



Review On Eco Friendly Crop Cutting Machine

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Abstract

A crop cutter is a machine that uses sliding blades to cut a lawn 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 lawns in gardens, schools, college's 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 lawn very fine and uniform surface look. In our project, crop cutter issued to cut the different crops for the different application.

Today, Agriculture especially in India need to concentrate in some aspects such as how to increase the productivity and profit, how to reduce the cost and how to solve the problem comes from workers. To overcome these, a new motorized cutter is fabricated specially for cutting various crop varieties during the time of harvesting and named as an ultraportable crop cutter. It comprises three criterions such as "easy to fabricate, low cost and light weight". With this Ultraportable Crop Cutter, the entire problem can be solved easily. There are some procedures involved in fabricating this device such as fabricating the prototype using suitable material and test the functioning of this machine. So the objectives are to fabricate and test the performance of the prototype of a motorized crop cutter for harvesting the crop.

1.Introduction

This project emphasizes on minimization of harmful efforts of using the manual crop cutter. The new developed crop cutter is operated on the power and it consist of different parts likes plate, Battery 12 Volt D.C., Motor, Cutting blades and wheel. In the new modified crop cutter the Rotar is fixed between the bearings is attached with the frame of crop cutter and Motor is attached to the rotor and motor is fixed

the crop cutter frame. Plate is fixed on the upper part of the crop cutter because of sun ray is directly on the plate and plate is directly connected to the motor. Then start the rotating the motor is clockwise or anticlockwise depend upon the connection or as per our requirement. Now the project mainly concentrates on designing a suitable operating system. To maintain simplicity and economy in the design the locally fabricated unit has been used. Our project achieves higher safety, reduces human effort, increases the efficiency of the crop cutter, reduces the work load, reduces the fatigue of workers and reduces maintenance cost.

Moving the crop cutters with a standard motor-powered crop cutters is an inconvenience, and Noone takes pleasure in it Cutting crop cannot be easily accomplished by elderly, younger, crop cutter moving with engine 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 crop are environmentally friendly, they too can be an inconvenience. Along with motor powered crop cutter, electric crop cutter are also hazardous and cannot be easily used by all. Also, if the electric crop cutter is corded, mowing could prove to be problematic and dangerous. Earlier most of the activities are done by manually. Gradually so many big and small equipment's are developed to ease human activities, thus to reduce the human efforts to do the things. Now a day's most of the activities which included human efforts are either replaced or automated by the use of machines or other kinds of equipment's. Skilled persons are required for conventional crop cutter. why because here we uses animals like bulls .nowadays the technology is developed in other hands skilled persons with convention crop cutter were decreased. Now we have a need to depend on the technology. Due to the risk involved in a conventional crop cutter, now days very few peoples coming forward to crop cutting by conventional crop cutter. moreover, educational background of Indian youth is improving. So most of people hesitate to use conventional crop cutter

1.2 Objective

- Development of the crop cutter working model project
- To make pollution free and low cost solution for crop cutting

1.3 Problem Definition

Paddy and Wheat is one of the new targets in agriculture where still not much researchers and manufactures participate in this field. From that there are some problems arise such as how to maximizing the profit, how to increase productivity and how to reduce the cost. One of the important activities in Paddy and Wheat is harvesting. This harvesting operation requires 50% of the investment on the particular crop goes to harvesting the crop and its transportation due to increase in wages of the labour and reduce in availability of labour leading to the high demand of the labour.

1.4 Scope of Project

- Design the prototype of motorized cutter for a harvesting crop using some criteria such as low-cost Material Selection
- Select suitable material, components and parts for this new invention.
- Fabricate the prototype of motorized cutter

2. Literature Review

Crop cutting machine is an essential tool for the maintenance of yards. They vary in size, mode of operation, and power. The power source riding mowers for example are usually powered by a gasoline engine and are ridden and steered by the operator. Walk behind mowers are designed to be pushed by the operator and typically run on gasoline or electricity. Modern gas powered and electric powered lawn mowers cut crop with a single blade revolving at a high speed parallel to the ground. The blade is slightly raised along its rear edge to create draft that lifts the cutting blades before its cutting operation. Mulching mowers suspends clippings and other debris near the blade shredding them before blowing them straight down in the lawn where they serve as manure for future lawn growth. Koori, (2010) designed a locally operated engine powered lawn mower. The mower is fitted with horizontal cutting blade attached to a vertical shaft. The mower was tested and the average effective field capacity and efficiency were 0.127 ha/hr and 88.4% respectively. Jeremy, (2005) designed and fabricated charged lawn mower. The machine was dependent on weather since the battery would be charged using photovoltaic panel (i.e. Panel). The common disadvantage was that the engine runs down easily and the cost of production was high for an average individual to purchase. Rotary mowers were not developed until engines were small enough and powerful enough to run the blades at a high speed. Many people experimented with rotary blades in the late 1920s and early 1930s, and Power Specialties Ltd. introduced a gasoline powered rotary mover. The story of one experiment in the design of rotary moving equipment is that of C Stacy, a farmer in the Midwest region of the United States. His concept was the use of a toothed circular saw blade mounted horizontally on a vertical shaft, which would be suspended at a height of approximately 2 inches (50 mm) and moved across a lawn to cut crop and other lawn vegetation at a uniform height. The power for his experimental mower was an electric motor. The success of Stacy's design was limited by two factors: the relatively small diameter of the saw blades he used for his experiments, which were about 8 inches (200 mm); and the fact that toothed circular saw blades are not an ideal tool for cutting freestanding crop and other plants. Stacy did not come up with any idea for a cutter similar to modern rotary mower straight blades, and soon dropped his experiments with rotary mowing.

The string trimmer was invented in the early 1970s by George Ballads of Houston, Texas, who conceived the idea while watching the revolving action of the cleaning brushes in an automatic car wash. His first trimmer was made by attaching pieces of heavy-duty fishing line to a popcorn can bolted to an edger. Ballads developed this into what he called the "Weed Eater", since it chewed up the crop and weeds around trees. Victor and Vern's, (2003) designed and developed a power operated rotary weedier for wet land paddy. The complex nature of the machine makes its maintenance and operation difficult for the peasant farmers. Generally, in areas like ours, the conventional methods of crop cutting involved the use

of cutlasses whichever met the maximum satisfaction. More so, it is strenuous, time and labor intensive. In world the usage of agriculture equipment is increasing. In the usage of agriculture Equipment's, India contributes only 10% as Conducted survey in year 2012. two types of harvesting methods generally available in India are 1. Manual method 2. Mechanized type of harvesting In Manual Harvesting to cut one acre of crop 15-16 labors are required they take 3 days to cut one acre and involves harvesting of 60-70 tons per acre with labors being paid 500-550 Rupees per ton of harvest hence total cost of harvesting per acre comes up to 30,000-35,000 Rupees. In mechanization now by using large scale harvesting machine takes about 6-7 hours for harvesting one acre averaging about 60-70 tons with labor costing around 3,500-4,000 Rupees per hour hence the total cost of harvesting per acre comes up to 20,000-25,000 Rupees.

With reference to literature available there are many types of lawn mowers, bush cutters and lawn tractors are exist in the market, which may not fulfill the capital and operational cost criteria. The main concentration of our design is the cost and operational ease In case small form units it is very expensive, so we decide to develop the new harvesting machine to reduce the cost of harvesting. We start research on the harvesting methods and machines. In the development of ultraportable crop cutter we utilize the past data and techniques. Therefore, there is the need to develop a locally, fabricated Ultra-Portable Crop Cutter which can take care of this operation easily.

2.1 Parts used in the project

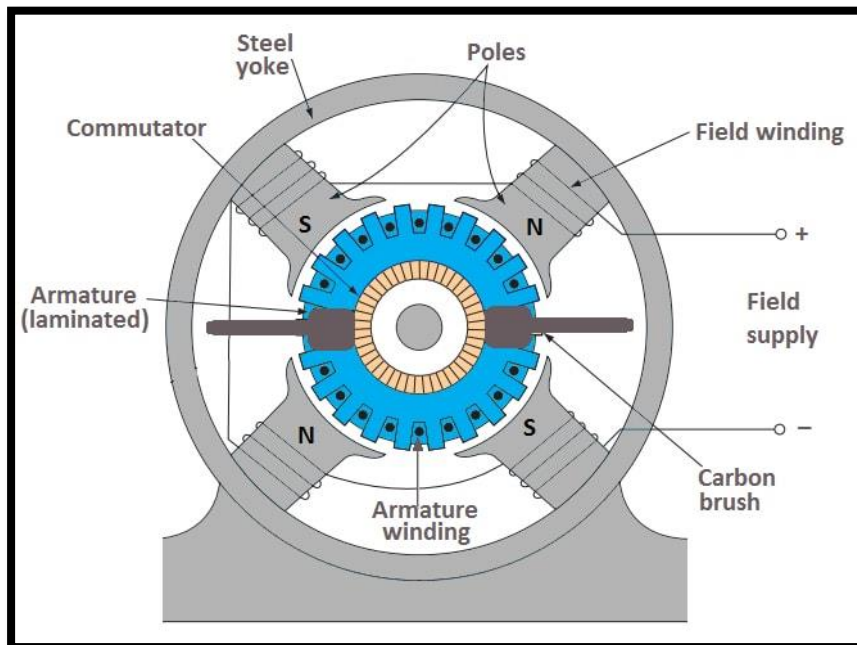
- Battery: 12vdc
- Motor: 12vdc, 1000 rpm
- Cutting blade 6-inch length, 20mm width
- Wheels: 10-inch diameter
- M.S. Square pipe 20mm*20mm

Construction of Permanent Magnet DC Motor or PMDC Motor

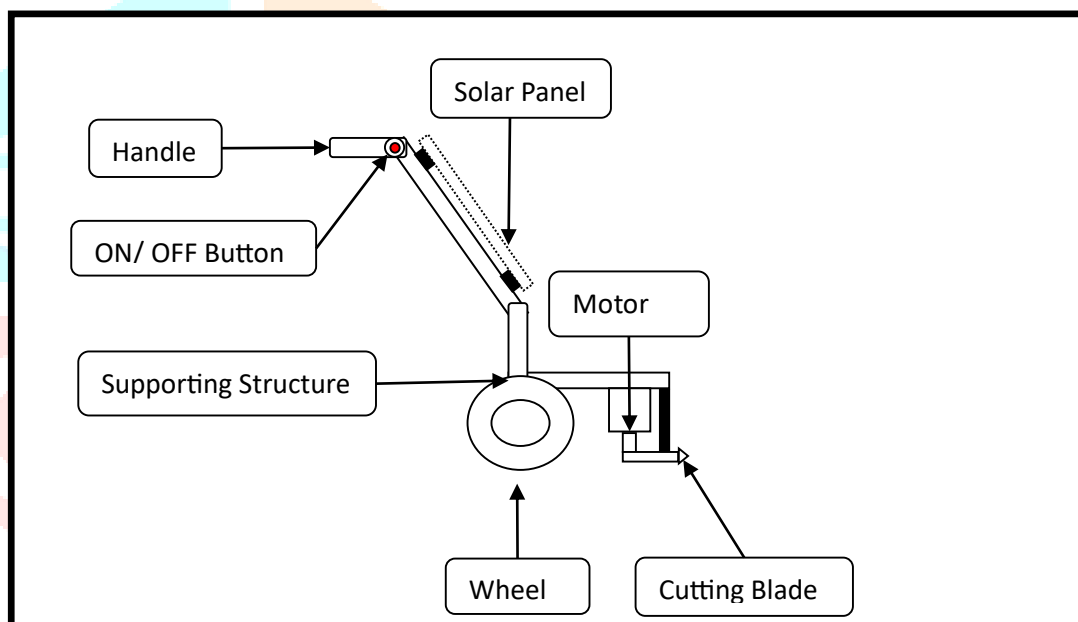
As it is indicated in name of permanent magnet DC motor, the field poles of this motor are essentially made of permanent magnet. A PMDC motor mainly consists of two parts. A stator and an armature. Here the stator which is a steel cylinder. The magnets are mounted in the inner periphery of this cylinder.

The permanent magnets are mounted in such a way that the N-pole and S-pole of each magnet are alternatively faced towards armature as shown in the figure below. That means, if N-pole of one magnet is faced towards armature then S-pole of very next magnet is faced towards armature.

In addition to holding the magnet on its inner periphery, the steel cylindrical stator also serves as low reluctance return path for the magnetic flux. Although field coil is not required in permanent magnet DC motor still it is sometimes found that they are used along with permanent magnet



3. Diagram of the project



3.1 Working of the project:

The new developed crop cutter is operated on the power and it consist of different parts likes, Battery 12 Volt D.C., Motor 12 Volt D.C, cutting blade for the cutting the crop and motor directly connected to the battery for charging the battery. Then start the rotating the motor is clockwise or anticlockwise depend upon the connection or as per our requirement. Then we are attaching round shaft to the motor. Motor is connected rom the round shaft & round shaft is connected from cutting blade. The round shaft is transfer the motion motor to cutting blade.

Now the project mainly concentrates on designing a suitable operating system. To maintain simplicity and economy in the design the locally fabricated unit has been used

3.2 Basic concept of project design:

Decision making comes in every stage of design. Consider two cars of different makes. They may both be reasonable cars and serve the same purpose but the designs are different. The designers consider

different factors and come to certain conclusions leading to an optimum design. Market survey gives an indication of what people want. Existing norms play an important role. Once a critical decision is made, the rest of the design features follow. For example, once we decide the engine capacity, the shape and size, then the subsequent course of the design would follow. A bad decision leads to a bad design and a bad product.

Design may be for different products and with the present specialization and knowledge bank, we have a long list of design disciplines e.g. ship design, building design, process design, bridge design, clothing or fashion design and so

3.3 Factors to be considered in project design

There are many factors to be considered while attacking a design problem. In many cases these are a common sense approach to solving a problem. Some of these factors are as follows:

- (a) What device or mechanism to be used? This would decide the relative arrangement of the constituent elements.
- (b) Material
- (c) Forces on the elements
- (d) Size, shape and space requirements. The final weight of the product is also a major concern.
- (e) The method of manufacturing the components and their assembly.
- (f) How will it operate?
- (g) Reliability and safety aspects
- (h) Inspectibility
- (i) Maintenance, cost and aesthetics of the designed product.

3.4 Product development process

A product development has to go through the following concepts of product engineering which are given as under.

- Product functions
- Product specifications
- Conceptual design
- Ergonomics and aesthetics
- Standards
- Detailed design
- Prototype development
- Testing
- Simulation
- Design for manufacture
- Design for assembly
- Drafting

Advantages

Advantages of the project as per following like as:

- Low Initial Cost, thus affordable by Indian Farmers.
- No cost of Fuels.→ Low Operating→ & Handling Costs.
- Low Maintenance Cost.→ Light in weight→ & Compact.
- Use of Non-Conventional Source of Energy, thus conserving Fossil Fuels.
- Long operating life
- Highly reliable and durable
- Easy to operate and maintain
- Eco-friendly

Disadvantages of the project

Dis-advantages of the project as per following like as:

- High installation cost
- It can't cut Heavy weight crops.
- Water is harmful for this.

Application of the project

Our project should use for following various applications like as:

- It can be used to harvest the agricultural field.
- It can be used to remove the unwanted crops or crop.
- It can be used in small farms where productivity is more.
- It can be used in farms where there is no availability of labor

Future scope

The project has covered almost all the requirements. Further requirements and improvements can easily be done since the as per requirements is mainly structured or modular in nature. Improvements can be appended by changing the existing modules

Conclusion

Our project works on the power due to the operating cost is zero. In the presented paper provides the fabricated information about the “Fabrication of crop Cutting Machine” which was designed such that the plate generates energy and utilizing this energy for running the crop cutter motor. Integrating features of all the hardware components used have been developed in it. Presence of every module has been reasoned out and placed carefully, thus contributing to the best working of the unit. Thus the project has been successfully designed and tested.

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