

MULTIUTILITY GRASS CUTTING MACHINE

PATEL NAITIK C.¹ PATEL JAVLIN D.² PATEL DHAVAL S.³ PATEL VIRAL S.⁴
VAGESH NAI.⁵

DIPLOMA ENGINEERING
MECHANICAL ENGINEERING DEPARTMENT
BHAGWAN MAHAVIR POYTECHNIC, VESU, SURAT, GUJARAT

Abstract:-The design objective is to come up with a mower that is portable, durable, easy to operate and maintain. It also aims to design a self powered mover of electrical source. The heart of the machine is a battery powered dc motor. It comprises of a system of speed multiplication pulleys which drive the cutting blades and the charging unit comprising of 12V alternator and a lift mechanism meant to alter the height of cut. These days we are facing the problems like pollutions, power cut problem etc. In order to overcome these problems, we have thought about the device, which can be performing its functions without causing any of these problems. So we have thought of doing the project on cutting grass, this uses the renewable source of energy for its operation like electric energy. This project aims at developing a portable operated grass cutting device, as there is power shortage. So we have decided to make energy operated device. This will run the DC motor. This motor is connected to blade shaft by the help of screw. This will rotate the blade in high speed, cut the grass. This device will help in building of eco-friendly system.

I. INTRODUCTION

The first lawn mower was invented by Edwin Budding in 1830 in Throop, just outside Stroud, in Gloucestershire, England. Budding's mower was designed primarily to cut the grass on sports grounds and extensive gardens, as a superior alternative to the scythe and was granted a British patent on August 31, 1830.

Budding's first machine was 19 inches (480 mm) wide with a frame made of wrought iron. The mower was pushed from behind. Iron gear transmitted power from the rear roller to the cutting cylinder, allowing the rear roller to drive the knives on the cutting cylinder; the ratio was 16:1. Another roller placed between the cutting cylinder and the main or land roller could be raised or lowered to alter the height of cut. The grass clippings were hurled forward into a tray-like box. It was soon realized, however, that an extra handle was needed in front to help pull the machine along. Overall, these machines were remarkably similar to modern mowers.

Two of the earliest Budding machines sold went to Regent's Park Zoological Gardens in London and the Oxford Colleges. In an agreement between John Freebee and Edwin Budding dated May 18, 1830, Freebee paid the costs of enlarging the small blades, obtained letters of patent and acquired rights.

Manufacture of lawn mowers took off in the 1860s. By 1862, Freebee's company was making eight models in various roller sizes. He manufactured over 5000 machines until production ceased in 1863. The first grass boxes were flat trays but took their present shape in the 1860s. James Sumner of Lancashire patented the first steam-powered lawn mower in 1893. His machine burned petrol and/or paraffin (kerosene) as fuel. These were heavy machines that took several hours to warm up to operating pressure.^[6] After numerous advances, these machines were sold by the Stott Fertilizer and Insecticide Company of Manchester and Sumner. The company they both controlled was called the Leyland Steam Motor Company.

II. WORKING

A rotary mower rotates about a vertical axis with the blade spinning at high speed relying on impact to cut the grass. This tends to result in a rougher cut and bruises and shreds the grass leaf resulting in discoloration of the leaf ends as the shredded portion dies. This is particularly prevalent if the blades become clogged or blunt. Most rotary mowers need to be set a little higher than cylinder equivalents to avoid scalping and gouging of slightly uneven lawns, although some modern rotaries are fitted with a rear roller.

provide a more formal striped cut. These machines will also tend to cut lower (13 mm) than a standard four-wheeled rotary. In our project we are using the cutter for cutting the crops, sugarcane, wooden materials and etc. It consists of simple manner and the used components are motor and rotating disc arrangement. Here the motor is working using with the help of battery power on the motor shaft we have fixing the arrangement of rotating disc.

The motor is connected to the batteries through connecting wires. Between these two mechanical circuit breaker switch 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 to slide on the fixed blade and this makes to cut the grass. The designed solar powered lawnmower 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 working of fully automated solar grass cutter, it has panels mounted in a particular arrangement at an angle of degrees in such a way that it can receive solar radiation with high intensity from the sun. This electrical energy is stored in batteries by using a solar charger. The main function of the solar charger is to increase the current from the panels while batteries are charging. It also disconnects the solar panels from the batteries when they are fully charged and also connects to the panels when the charging of batteries is low. The motor is connected through the motor driver IC which is controlled the motor performance. The power transmits to the mechanism and this makes the blade to rotate with high speed and this makes to cut the grass at an even height. The cutter and vehicle motor are controlled by Atmega8 microcontroller. It is move the vehicle in forward direction. To avoid and protect the device from any human interaction or any large and/or small obstacles the ultrasonic sensor is used. The sensor is sensed in some maximum distance for example 1m, 2m, etc it depends on which type sensors are used.

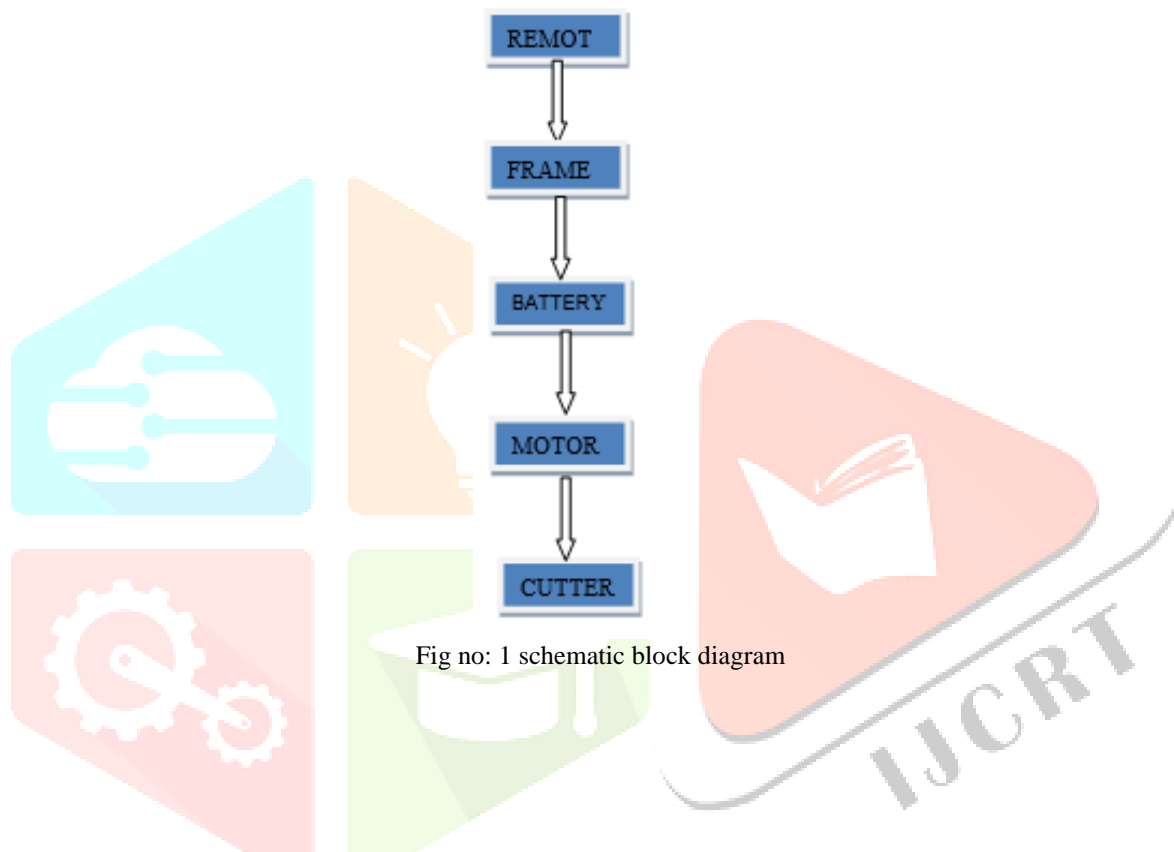


Fig no: 1 schematic block diagram

III. ASSEBLY AND DETAIL DRAWING

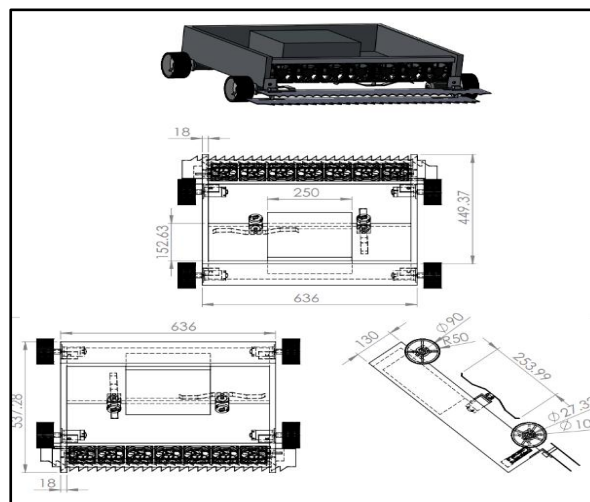


Fig no: 2 grass cutting machine

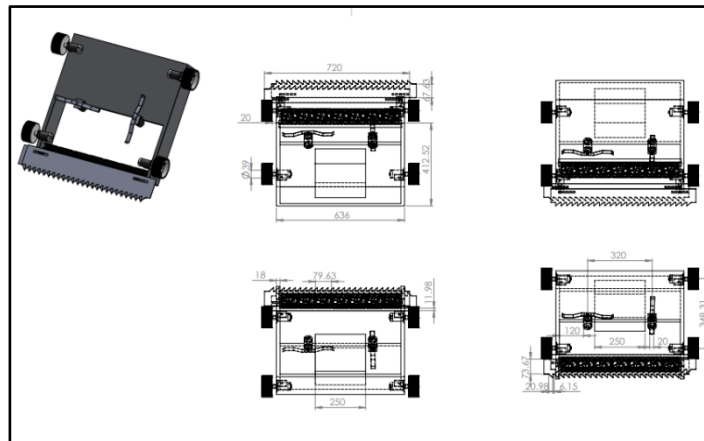


Fig no: 3 grass cutting machine

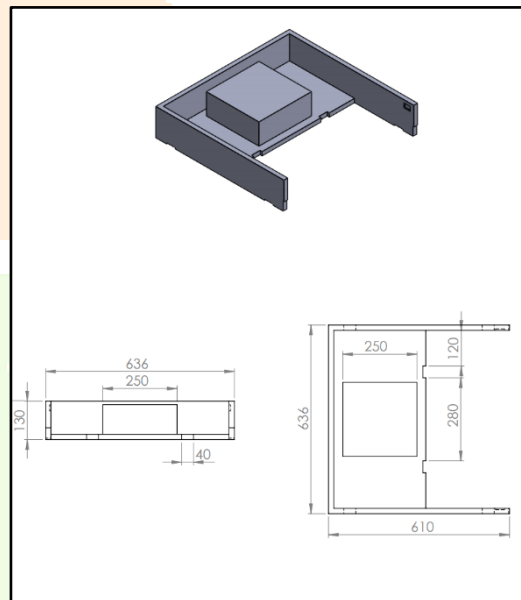
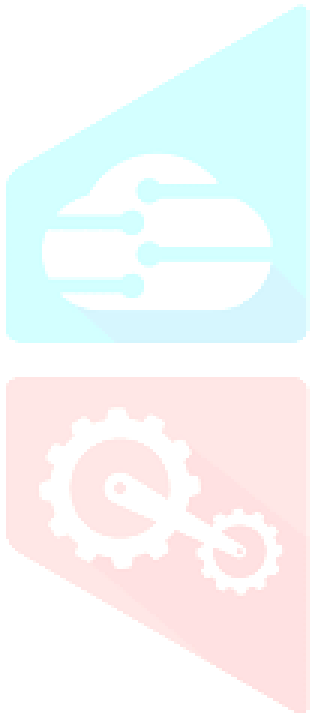


Fig no: 3 frame

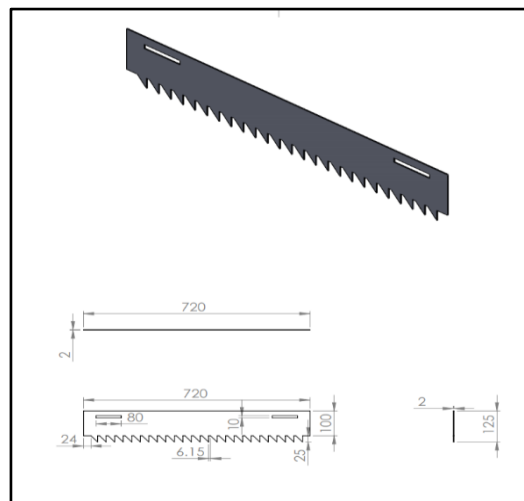


Fig no: 4 front cutting blade

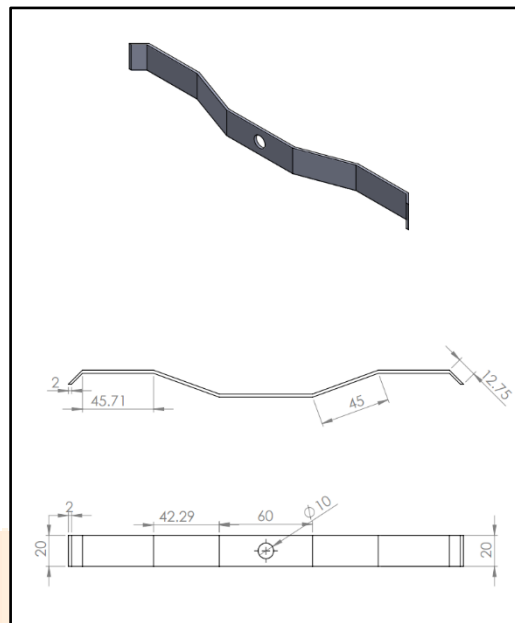


Fig no: 5 cutting blade

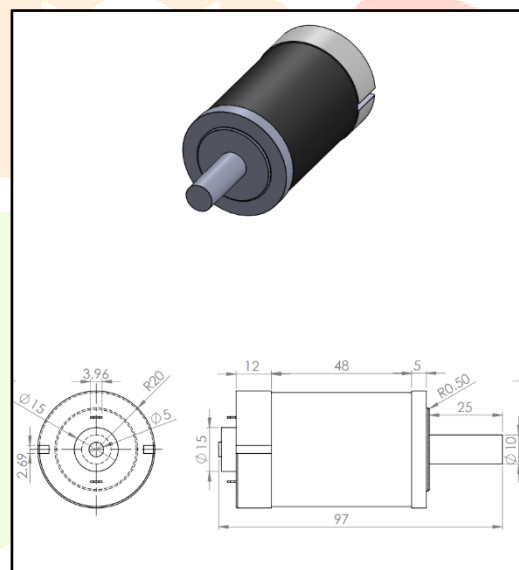


Fig no: 6 motor

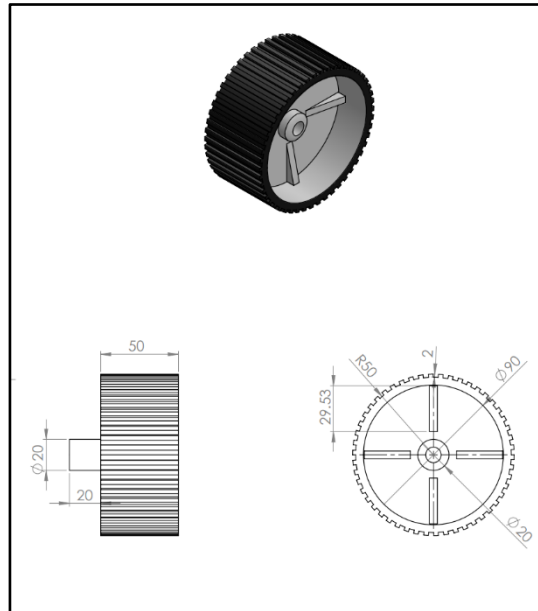


Fig no: 7 wheel

IV. APPLCATIONS

- For playgrounds (cricket ground, football ground etc.)
- For house gardens.
- For small farms.
- Now we are safety with no pollutants emitted.
- It is easy to use, because it is cordless.
- No fuel cost.
- No pollution.
- Easy to move from one place to another.
- Less wear and tear.

V. REFERENCES

- <http://nevonprojects.com/fully-automated-grass-cutter/>
- http://www.ksct.iisc.ernet.in/spp/39_series/SPP39S/02_Exhibition_Projects/169_39S_BE_1251.pdf
- <http://www.slideshare.net/kamerakrathikumar1/Automated-grass-cutter>
- http://www.ijera.com/papers/Vol4_issue9/Version%203/C49031021.pdf
- www.engineersgarage.com/articles/avr
- www.atmel.com/microcontroller

● MULTIUTILITY GRASS CUTTING MACHINE

● PATEL NAITIK C.¹ PATEL JAVLIN D.² PATEL DHAVAL S.³ PATEL VIRAL S.⁴
VAGESH NAI.⁵

● DIPLOMA ENGINEERING

● MECHANICAL ENGINEERING DEPARTMENT

● BHAGWAN MAHAVIR POYTECHNIC, VESU, SURAT, GUJARAT

