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Fabrication of Automated Solar Grass Cutter

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Abstract: We plan to build new type of automated grass cutter which runs on solar energy as well as battery power and this model is also economical. The main objective of our project is to make the grass cutter which operates on solar energy which is stored in the battery hence save the electricity and reduces manpower. In our project we use microcontroller for controlling various operation of grass cutter. Also the grass cutter has IR Sensors for obstacle detection.

Keywords: Arduino, IR Sensors, Power Distribution Board, 5 Channel relay, Solar Panel and DC Motors.

I. INTRODUCTION

Grass cutter machines have become very popular today. Most common machines are used for soft grass furnishing. The main parts of the Grass cutting machines are DC motor, relay switch for controlling motor, Battery for charging it through solar panel. It is placed in a suitable machine structure.

The linear blades are attached in this machine. 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.

Now a day, 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.

So, introduce solar energy for the machine process to work. A solar panel is a large flat rectangle. The cells, each of which is about the size of an adults palm, are usually octagonal and colored bluish black. Just like the cells in a battery, the cells in a solar panel are designed to generate electricity; but where a battery cells make electricity from chemicals, a solar panel cells generate power by capturing sunlight instead. Solar grass cutter has no moving parts and hence requires little maintenance and work quite satisfactorily without any focusing device.

It does not cause any environmental pollution like the fossil fuels and nuclear power. Solar cells last a longer time and have low running costs.

II. LITERATURE SURVEY

A. Vicky Jain

They have prepared wireless grass cutter. There are two main components such as transmitter and receiver. Transmitter continuously transmits the rays if any obstacle come in front of grass cutter then the rays are reflected back towards the receiver. The receiver receive the signals in the serial form encoder but microcontroller required parallel data for communication so receiver sends data to decoder to convert data in the parallel form and then it passed to microcontroller. They have used solar panel so it is not required to charge battery externally and battery is continuously charged at constant voltage when grass cutter is in working. The battery is charged in day time by using solar panel and it is stored so we can use grass cutter at night time also. Because of two DC motor both forward and backward motion of grass cutter can simultaneously possible.

B. Pankaj Malviya

Author prepared manually handle device. The battery can be charged by using solar panel as well as external power supply and DC motor which is controllable is used for changing the direction of grass cutter as per need are used. The most modern regulator is used for preventing overcharging and discharging of battery which saves span of battery. Due to industrialization more electricity is required for various industrial applications and electrical gadgets so solar energy is best alternative for electricity. Solar panel, battery, DC motor, solar charger these components are used for fabrication of grass cutter. They have used less number of moving components so there is less maintenance. This grass cutter will give much more physical exercise to operator and it will easily handle.

C. Praful P. Ulhe

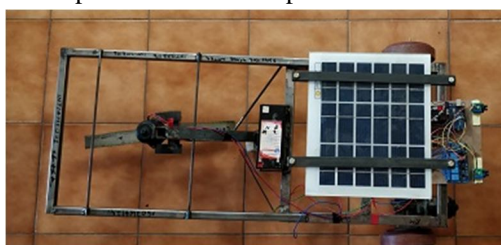
In this paper they have prepared manually operated grass cutter with spiral roller blades due to spiral blades increases the efficiency of cutting. For adjusting the height reel cutter is component placed on grass cutter. This grass cutter used to cut the grass uniformly and also it can cut the different types grasses. The battery can be charged during working conditions and it also having AC charging. For collection of cutting grass cutting box is placed over grass cutter so the cut grass put outside the lawn. It is having light in weight and compact in design.

D. Advantages of Automatic Grass Cutter

The Automatic Lawnmower is Convenient. An Automatic Lawnmower offers you a Lot More Free time. Dispense with the weekly chore of mowing the lawn. Automatic Lawnmower Safety Features Automatic lawnmowers will SHUT OFF if lifted or titled over in any order.

E. Materials Used For Fabrication

Table shows the components, quantities and the specifications of the parts used in the fabrication process.



F. Components and their specifications

COMPONENT	QUANTITY	SPECIFICATION
Pb Acid Battery	1	12 Volts, 7.5 amp
Pb Acid Battery	1	12 Volts, 1.2 amp
DC motors	1	12 Volts, 2 amp
Arduino(UNO)	1	5 Volts
DC motors	1	1200 rpm, 12 volts
DC motors	1	60 rpm, 12 volts
Nylon tyres	2	4 inch Diameter
5 Channel relay	1	auto ping and programmable reboot
Power Distribution Board	1	connects all the ground connectors to one another
IR Sensors	2	Board size: 3.2cm * 1.4cm Power: 3-5 Volts

III. WORKING

The source is driven from the solar energy using photovoltaic panel which charges the battery and is utilized for powering operation of the system.

The system's control is done by the microcontroller.

Automation for object detection is achieved by using IR sensor and microcontroller. Wheel movement and cutting operations are done using DC motors. To achieve compatibility of microcontroller and the motors driver circuit is used. The driver circuit enhances the microcontroller's small output. Toggle switch is used to select the mode of operation and DPDT switch for movement operations.

Wheel chains on both sides are attached to a platform which supports the whole model. Wheels move when two motors are driven. Cutting blade is used for cutting operations. Cutting action of the blade is provided by a motor.

IV. CONCLUSION

In conclusion remarks of our project work, the authors would like to add a few more lines about our impression project work. Thus developed a "AUTOMATED SOLAR GRASS CUTTER" which helps to know how to achieve simple manual drive mechanism. The application of this machine is high when compared to the cost of the machine. In the presented report provides the fabricated information about the "Fabrication of automated solar grass cutter" 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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