, a way to move around, and a way to dispose of the grass clippings. Switching ON the DC motor connected to grass-cutting blades serves as the system's controlling device.

S.No	Particular	Solar Based Grass Cutter
1	Pollution	No
2	Fuel	No fuel used
3	Cost	Low
4	Maintenance	Low
5	Load Carrying Capacity	Low
6	Friction	Low

DESIGN

Both the force needed to cut the grass and the force acting on the blade was taken into account when designing the cutting blade. Any sharp object must impact the grass with less than 10 Newton's of force in order to do so. Additionally, it depends on the object's height, density, and surface area (Atkins, 1984). Therefore, the force needed to effectively mow should be greater than 10 Newton when designing the blade of the solar- powered lawnmower. Because of its durability and light weight, stainless steel was chosen to build the cutting blade because it can transmit speed at a level comparable to that of a DC motor or with slightly less friction.

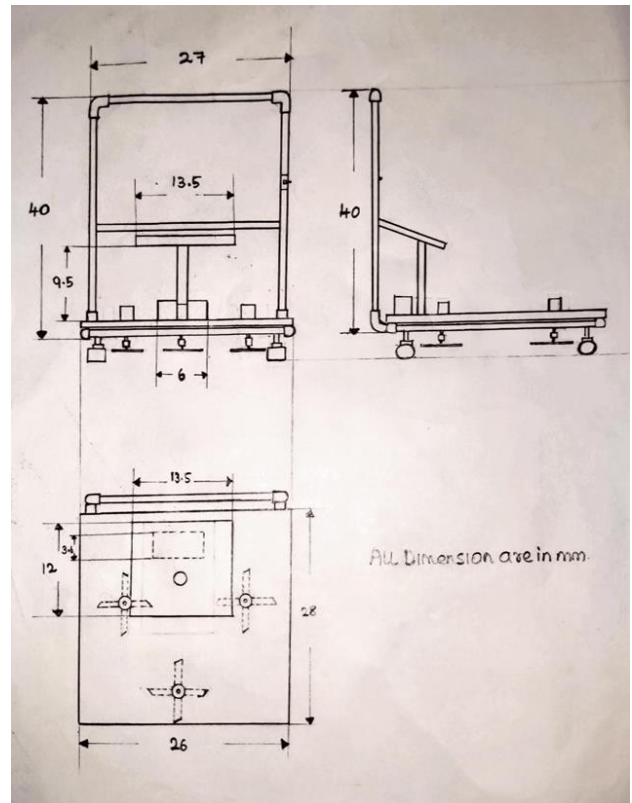


Fig 1. CONSIDERATION OF SOLAR GRASS CUTTER

III. CONCLUSION

A grass cutter powered by solar energy cuts the grass uniformly. Future electricity use will be significant. It

is used to maintain and care for lawns in parks, colleges, schools, and other places. The lawn's extremely fine and uniform surface appearance is simple for inexperienced people to operate and maintain. Equipment for mowing grass today is being used more and more frequently. We can observe how man-made pollution operates in our daily lives. Older lawn mower models had inefficient IC engines, which produced more pollutants and were terrible for the environment. The price of an IC engine-driven cutter is higher. Such ordinary equipment requires extensive maintenance. To overcome these issues, we intend to create a brand-new, more economical variety of solar-powered lawnmower. The word "solar energy" refers to the heat and light radiations that come from the sun. On a global basis, it is one of the most popular and varied non-conventional renewable energy sources. It has no value, immediately enters the market, and is free of pollutants. the process of creating electricity and power from solar energy using equipment such as star panels, which are made of electrical phenomena cells. Due to its benefits over other renewable energy sources, solar energy has received increasing attention this year.

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