

SOLAR OPERATED BRUSH CUTTER

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Abstract

Solar brush cutter is a mechanical device for cutting unwanted plants in waste lands, borders of the field, road sides, public places. At present the brush cutter is operated using diesel or electricity which is high cost per unit. To overcome this solar energy can be effectively utilized instead of diesel or electricity. It can also be called as eco-friendly vehicle. The solar energy observed by the panels is converted into electrical energy. The power is then transmitted to the battery and then from battery the power transmitted to a electric motor, on the shaft of the electric motor a nylon wire and aluminium cutter was connected. It is used to cut the grasses or bushes from the use of nylon wire the material was flexible on stones and safe of workers when compared with the blades. The main advantages of solar operated brush cutter is time saving, energy saving at less cost. Use of solar energy was found to be eco-friendly for environment and pollution free machine. This machinery is financially give more benefits for farmers. Use of wheels is the added advantage to the machinery, since mounting it on the labour's body will cause some health effects due to vibration that cause heart related problems and burden to the farmer.

INTRODUCTION

Weeds are unwanted or undesirable plants which is present everywhere in the soil. Weeds present in cultivable lands cause heavy loss to crop productivity and weeds that grow in waste lands, road sides, bunds, irrigation channels cause an increase in weed seed bank. Controlling weeds in both cultivable and uncultivable lands is usually done manually. Unavailability of labours cause problem in manual weeding. As an alternate herbicides can be used, but continuous use of herbicides cause pollution and development of herbicide resistant weeds. To overcome

these issues at wastelands, uncultivable lands and road sides brush cutters are effectively utilized. Brush cutter is a powered operated machine generally used to trim weeds in wastelands, bunds and road sides which is similar to lawn mower. Blades, trimmer heads of various size can be attached to the machine for specific purposes. Brush cutter is heavy in weight and more powerful machine, suitable for clearing overgrown grass, weeds, brambles and small hedges. Basically, there are three types of brush cutters like handheld, walk-behind and tow-behind. Alfred Schefenacker invented the first brush cutter. Thin nylon string or metal blade is used to cut the vegetation that is grown in waste lands, bunds such as grasses or weeds. Proper safety measures are to be followed to avoid high risk for human health.

PROBLEM IDENTIFICATION

Energy source

Brush cutters that are used today utilize diesel or petro as energy source which cause high cost of operation. Brush cutters utilize maximum fuel or electricity as a source of energy which are cost efficient and non-renewable source of energy.

Ergonomic defect

Use of brush cutters cause discomfort for the people concerned. The present model of brush cutter has to carried out in shoulder which cause pain and other health effect to the workers. While using the cutter, it creates vibration which cause heart problems and restricts blood supply.

METHODOLOGY

The project is designed to fabricate a cost efficient eco-friendly solar powered brush cutter. The methodologies of attachments are explained:

1. Components of attachments
2. Working of solar grass cutter

COMPONENTS OF ATTACHMENTS:

1. Solar panel for power generation
2. Battery to store the power
3. 1 hp motor
4. Wheel
5. Rod
6. Nylon wire
7. Brake connection
8. Light



COMPONENTS

Solar panel

- ✓ An assembly of photo-voltaic cells that are mounted on a framework is known as solar cell panel. Source of energy for the panel is sunlight which it converts in direct current electricity.
- ✓ Power for electric loads is generated in the solar panels which collects and converts sunlight into electricity.
- ✓ Utilization of solar energy by using solar panels is less expensive and eco-friendly.

Battery

- ✓ Battery used for our construction is lithium-ion batteries.
- ✓ Ninety percent of the global grid battery storage market is occupied by these types of batteries. They have the most popular storage options.
- ✓ Lithium-ion batteries have high energy density and light in weight. These types of batteries can store about 150 watt-hours of electricity in 1 kilogram of battery.
- ✓ Lifespan is about two to three years. Thumb rule is it can hold only 70 -80 percent of its original energy storage, it should be replaced.

Motor

- ✓ The motor here we are using is 1hp motor.
- ✓ Generally, electric motors convert electrical energy into mechanical energy.
- ✓ The power level of 1hp is equivalent to 746 watt s or 0.746 kilowatts.



NYLON WIRE

This is the instrument we have used to cut the bushes . By using of nylon wire we can able to get some good results are following

1. Safe for worker
2. Flexible on stones
3. Long duration when compared to blades
4. Easy to replace

WORKING

1. The grass cutter is mounted with a solar panel at an angle of 45° in order to get a direct light from the sun.
2. Once the sunlight is received in the solar panels, it is converted into electrical energy which provides power for operating the bush cutter.
3. Using connecting wires motor of 1 HP connected to battery.
4. From this motor the power is transmitted and make the blade to rotate which cuts the grass.
5. For speed and movement, the grass cutter is provided with two handle bars setup with accelerator and brake.
6. A pair of wheel is provided for the comfortable movement.

RESULT

Solar operated brush cutter effectively utilizes solar energy as a source of energy which is eco-friendly and cost effective. Using the weeds present in waste lands, bunds and road sides can be effectively controlled. Future line of work can be done the aspect of sensor based cutting for increasing the efficiency of motor.

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