

Solar Economical Grass Cutter

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Abstract - In this project we studied a solar grass cutter. A solar Grass cutter is a machine that uses revolving blades to cut a grass at an even length. Even more sophisticated devices are there in every field. Power consumption becomes essential for future. Grass cutter is a very useful device which is very simple in construction. It is used to maintain and upkeep lands in gardens, schools, college's part 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 land very fine and uniform surface look. In our project, "solar economical grass cutter" is used to cut the different grasses or different grass for the different application.

Key Words: Solar panel, battery, Motor, Pulley system, Grass cutter, pollution

1. INTRODUCTION

In large size of grass field is cut manually. The farmer used hand scissors used to cut and maintain grass uniformly. It is not easy and also very difficult to maintain uniform size. Hence, we design to make a grass cutter without any power source due to reduce the power consumption. The unskilled gardener is enough to operate the grass cutter.

The grass cutter easy to operate and it consists of Rotary Blade, Roller etc. The blade removes the extra growth of the land and roller gives light pressure to the top surface of Land. It gives fine cutting done fast work done on the land and uniform speed throughout the Land. The project work was very great successful one. It is used to maintain land of our college auditorium land maintenance.

The operations involved in the grass production cycle include land clearing, land forming/ land levelling, tillage, and grass establishment, harvesting and post-harvest operations. Grass establishment, harvesting and post-harvest operations. Grass establishment is necessary to eliminate the effect of weeds, pests and disease infestation and to provide suitable conditions for optimum yield. More than 3000 species of weeds had been identified all over the world. The cost of weed management is enormous; however, the opportunity cost of weed management is higher. Weed control measures must be put in place to check the growth

and propagation of weeds. Chemical and manual weed control methods are viable alternatives; however, whereas environmental impact of herbicides made chemical method unsustainable, drudgery limits the size of farm of an individual in sub-Saharan Africa. Introduction of an effective mechanical weeder is expected to encourage subsistent farmers leading to increased production and hence reducing poverty. To achieve this objective, a row grass cutter was developed in the Federal University of Technology, Akure in Nigeria. The weeder was designed, fabricated and tested and found to be very efficient. The machine consists of an abrasive nail- brush mounted on a shaft, transmission system, engine, frame and wheels. The height of cut of the machine is set above the ground level, but works effectively as a weeder. The machine is simple, cost effective and useful for small to medium scale farm holders.

A Crop cutter is a machine that uses revolving blades to cut a crop at an even length. Even more sophisticated devices are there in every field. Power consumption becomes essential for future. Crop cutter is a very useful device which is very simple in construction. It is used to maintain and upkeep lands in gardens, schools, college's part 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 land very fine and uniform surface look.

In our project, "crop cutter" is used to cut the different grasses or different crops for the different application.



Fig-1: Side view of Solar Economical grass cutter

2. LITERATURE REVIEW

Automated Solar Grass Cutter (February 2017) Ms. Rutuja A. Yadav, Ms. Nayana V. Chavan, Ms. Monika B. Patil, Prof. V. A. Mane

According to the author a daily purpose robot which is able to cut the grass in the lawn. The system will have some automation work for guidance and other obstacle detection and the power source that is battery and a solar panel will be attached on the top of the robot because of this reduces the power problem. Automated solar grass cutter are increasingly sophisticated, are self-docking and some contain rain sensors if necessary, nearly eliminating human interaction. The system is switched to automatic mode in which the robot's infrared sensors make a comparison between, cut and uncut the grass. The mower continues this process until it completes the job. The system uses 12v batteries to power the vehicle movement motors as well as the grass cutter motor. They also use a solar panel to charge the battery so that there is no need of charging it externally. The grass cutter and vehicle motors are interfaced to an 8051 family microcontroller that controls the working of all the motors. It is also interfaced to an ultrasonic sensor for object detection. The microcontroller moves the vehicle motors in the forward direction in case no obstacle is detected. If in case obstacle is detected by the sensor then the microcontroller stops the grass cutter motor so as to avoid any damage to the object/human/animal coming. [2]

Solar Based Grass Cutting (January-June 2017)

Ms. Bhagyashri R. Patil, Mr. Sagar S. Patil

According to the author, human enlargement in many countries there are studies and trials going on the solar energy and the wind energy, so they made their new concept solar power grass cutting machine. In this concept they cut the grass on the agricultural land or small plants in lawns and gardens. The design of solar powered agricultural equipment will include direct current (DC) motor, a rechargeable battery, solar panel, a stainless steel blade and control switch. The automatic grass cutting machine is going to perform the grass cutting operation by its own which means no manpower is essential. The purpose of the project here is to design and build a remote controlled grass cutter. The device consist of linear blades and it does not affected by climatic conditions. They have used many components for preparing grass cutter like DC Motor(3) for rotating the wheels and blade, wheels(4), battery, Solar panel, IR sensor, Collapsible blade. 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 receives the signal in the serial form from encoder but microcontroller requires parallel data for communication so receiver sends data to decoder to convert data in the parallel form and then it is passed to microcontroller.[4]

Solar bases wireless grass cutter (IJSTE - International Journal of Science Technology & Engineering, May 2016)

According to the author, The idea of autonomous machine used to reduce man power with efficient work has given. Mainly this project explains application of green energy. This knowledge can be used in agricultural field as a future scope.

According to the author, it gives description multipurpose grass cutter which is sensor based for special purposes like in grass trimming, hedge trimming etc. utilization of sensor and design calculation are used in proposed system.

According to the author, A robot was designed that operates on an on-board, solar charged battery has been designed by the French manufacturer SN Eno. The Robo-Mower4 the capability of steering itself across a person's lawn. This robot called the Atawa A34, uses built-in infrared sensors to avoid obstacles. This system uses wires buried beneath the surface of the ground [4]

3. BLOCK DIAGRAM DESCRIPTION



Fig-2: block diagram

3. Mechanism and working layout

The work layout shows the arrangement of various parts of project. to the end of 3rd shaft and which is power transmit to the cutter mechanism



Fig -3: front view of grass cutter

3.1. WORKING PRINCIPLE

Coming to the working of solar powered grass cutter, it has panels mounted in a particular arrangement at an angle of 45 degree in such way that it can receive solar radiation with high intensity easily from the sun. These solar panels convert solar energy into electrical energy is stored in batteries by using a solar panel. The main function of the solar charger is to increase the current from the panels while batteries are charging, it also disconnect the solar panel from the batteries when they are fully charged and also connects to the panels when the charging in batteries is low. The motor is connected to the batteries through connecting wires. Between these two mechanical circuit breaker switches is provided. It starts and stops the working of the motor. From this motor, the power transmits ton the mechanism and this makes the blade to slide on the fixed blade and this makes to cut the grass.

3.2. SOLAR ENERGY

Solar radiation is format among the promising new source of energy. India receives annually over 60 x 1000 MWH of solar insulation with a span of 3000 – 3200 hrs in Rajasthan, Gujarat, West of Madhya Pradesh and North of Maharashtra; and 2600 – 2800 hours in the rest of the country excepting Kerala, Assam and Kashmir.

Energy from the sun can be utilized in multi various ways. It can be tapped directly from solar radiation in the form of thermal, thermodynamic and photovoltaic energy and indirectly through the production of Phyto man and other related energy sources such as wind, hydropower and ocean energy all of which are the result of solar radiation on the planet Earth. The contribution of these sources in the total consumption of energy in the world is about 15%.

The scope for the application of solar energy now stands greatly enhanced through intensive research and development carried out all over world. The major areas that manifest great potential out all over world. The major areas that manifest great potential for immediate .

3.3ADVANTAGES

- Compact size and portable
- Easy to move from one place to another place
- Operating principle is simple.
- Non-skilled person also operate this machine

3.4 LIMATATIONS

- Large time required to remove the grass
- Manually operated
- Difficult to operate in rainy season

3.5 APPLICATION

- For cricket ground
- College campus
- All playground

4. COST BENEFITS & ANALYSIS:

In our market, the approximate cost of an electric grass cutter is 25000/- coming to our project, we are modelling a solar powered grass cutter with an estimated cost of

| Sr. No. | 1) PARTS | Qty. | Material | Amount (Rs) |
|---------|--------------------------------------|------|--------------|-------------|
| i. | Motor 12 v | 1 | ALU | 2350 |
| ii. | Frame of 1 inch angle | 1 | M.S. | 1850 |
| iii. | Pulley system | 1 | M.S | 890 |
| iv. | Power Switch push on type | 1 | Plastic | 210 |
| v. | Wires | 1 | Cupper | 50 |
| Vi | Cutting blades | 2 | Steel | 950 |
| viii. | Battery | 1 | Plastic | 670 |
| ix. | Wheels | 4 | Plastic | 950 |
| X | Labour work lathe ,drilling, welding | 1 | Machine work | 2230 |
| Xi | Solar Panel | 1 | Silicon | 1850 |
| | TOTAL AMOUNT (Rs) | | | 12000 |

Table-1: cost estimate analysis

4.1 products description

| Sr. No. | PARTS | Material |
|---------|---------------------------|-------------------|
| i. | Motor power | 12 V , 2000 rpm |
| ii. | Battery specification | 12 v, 18 Ah |
| iii. | Solar panel | 12 V ,20w |
| iv. | Power Switch push on type | Plastic |
| v. | Wheel | Plastic |
| Vi | Cutting blades | High carbon steel |
| viii. | Battery type | Li- on Battery |

Table-2: Specifications

5. CONCLUSIONS

This project work has provided us an excellent opportunity and experience, to use our limited knowledge. We gained a lot of practical knowledge regarding, planning, purchasing, assembling and machining while doing this project work. We feel that the project work is a good solution to bridge the gates between institution and industries.

We are proud that we have completed the work with the limited time successfully. The Crop Cutter is working with satisfactory conditions. We are able to understand the difficulties in maintaining the tolerances and also quality. We have done to our ability and skill making maximum use of available facilities. In conclusion remarks of our project work, let us add a few more lines about our impression project work.

Thus we have developed an “solar economical *grass cutter*” which helps to know how to achieve low cost automation. By using more techniques, they can be modified and developed according to the applications.

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