

# Remote Controlled Solar Powered Grass Cutting Machine

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**Abstract:** This paper present a design of remote controlled grass cutter which will act like a robot. By using TV remote we are going to control the movement of four wheels which will be going to perform grass cutting operations very smoothly. This system consists of six dc motors, solar panel for charging purpose. One dc motor is placed vertically, one blade is attached to the motor to cut the grass precisely, and one motor is connected as a stepper motor to move the first motor up and down according to height of grass. Remaining four motors are provided to the four wheels of the grass cutter which rotate though 360 degree. The storage battery is used to store the energy, which is received from solar plate. The stored energy will used for to operate the six motors. By using remote we can move the grass cutter forward, backward also we can take turn.

**Keywords:** DC Motor, solar panel, robot, IR remote control

## I. INTRODUCTION

In modern world, all technology is developing rapidly in all kinds of fields like national defence systems, banks, farming, education and many more. In this modern world, we have to be updated with new technologies. Solar energy is a very good source of energy, as it does not affect our environment. We can easily utilize that energy with the help of solar panel. Many farmers are using this technology to empower their machineries. In horticulture, we need labour to cut the grass and other unnecessary plants. If we use a machine to do these kind of works then the need of labour will be reduced. Therefore, our motto is to reduce the efforts of human in horticulture by using machine. In this project, we designed a machine, which helps to maintain the height of grass from gardens with a specific height and to improve the grace of lawn.

## II. LITERATURE SURVEY

Rotary mowers were not developed until engines were small enough and powerful enough to run the blades at sufficient speed. Many people experimented with rotary blade mowers in the late 1920s and early 1930s, and Power Specialties Ltd. introduced a gasoline-powered rotary

mower. KutKwick replaced the saw blade of the "Pulp Saw" with a double-edged blade and a cutter deck, converting the "Pulp Saw" into the first ever out-front rotary mower

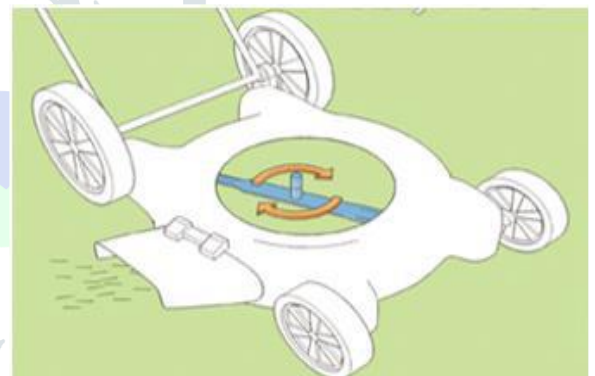


Fig. 1 Rotary mover

One company that produced rotary mowers commercially was the Australian Victa company, starting in 1952. Its mowers were lighter and easier to use than similar ones that had come before. The first Victa mowers were made at Mortlake, an inner suburb of Sydney, by local resident Mervyn Victor Richardson. The venture was so successful that by 1958 the company moved to much larger premises in Parramatta Road, Concord, and then to Milperra, by which time the mower incorporated an engine, designed and manufactured by Victa, which was specially suitable for mowing, rather than employing a general-purpose engine. Two Victa mowers, from 1958 and 1968 respectively, are held in the collection of the National Museum of Australia. The Victa mower is regarded as something of an Australian icon, appearing en masse, in simulated form, at the opening of the Sydney Olympic Games in 2000.

III. EXPERIMENTAL SETUP

A. Solar Lawn Mower

The lawn mower or grass cutter is made up of an induction motor, a battery, an alternator, three collapsible blades, and a link mechanism. The D.C. motor forms the heart of the machine and provides the driving force for the collapsible blades. This is achieved by the combined effect of mechanical action of the cutting blades and the forward thrust of the mower. The shaft fitting mechanism with which the height of cut is altered. Solar grass cutter are based on the use of small but powerful engine that provides enough torque to spin a very sharp horizontal blade that cuts the grass upon contact. The blade is located in the deck that prevents grass from flying all over the place when struck. In most cases, the motor is situated at the top of the deck, which is usually mounted on four wheels. It uses the photovoltaic panel to generate the energy needed to power the mower. It is assumed that a lawnmower using solar as the energy source will address a number of issues that the standard internal combustion engine.

A lawnmower with solar energy will be easier to use, it eliminates down time by frequent trips to the gas station for fill-ups and danger associated with gasoline spillage. The dangerous emissions generated by the gasoline spillage and that of the internal combustion engine into the atmosphere are eliminated. The solar powered lawnmower will help to reduce air pollution as well as noise pollution produced by other types of lawnmowers. In addition, it will help to reduce the running cost of using and maintaining the lawn mower.

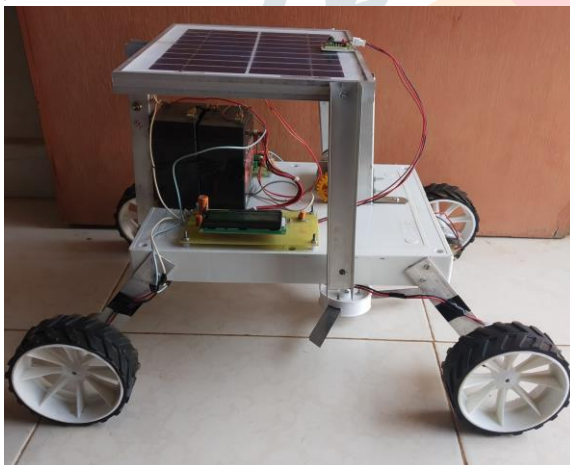


Fig. 2 Remote controlled Solar Grass Cutting Machine

B. Blade

This is the most important part and when designing for this, safety as a major factor was put into consideration as the blade when in operation can be a safety hazard. Also the weight of the blade and how to mount it on the motor shaft is also a key consideration. Moreover the sharpness of the blade is another important aspect and this will depend on the power and the RPM of the motor used. The key connects the rod to the shaft and keeps the rod from slipping while the shaft is rotating. Then I cut the rod to length and welded it to a 1/8" thick metal plate that the mower blade will be bolted to. After the blade mount was finished being fabricated Inserted it on to the shaft.



Fig. 3 Blade

C. Controller Unit

Fig. 3.1 and 3.2 shows the controller circuit. These circuits consist of various components like PIC 16F877P which is the heart of this system which contains program to give command to the motors. Below circuits also consists of voltage regulator, relays, resistors, capacitors, crystal oscillator, diodes and LED etc. for different functions.

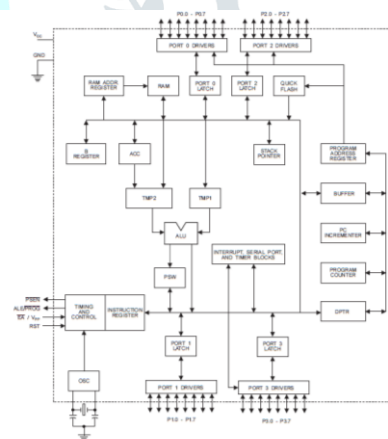


Fig. Block Diagram of Controller Unit

D. Permanent Magnet DC motor

A DC motor is a mechanically commutated electric motor powered from direct current (DC). The stator is stationary in space by definition and therefore so is its current. The commutator to also be stationary in space switches the current in the rotor. This is how the relative angle between the stator and rotor magnetic flux is maintained near 90 degrees, which generates the maximum torque.

DC motors have a rotating armature winding (winding in which a voltage is induced) but non-rotating armature magnetic field and a static field winding (winding that produce the main magnetic flux) or permanent magnet. Different connections of the field and armature winding provide different inherent speed/torque regulation characteristics. The speed of a DC

motor can be controlled by changing the voltage applied to the armature or by changing the field current.

The introduction of variable resistance in the armature circuit or field circuit allowed speed control. Modern DC motors are often controlled by power electronics systems called DC drives. In this system we used three Johnson metal geared motors. Two motors are having speed of 100 rpm which are connected to the front wheels of the project. Remaining one motor having a speed of 1000 rpm is connected to the grass cutter.



Fig. Permanent Magnet DC motor

#### IV. CONCLUSION

This system 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. It can be easily handled. This system is having facility of charging the batteries while the solar powered grass cutter is in motion. So it is much more suitable for grass cutting also.

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