Solar Grass Cutter

Pranay S. Bramhne[1], Keshav A. sonwane[2], Komal S. Harde[3], Mr. C. J. Sharma[4]
[1, 2, 3] Dept of Electrical Engineering
[4]Assistant Professor, Dept of Electrical Engineering
[1, 2, 3, 4] KDK college of engineering, Nagpur

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 lawn mower. The heart of the machine is a battery powered dc electrical motor. It comprises of a system of speed multiplication pulleys which 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 grass cutter and vehicle motors are interfaced to an ATMEGA328 that controls the working of all the motors. Thus, the machine is considered highly efficient and is readily adoptable to different cutting conditions.This device will help in building of eco-friendly system. Throughout this paper you will learn more 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.[1]*

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

I. INTRODUCTION

Nowadays pollution is a major issue for 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, the solar powered grass cutters are introduced. Solar powered grass cutter 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 the renewable energy.[4]

Grass cutter or lawn moving with a standard motor-powered lawn mower is an inconvenience, and no one take pleasure in it. Cutting grass cannot be easily accomplished by elderly, younger, or disabled people. Motor powered push lawn movers 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 movers are environmentally friendly, they too can be inconvenience. Along with motor powered lawn movers, 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.[3]

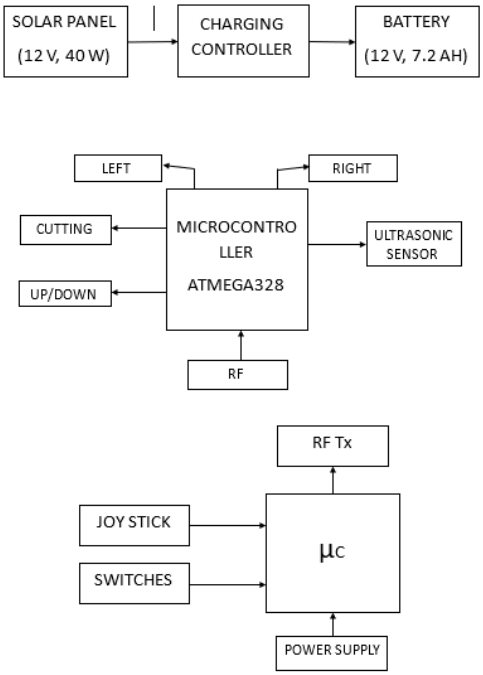
So automatic grass cutter using rechargeable battery is economically helpful for user. By using this automatic grass cutter, the user can cut the grass of the required area by giving input by using joystick.[2]Also, the height of grass can be specified by adjusting the height of blades. The main objective of this grass cutter is that the grass in the lawn must be move with less effort. Also, to cut the grass of 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 the 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 of 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 of charging it externally. The grass cutter and vehicle motors are interfaced to ATMEGA328 that controls the working of all the motors.

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

III. BLOCK DIAGRAM



WORKING PRINCIPLE:

The working principle of solar grass cutter is it has 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 panel 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 whey 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. Its starts and stops the working of the motor. From this motor, the power transmits to the mechanism and this makes the blade to 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, solar panel, a stainless-steel blade and 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 drive the blade used for mowing. The battery recharges through 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. Operating principle is simple.
3. Compact size and portable.
4. 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 rainy season.
2. Blade failure.

APPLICATION:

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

IV. CONCLUSION

This solar grass cutter mover will meet the challenge of environmental production and 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 driven mover 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 lawn mower. The proposed system will be cost efficient with higher reliability.

REFERENCES

[1] International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol. 6, Issue 4, April 2017.

[2] https://www.slideshare.net/punuguntavishnu/solar-grass-cutter-91050952
[3] https://www.slideshare.net/jatinder729/solar-power-lawn-mover.
[4] Grass Cutting Machine by Solar Energy Power, International journal & magazine of engineering, technology, management & research, ISSN No.: 2348-4845, Vol. 3, Issue 5, May 2016.