

# Literature Review of Grass Cutter Machine

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**Abstract – This paper summarizes and reviews technological development for making efficient and cost effective grass cutter. Our aim is to study the various developments in the grass cutter machines and their performance. Current technology commonly used for cutting the grass by the manually handled device. From the survey we found that various types of grass cutter available in market which are run by means of solar, electric and internal combustion engine. Grass cutters are available in market having some limit to cut grass at some height. We are trying to make the new innovative concept mainly used in agricultural field. We are going to fabricate the grass cutting machine for the use of agricultural field, to cut the crops in the field as well as to cut the grass.**

**Index Terms – Components, Grass Cutting Machine.**

## 1. INTRODUCTION

In the past and even until now, cutting of grasses in the schools, sports tracks, fields, industries, hotels, public center, etc. was done with a cutlass. This method of manual cutting is time consuming because human effort is needed for the cutting. Also inaccuracy in cutting level was observed using the manual cutting method. This work deals with the cutting of verdant (shrubs, stubborn, grass, flowers, leaves of trees) and also with the design of the machine, its efficiency, rigidity, mode of operation and the selection of materials. The design gives a greater degree of flexible mobility and interchangeability. The aim of this work includes, but not limited to the following:

- To reduce labour input in the cutting of not only weeds or grass but also in the trimming of flowers and trees.
- To reduce cost, time of cutting and also to beautify the environment.

Mechanical mowing became possible early in the 19<sup>th</sup> century by an English engineer named Edwin Budding. While working in a textile mill, Budding noticed a machine that was used to shear the nap of velvet, which to Budding, was very similar to his overgrown grass at home that he had to cut with a scythe every Saturday afternoon instead of going down to the pub and listening to reports of the soccer game come in.

Through Budding's ingenuity he developed a cylinder, or reel-type mower. It was a series of blades arranged around a cylinder with a push handle. It really looked much like our nonpolluting, non-powered, aerobic workout, lawn mowing machine of today—the classic reel mower still available in many hardware and home improvement stores across the country. In 1870, Elwood McGuire of Richmond, Indiana designed a machine that basically brought push mowing to the masses. It was lighter, easier to push and had fewer moving parts than the old versions. By 1885, America was building 50,000 lawnmowers a year and shipping them to every country on the globe.[6]

Towards the end of the 19<sup>th</sup> Century, men from all walks of life, began realizing what a chore it was pushing one of those clunkers around the yard every week, so they started tinkering with ways to get more power (meaning more non-human power) behind the mower. First they figured the best thing would be to hook up a horse to the mowing machine, but the wife complained about the horse trampling her favorite roses. Then someone got the idea of using a steam-powered engine to push it around the yard, but in reality, it took longer to fire up the boiler than it did to actually cut the lawn.

In the United States, the first gasoline powered mowers were manufactured in 1919 by Colonel Edwin George (you had to guess that it would take a military man to get some real power

behind those whirling blades). However, before the Second World War the power mower was little used in most neighborhoods. It wasn't because that husbands didn't want to have one of those new powered mowers, it was because we were in the midst of a slight depression in the economy and it was kind of hard to explain to the wife that you'd like to buy a power lawn mower instead of buying food for the family for the next six months.

During World War II, when most of the able-bodied men were off fighting the war, women were left at home to take care of the yard themselves along with cooking, shopping, cleaning, and oh yes, all that working in the factories business. I think that was the real secret to the power lawn mower boom that followed the war. When the fighting men came home, they didn't want to mess around with cutting grass with an old push mower. After all they had been out driving about the world in tanks, and jeeps, and bombers and such. The idea that now they were relegated to pushing an old 19<sup>th</sup> Century lawn mower around the backyard, just didn't quite cut it with the GI's. Not being shy about such things, they told their wives that they weren't going to cut the grass anymore; after all, it was woman's work. Women in mass stood up and in a quiet revolt pointed their respective husbands towards hardware stores across American in search of the power mower. Things haven't been the same since.

By the early 60s gasoline powered mowers were so common that in 1961 C. B. Mills, an expert in grass seed and lawns at the time, said this about powered mowers: "Today, if all of them in a single neighborhood were started at once, the racket would be heard round the world." He probably lived next door to someone who liked to cut his grass early on a Saturday morning. Today, new technology is bringing us improved mower versions. Low emission gasoline engines with catalytic converters are being manufactured to help reduce air pollution. Improved muffling devices are also being installed to reduce the noise pollution. Battery powered mowers are also becoming practical.[8]

## 2. LITERATURE REVIEW

Prof. C. J. Shende: In this paper they have prepared manually handle device which is capable to cut the grass. This device consists of linear blades and it does not affected by climatic conditions. The main objective of this paper is to move the grass cutter in different directions to prepare various designs as per requirements. By using link mechanism the height of the cut can be adjusted. The unskilled labour can easily operate this device.[1]

C. B. Mills: Today, new technology is bringing us improved mower versions. Low emission gasoline engines with catalytic converters are being manufactured to help reduce air pollution. Improved muffling devices are also being installed to reduce the noise pollution. Battery powered mowers are also

becoming practical. Although slightly smaller with an average cutting swath of only 17-19", these new mowers will quietly cutting lawns without the common cloud of blue smoke hanging in the air, for about an hour per charge. Prices are comparable to a high-end gasoline powered mower.[2]

Davidge E D: "I'm planning on moving my entire fleet to propane. Not only is it better for the environment, it also increases my productivity. I'm saving money on fuel, and labor costs as well, since my crew isn't spending time filling up at the pump. Propane has no additives and is a clean burning system. I save on maintenance since there is no carburetor or fuel filter to maintain.[3]

Edwin Beard Budding: Budding obtained the idea of the lawn mower after seeing a machine in a local cloth mill which used a cutting cylinder mounted on a bench to trim cloth to make a smooth finish after weaving. Budding realized that a similar concept would enable the cutting of grass if the mechanism could be mounted in a wheeled frame to make the blades rotate close to the lawn's surface.[4]

Ms. Lanka Priyanka: In this paper they have fabricated grass cutting machine with tempered blades are attached to this grass cutter. This grass cutter is manually operated as well as automatic operated. The materials commonly used GI sheet, motor, wheel, Al sheet, switch, wire, square pipe and insulating material.[6]

P.Bulski: Bulski identify the sound created by the machine is making noise pollution. He research on sound created by the machine and giving the result how to remove the sound while cutting the grass of lawn or ground. As looking to the petrol engine it make air pollution to environment so from my recommendation it should be implement on electric operated lawn mower.[9]

Praful P. Ulhe: In this paper they have prepared manually operated grass cutter with spiral roller blades due to spiral blades increases the efficiency of cutting. For adjusting the height reel cutter is component placed on grass cutter. This grass cutter used to cut the grass uniformly and also it can cut the different types grasses.[10]

Ransome: The first was produced by Ransomes in 1902. JP Engineering of Leicester, founded after World War I, produced a range of very popular chain-driven mowers. About this time, an operator could ride behind animals that pulled the large machines. These were the first riding mowers. In the United States, gasoline-powered lawn mowers were first manufactured in 1914 by Ideal Power mower.[11]

Thomas Green & Son: He introduced a mower called the Silens Messor (meaning silent cutter), which used a chain drive to transmit power from the rear roller to the cutting cylinder. These machines were lighter and quieter than the gear-driven machines that preceded them, although they were slightly more

expensive. The rise in popularity of lawn sports helped prompt the spread of the invention. Lawn mowers became a more efficient alternative to the scythe and domesticated grazing animals.[12]

#### Outcome of literature survey:

- Cutting grass of secondary primary and tertiary field thereby reducing human effort needed.
- Great portion of farmland can easily cut or brushed with lawn mower in one day.
- This project reduced number of personnel that needed in a particular farm operation.
- To reduce manpower.
- To improve the economy of the country.

### 3. PROPOSED MODELLING

#### 3.1 Grass Cutter:

Grass cutters are manufactured with wheels of varying diameters. One of the most popular has a diameter of 5.5 mm ( 7/32 in). The ratio between the arc of the wheel and the pressure applied with the tool has an important bearing on the degree of penetration. Average hand pressure with this size wheel often gives good results. For a duller wheel on soft grass a larger wheel (e.g., 6 mm ( 1/4 in) will require no change in hand pressure. A smaller wheel (3 mm ( 1/8 in)) is appropriate for cutting patterns and curves since a smaller wheel can follow curved lines without dragging.

#### 3.2 Types of Lawn Mower:

##### 3.2.1 Cylinder or reel mowers:

A cylinder mower or reel mower carries a fixed, horizontal cutting blade at the desired height of cut. Over this is a fast-spinning reel of blades which force the grass past the cutting bar. Each blade in the blade cylinder forms a helix around the reel axis, and the set of spinning blades describes a cylinder. Of all the mowers, a properly adjusted cylinder mower makes the cleanest cut of the grass, and this allows the grass to heal more quickly. The cut of a well-adjusted cylinder mower is straight and definite, as if cut with a pair of scissors. This clean cut promotes healthier, thicker and more resilient lawn growth that is more resistant to disease, weeds and parasites. Lawn cut with a cylinder mower is less likely to result in yellow, white or brown discoloration as a result of leaf shredding.

3.2.2 Rotary mowers: The entire proposed modelling and architecture of the current research paper should be presented in this section. This section gives the original contribution of the authors. This section should be written in Times New Roman font with size 10. Accepted manuscripts should be written by following this template. Once the manuscript is accepted authors should transfer the copyright form to the

journal editorial office. Authors should write their manuscripts without any mistakes especially spelling and grammar.



Fig.2 Rotary Mower

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 to provide a more formal striped cut. These machines will also tend to cut lower (13 mm) than a standard four-wheeled rotary.

##### 3.2.3 Gasoline (petrol):

Extensive grass trimming was not common before the widespread application of the vertical shaft single cylinder gasoline/petrol engine. In the United States this development paralleled the market penetration of companies such as the Briggs and Stratton company of Wisconsin.

##### 3.2.4 Electricity:

Electric mowers are further subdivided into corded and cordless electric models. Both are relatively quiet, typically producing less than 75 decibels, while a gasoline lawn mower can be 95 decibels or more.



Fig.3 Electricity operated lawn mower

##### 3.2.5 Automated Lawn Mower:

Most people do not associate air pollution with mowing the lawn. Yet emissions from lawn mowers, snow blowers, chain saws, leaf vacuums, and similar outdoor power equipment are a significant source of pollution. Today's small engines emit high levels of carbon monoxide, a colorless, odorless, poisonous gas. They also emit hydrocarbons and nitrogen oxides, pollutants that contribute to the formation of ozone. While ozone occurs naturally in the upper atmosphere and

shields the earth from harmful radiation, ozone at ground level is a noxious pollutant.

#### 4. RESULTS AND DISCUSSIONS

Number Of Blades and Name of Blades	Diameter of Blades	Rotation speed (rpm)	Height from the ground level	Weight of collected waste	Time run	Distance travel
1. [Taper Blade]	300 mm	2800 rpm	50 mm	70 gram	40 sec	230 cm
2. [Straight Blade]	300 mm	2800 rpm	50 mm	30 gram	40 sec	230 cm
3. [Larger Blade]	440 mm	2800 rpm	50 mm	40 gram	40 sec	230 cm

#### 5. CONCLUSION

We have presented a detailed description of fabrication of grass cutter. In this we concluded that the modern grass cutter machine having better efficiency as compare to old machines because of using the engine and better material of blades and it also reduces the man power. A lawn mower which is simply called as a grass cutter machine becomes very popular today and it is very commonly used for furnishing soft grasses. Now it is necessary for cleaning gardens. Since it is easily operating machine so now it is used for various application.

#### 6. FUTURE SCOPE

##### This is the future... Of cutting the grass

Husqvarna's new all-electric concept makes mowing the lawn as sleek and futuristic as you always knew it could be

##### Panthera leo

Futuristic mower may even distract from that beer belly of yours while mowing.

Mowing the lawn may not be the most glamorous chore, but Husqvarna's new concept mower might change the image of grass grooming forever. Powered by a fully electric and rechargeable lithium phosphate [battery](#), the mower can zip along for 2 grass-decapitating hours.

##### Uses of grass cutters

If you live in a home with a yard, you probably use at least one kind of grass cutter to keep your yard looking tidy. Grass cutters have different intended uses and come in many types and sizes, but they all have roughly the same use: to keep the grass trimmed. Whatever your grass-cutting needs, a tool stands ready to help you do it. Choosing the right grass cutter for the task makes the work easier and leads to satisfying results.

#### Lawnmowers

Lawnmowers are the most common kind of grass cutter that most homeowners use. Mowers may be rotary types, where blades swirl horizontal to the ground, or reel mowers where blades cut vertically. Typically gas or electric powered, rotary mowers may be self-propelled or rely on manpower to make them move. For large areas, reel mowers are pulled behind lawn tractors. Smaller versions are manually pushed across lawns. Lawn mowers are designed to keep grass cut short, but a good rule is to never cut off more than one-third of the height of your grass. Most mowers have levers that allow you to raise or lower the mowing blades to cut the grass to your desired length.

#### Edge Trimmers

Edge trimmers are a common style of grass cutter, used primarily along edges of your lawn and areas that a lawnmower cannot reach. They feature a gas or electric motor and a spindle that spins a piece of hard plastic line that cuts grass off when the line hits the grass. Some heavy-duty trimmers are equipped with cutting blades, but these are geared toward cutting thick brush rather than the grasses cut with edge trimmers. People often use the term "whipper-snipper" to describe this useful grass-cutting tool.

#### Manual Shears

If you want your yard to appear meticulous, you may make use of a set of handheld grass shears. These manual grass cutters or trimmers work as large, scissor-like devices for trimming your grass. While it's impractical to cut the entire lawn with this type of tool, they are useful for cutting the edges of your lawn, especially next to patios or close around trees or gardens. This prevents accidental damage that can be caused by mowers and trimmers. Manual grass shears work best with sharp, clean blades. Operate them in the same manner you would a large pair of scissors.

#### Sod Cutters

If you want to tear up your lawn and seed or re-sod it, a sod cutter will make the work easier. Homeowners don't typically own sod cutters, because they aren't needed on a regular basis. Instead, sod cutters can be rented from garden centers or equipment rental stores. Sod cutters look like a cross between a lawnmower and a tiller. They have sharp, spinning blades that cut through the grass and its roots, lifting up large strips so you can roll them up and remove them. Sod cutters work for removing grass for new garden spaces or preparing for a new lawn.

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