



Solar Grass Cutter

Pranay S. Bramhne, Keshav A. Sonwane, Komal S. Harde, C. J. Sharma

¹⁻³Student, Department of Electrical Engineering, KDK college of engineering, Nagpur, Maharashtra, India

⁴Assistant Professor, Department of Electrical Engineering, KDK college of engineering, Nagpur, Maharashtra, India

ABSTRACT

The design objective is to come up with a mover that is portable, durable, easy to operate and maintain. It also aims to design a self-powered mover of electrical source, a cordless electric lawnmower. The heart of the machine is a battery-powered dc electric motor. It comprises of a system of speed multiplication pulleys that drive the cutting blades and the charging unit comprising of a 12v battery and a lift mechanism meant to alter the height of cut. We use a solar panel to charge the battery. The grasscutter and vehicle motors are interfaced with an ATMEGA328 that controls the working of all the motors. Thus, the machine is considered highly efficient and is readily adaptable to different cutting conditions. This device will help in the building of an eco-friendly system. Throughout this paper, you will learn more about how we are going to complete this project and what various parts were used that replaced the physics power needed in moving the grass cutter.

Keywords : solar panel, battery, DC motor, ATMEGA328, sensor, blades.

I. INTRODUCTION

Nowadays pollution is a major issue for the whole world. Pollution is manmade and can be seen in own homes. In case gas-powered lawn movers due to the emission of gases it is responsible for pollution. Also, the cost of fuel is increasing hence it is not efficient. So, solar-powered grass cutters are introduced. Solar-powered grasscutter can be described as the application of solar energy to power an electric motor which in turn rotates a blade which does the moving of a lawn. Solar energy is renewable energy.

Grasscutter or lawn mowing with a standard motor-powered lawn mower is an inconvenience, and no one takes pleasure in it. Cutting grass cannot be easily accomplished by the elderly, younger, or disabled people. Motor powered push lawn mowers and riding

lawn movers create noise pollution due to the loud engine, and local air pollution due to the combustion in the engine. Also, a motor-powered engine requires periodic maintenance such as changing the engine oil. Even though electric lawn mowers are environmentally friendly, they too can be an inconvenience. Along with motor-powered lawn movers, an electric lawn mower is corded, mowing could prove to be problematic and dangerous. The self-propelling electric remotes control grass cutter is a grass cutter that has remote control capability.

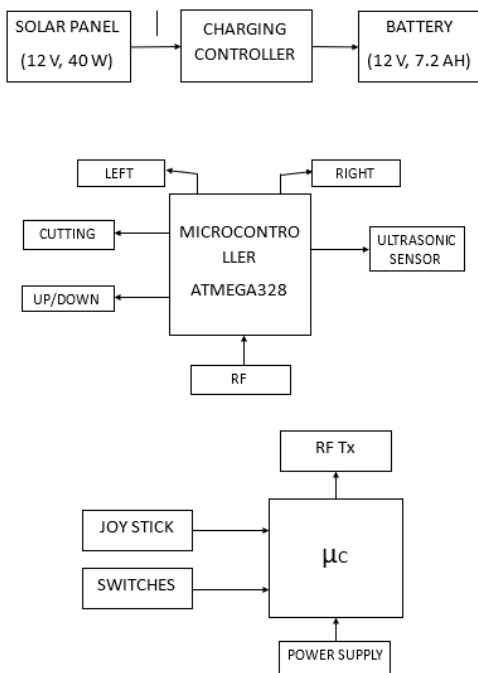
So automatic grass cutter using the rechargeable battery is economically helpful for the user. By using this automatic grass cutter, the user can cut the grass of the required area by giving input by using a joystick. Also, the height of grass can be specified by adjusting the height of the blades. The main objective

of this grass cutter is that the grass in the lawn must be move with lesseffort. Also, to cut the grass of a particular area as per user requirement. The sensors are the eyes of this grass cutter.

II. OBJECTIVE

The objective of the proposed work is to design and construct the solar grass cutter is a fully automatic grass cutting robotic vehicle powered by solar energy that also avoids obstacles without the need for any human interaction. The system uses 12v battery to power the vehicle movement motors as well as the grass cutter motor. We also use a solar panel to charge the battery so that there is no need for charging it externally. The grasscutter and vehicle motors are interfaced with ATMEGA328 that controls the working of all the motors.

III. BLOCK DIAGRAM



It is also interfaced to an ultrasonic sensor for object detection. The ATMEGA328 controller moves the vehicle motors in the forward direction in case no obstacle detected. On obstacle detection, the ultrasonic sensor monitors it and the controller and thus stops the grass cutter motor so as to avoid any damage to the object/human/animal. The controller then turns the robotic vehicle off until it gets clear of the object and then moves the grass cutter in a forward direction again.

WORKING PRINCIPLE

The working principle of solar grass cutter is it has a panel mounted in a particular arrangement at an in such a way that it can receive solar radiation with high intensity easily from the sun. These solar panels convert solar energy into electrical energy. This electrical energy is stored in batteries by using a solar charger. The main function of solar charger is to increase the current from the panel while batteries are charging, it also disconnects the solar panel from the batteries when they are fully charged and also connect to the panel when the charging in batteries is low. The motor is connected to batteries through the 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 to the mechanism and this makes the blade slide on the fixed blade and this makes to cut the grass.

The designed solar grass cutter comprises of direct current (D.C.) motor, a rechargeable battery, a solar panel, a stainless-steel blade, and a control switch. 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 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 drives 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.

COMPONENT USED

1. Solar panel
2. Battery
3. DC motor
4. Solar charger
5. Blades
6. Sensor

ADVANTAGE:

1. No fuel consumption.
2. The operating principle is simple.
3. Compact size and portable.
4. The non-skilled person can also operate this machine.
5. Easy to move from one place to another.
6. Noiseless operation.
7. No pollution.
8. No required of any external supply.

LIMITATION:

1. Difficult to operate in the rainy season.
2. Blade failure.

APPLICATION:

1. For playgrounds.
2. For the house garden.
3. For small farms.

IV. CONCLUSION

This solar grass cutter mover will meet the challenge of environmental production and the low cost of operation. Since there is no cost of fuelling. A solar grass cutter has been developed for the use of residences and establishments that have lawns where tractor drivenmover cannot be used. The machine's capacity is adequate for its purpose. The machine has proved to be a possible replacement for the gasoline-powered lawnmower. The proposed system will be cost-efficient with higher reliability.

V. REFERENCES

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