

Design and Fabrication Of Motorized Grass Cutter

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ABSTRACT

The grass cutting machine is available in the various types like reel (cylinder) mower, rotary and mulching mower, hover mower, riding mower, professional mower etc. but these are very costly and unaffordable. It required a skilled person to operate. Hence, it was found necessary to have a grass cutter which can be operated by electricity (motor) with minimum initial cost and can be operated by unskilled labour. The newly developed grass cutter was able to operate at an average speed of 2km/hr without disturbance in operation. The effective field capacity of the machine was 0.07 ha/hr (i.e. to move one hectare in 14.30hr) with an efficiency of 70 per cent. 1 hp single phase electric motor was sufficient to operate at working width of 500mm cutter bar. A normal grass cutter moving with IC engine will run based on the energy from petrol. The major drawbacks of this technology are high running cost; create noise pollution and air pollution. Also, an IC engine requires periodic maintenance such as changing the engine oil, mechanical maintenance. It is an innovative technology of cutting grass without any pollution, electric solar grass cutter are environmentally friendly. Nowadays, the labor charge is increased day by day. This technology can help the people who are living in rural areas. This project is mainly proposal for reduce the manpower and usage of electricity. The system control is done by the Schmitt trigger circuit. The grass cutter and vehicle motors are interfaced to a Schmitt trigger circuit that controls the working of all the motors.

Keywords:High Speed DC Motor, Blades, Steel bed, handle bar

I.INTRODUCTION

Agriculture is the backbone of India. In India agriculture has facing serious challenges like scarcity of agricultural labour, in peak working seasons but also in normal time. This is mainly for increased nonfarm job opportunities having higher wage, migration of labour force to cities and low status of agricultural labours in the society. In India two type of grass cutting like as manual method (conventional method) and mechanized type of grass cutter. The grass cutting is important stage in agriculture field. Currently Indian farmer used conventional method for grass cutting i.e. cutting grass manually using labour but this method is very lengthy and time consuming. To design and analysis the grass cutter machine which is help to the Indian farmer which is in rural side and small farm. It will reduce the cost of grass cutting in field. There are several types of mowers, each suited to a particular scale and purpose. The smallest types, non-powered push mowers, are suitable for small residential lawns and gardens. Electrical or piston engine-powered push-mowers are used for larger residential lawns (although there is some overlap), which sometimes resemble small tractors, are larger than push mowers and are suitable for large lawns, although commercial riding lawn mowers (such as zero-turn can be "stand-on" types, and often bear little resemblance to residential lawn tractors, being designed to mow large areas at high speed in the shortest time possible. The largest mult

designed for large expanses of grass such as municipal parks, although they are ill-suited for complex terrain.

II.HISTORY

Ah, 1830, Edward Budding invented the brilliant grass cutter machine in Gloucestershire, England. Edward's budding invention is called a cylinder mower is designed to mow grass in gardens and sports grounds. At the time, the cylinder mower was starting, and after being granted a British patent in August 1830, it soon became known as a viable alternative to scissors for cutting grass. A popular option for time for cut grasses in the ground. The grass cutter machine has come a long way from [Edward Budding's](#) Eureka moment to Robomo's garden-friendly robot grass cutter machine, and here we are going to take a look at its **colorful history**.

III.1830 FIRST GRASS CUTTER

As stated above, the inventor of the grass cutter machine was by the English engineer Edward Budding. He first came up with the idea after seeing the device at a local textile mill. Budding realized how to use the same mechanism to **cut the fabric** to cut the grass after weaving. By mounting the same machine on the wheel frame.

The blade rotates closer to the edge, giving rise to the **cylinder mower**.

Budding later partnered with another engineer, **John Ferby**, and the two began making cylinder mowers at the Stroud factory. The opening machines on display at the Stroud Museum are made of **cast iron** and come with a large roller that holds the cutting cylinder or reel in front.

Cast iron gear wheels transmit power from the rear roller to the cutting cylinder, which makes them surprisingly similar to the grass cutter machine used so far. Budding and Ferby are also smart enough to allow others to **copy their designs** as they are licensed. Out of all those companies, Ransom of Ipswich **was the most successful**.

Ransom still makes grass cutting machines, and to this day, they are one of the largest grass cutter machine manufacturers in the world.

By 1850, Budding's patent had expired, and other companies came up **with their designs** for the grass cutting machine.

Over time, the grass cutter machine **becomes lighter and less noisy**, thanks to Thomas Green and Son, who introduced **SilensMessor**, a quiet cutter. Silens was considered much better than gear-driven cousins;

SilensMessor has been a big hit in the homes, although its price tag is steep. At the same time came other grass cutting machine manufacturers, such as **Alexander Shanks**, who designed the Caledonia Movers line, and Ransomes, who introduced automation. All of these models came in **different sizes and included grass collection boxes** as an optional collection. The next **giant leap** for the grass cutting machine was the invention of the **side-wheel machine**.

In the 1890s, this machine's presence is limited to England while also very popular in North America.



The side-wheel grass cutting machine used **iron wheels on both sides**, which removed the straight cutting wheel. And they **don't have a metal rear roller**, which makes them lighter and cheaper. Motorized grass cutting machines are made lightweight and using petrol engines or **steam power** units on the scene in the 1890s. Steam mowers did a great job, and in the early 1900s, petrol-powered grass cutting machine conquered the market.

After **World War I**, the grass cutting machine product will **reach new heights** when taking the driver's seat with many famous names such as Sims, Ransom, and Jefferies.

At the same time, the name **Atco** came about, which started Atco Motor Mower in 1921. Qualcast is another grass cutter machine manufacturer Company, popular with its **E Sidewheel** and **Panther roller grass cutter machine**.

The first **gas-powered** reel grass cutting machine in America was introduced in 1914 by the ideal power mowing company in Michigan. It was at the same time as the introduction of the **riding grass cutter machine**.

In the 30s, 40s, and 50s, the grass cutting machine became **smaller, lighter, and more efficient**. The 60s grass cutter machine was very sophisticated, had plastic parts, and came at a low price. Traverse City built Monta Mower Montague [1923-1962] in Michigan. They have **wooden T-handle** until 1942, the first introduction of metal rods with rubber. In 1995, invented first **solar-powered** grass cutter machine. A solar-powered grass cutting machine **can find its charging terminal** by the guidance of emissions from the wireless frequency from the boundary wire.

IV. Material and Method

Background A) Agricultural farm Machinery and Equipment: Manual labour takes time and is not effective as they can work for 3 to 4 hours at a stretch. Even if the land holding is small, it takes two or three day completely harvests the soybean grass. Also the planting is not done with proper care. The machine focus the project is to make combination of harvesting and collecting machine for the small scale farmers in India who have land holding less than two acres, to harvest grain more efficiently. The level of mechanization has been increasing steadily over the year of the joint efforts made by the Government and the private sector. As a result of different programs implemented by the Government of India over the years, the total farm power availability is estimated to have increased from 0.295kw/ha in 1971-72, 1.72kw/ha in 2010-11.(1) B) Land holding. Even though the adoption of farm mechanization is increasing in India, it is mostly region specific. Farm mechanization has very low growth rate in regions such a hilly and sloppy land. The decreasing trend in operational land holding is also observation the growth of agricultural mechanization under these myriad farmed plots is 44.31% of the country's total farmed area (it was 41.14% in the 2005-2006) (1)

V. LITERATURE SURVEY

A Various approaches have been proposed for improving mechanized type of grass cutter in agriculture field.

Designing a reaper machine to harvest grains more efficiently. The research work focusing on harvesting operation to the small land holder to cutting varieties of grass in less time and at low cost by considering the factor as power requirement, ease of operation, field condition, time of operation and climatologically condition. By the study Mr. P. B. Chavan, Mr. D. K. Patil, Mr. D. S. Dhondge (2) b. To increase the productivity and profit. How to cutting reduce the cost and how to solve the problem comes from workers. It is fabricated for cutting various grass varieties during the time cutting to the "FABRICATION AND PERFORMANCE TEST OF AN ULTRAPORTABLE GRASS CUTTER" by G Maruthi Prasad Yadav, GMD Javeed Basha (3) c. This fabrication model small scale sugarcane harvesting machine consists petrol engine and mechanisms are used in this machine to compare to manual harvesting by using this machine has capacity to cut sugarcane in faster rate and economical. This study done by the Adarsh J Jain, Srinivas Rarod, Vinay N Thotad and Kiran (4) d. In this research work was made to investigate the cutting energy and force required for the pigeon pea grasses. The commercially available blade it has been attached to the lower end of the arm of pendulum type dynamic tester which cut the stalk at 900 to the stalk axis with knife velocity ranging between 2.28m/s to 7.23 m/s the diameter of stem at 42.6% (wb) moisture content. The cutting force I directly proportional to cross sectional area "stem cutter was design and developed by Atul R. Dange, S. K. Thakare, I Bhaskarao and Umarfarooq momin. (5)

VI. WORKING PRINCIPLE:

It has panel mounted on top of model in a particular arrangement such that angle of inclination is 45 degree hence it can be receive solar radiation easily. Solar panel converts solar energy into electrical energy. This electrical energy is stored in the battery. The motor is connected to the battery through connecting wires. The cutting blades tap the power from DC motor and which in turn actuates the blades and hence rotating blades cut the grass. It also works on direct electric current by using eliminator it can extract electric current directly from the switch board and the motor wires are directly connected to the eliminator which then helps the blades to rotate and hence cut the grass. The placement of the blades is such that the mower blade is placed ahead of the trimmer blade at a ground clearance of 3 inches and the trimmer blade is placed behind mower blade at a ground clearance of 1.5 inches. Thus, the hybrid grass cutter does the action of mowing and trimming large and smaller grasses together in a single operation.

VII. CONCLUSION

In the world today, all machines are designed with the aim of reducing or eliminating green house gas emissions which is the major causes of climate change. This hybrid operational grass cutter will meet the challenge of environmental production and low cost of operation since there is no cost for fuelling. A hybrid operational grass cutter has been developed for the use of residences and establishments that have lawns where tractor driven mowers could not be used. The machine's capacity is adequate for its purpose. The device combines the mower and trimmer in a single set up to reduce the operational costs and efforts of using the mower and trimmer separately. Also it can be operated on both DC and AC current. The machine has proved to be a possible replacement for the gasoline powered lawn mowers.

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