

## Adjustable Bush Trimmer

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**Abstract** - A Adjustable bush trimmer is a machine that uses revolving blades to cut a lawn at an even length. Even more sophisticated devices are there in every field. Power consumption becomes essential for future. Adjustable bush trimmer is a very useful device which is very simple in construction. It is used to maintain and upkeep lawns in gardens, schools, college's part 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, "Adjustable bush trimmer" is used to cut the different grasses for the different application.

**Key Words:** Adjustable bush trimmer, Electric motor,

**INTRODUCTION:** In large size of lawn in the park, schools, college, are maintained manually. The gardener used hand scissors used to cut and maintain lawn uniformly. It is not easy and also very difficult to maintain uniform size. Hence we design to make a lawn mower without any power source due to reduce the power consumption. The unskilled gardener is enough to operate the lawn mower.

The lawn mower easy to operate and it consists of Rotary Blade, Roller etc. The blade removes the extra growth of the lawn and roller gives light pressure to the top surface of Lawn. It gives fine look to the lawn and uniform look throughout the Lawn.

The project work was very great successful one. It is used to maintain lawn of our college auditorium lawn maintenance.

Overall, with the rapid development of horticulture industry, the demand for more advanced horticultural machinery is increasing. The aim of this work is to design and test a form trimming machine for shrubs so that this labor-intensive operation can be completed by a more efficient and automatic solution.

The design method and experimental evaluation process reported herein can be applied in developing form trimming machines for horticultural plants to promote the mechanization and automation level of trimming operation.

General Bush cutter or lawn mowing with a standard motor powered lawn mower is an inconvenience, and no one takes pleasure in it. Cutting grass is not easy to accomplish by elderly, younger, or disabled people.

Motor powered push lawn mowers and riding lawn mowers create noise pollution due to the loud engine, and local air pollution due to the combustion in the engine. The motor powered engine requires periodic maintenance such as changing the engine oil. Even though electric lawn mowers are environmentally friendly, they too can be an inconvenience.

### WORKING PRINCIPLE

The grass cutting machine is provided with a sprocket drive. The wheel is having free wheel sprocket and the rolling cutter shaft is having big sprocket. The speed ratio of the sprocket is 1: 4. The fixed blades is fitted in the frame of the body and the moving blade is rotated when the vehicle in moving condition.

The cutting length of the grass is adjusted with the help of fixed blade adjustment. The screw is used to adjust the fixed blade sharpness. The speed is also reduced in the ratio of 1: 4. When the main shaft rotates 4 times the wheel shaft will rotate only once. The handle is used to move the lawn mower from one place to another place.

The virtual prototyping technology to research and develop the electric multi-purpose edge trimmer, and innovatively designs the trimming mechanisms.

The trimming mechanism consists of multiple ac motors, so it can achieve any space track movement. It can trim the shape of flat, wavy surface, etc. It has a high-speed real-time having motor speed of 4000 rpm.

With the sliding movement adjusting the height and width through lead screw mechanism which control

trimming mechanism's position and space posture in time.

The dedicated trolley structure is specially processed, so that it can prevent the rolling caused by the machine's gravity centre offset when trimming. All the power of the vehicle is provided by the ac power supply and all the moving elements are driven by the motor drives

**COMPONENTS AND DESCRIPTION**

The machine body is completely made of M.S.Sheets of 2 mm thick and 8 inch wheels are fitted in two sides of the lawn mower.

**SHAFTS:-**

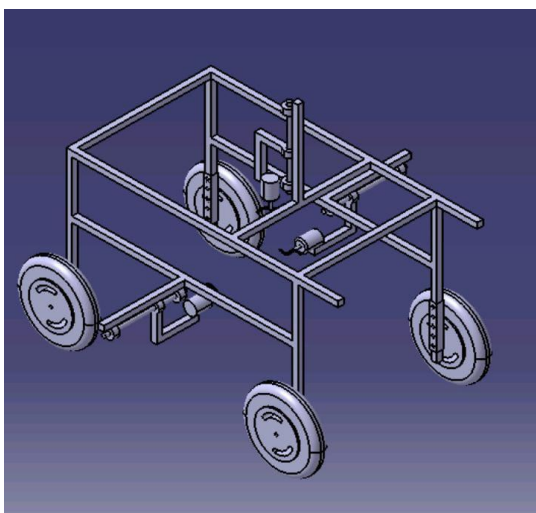
The material is M.S. Total length is 16 inches of outer dia 15mm. The rotating blades are fitted in this shaft.

**BEARINGS WITH BEARING CAP:-**

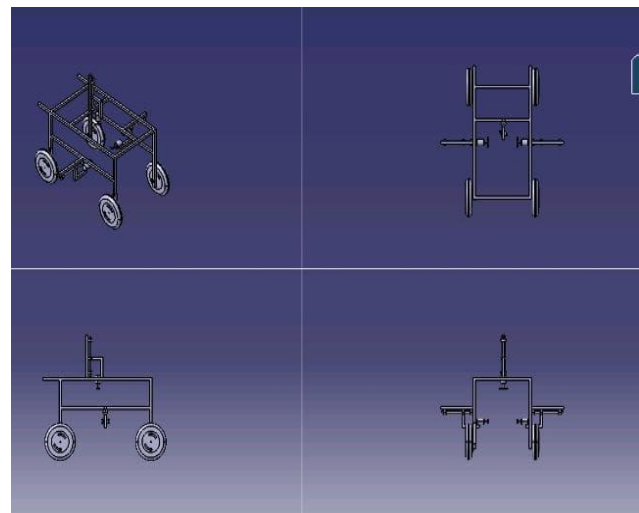
The bearings are pressed hydraulically to fit into the shafts because if hammered the bearing may develop cracks.

The bearings are pressed smoothly to fit into the shafts because if hammered the bearing may develop cracks. Bearing is made up of steel material and bearing cap is mild steel.

**DESIGN AND DRAWING**



**Fig1. 3D view of adjustable bush trimmer in CAED model**



**Fig.2 Side view of adjustable bush trimmer**

**DESIGN OF BALL BEARING**

Bearing No. 6202

Outer Diameter of Bearing (D) = 35mm

Thickness of Bearing (B) = 12 mm

Inner Diameter of the Bearing (d)=15 mm

r<sub>1</sub>= Corner radii on shaft and housing

r<sub>1</sub>=1(From design data book)

Maximum Speed =14,000 rpm (From design data book)

Mean Diameter (d<sub>m</sub>)= (D + d) / 2

$$(35 + 15) / 2$$

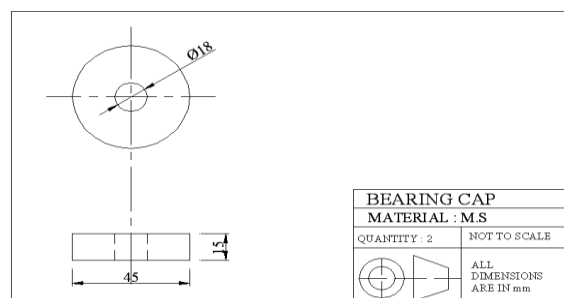
$$d_m = 25 \text{ mm}$$

**STRESS FACTOR**

$$K_s = \frac{4C-1}{4C-4} + \frac{0.65}{C}$$

$$= \frac{(4 \times 2.3) - 1}{(4 \times 2.3) - 4} + \frac{0.65}{2.3}$$

$$= 1.85$$



**Fig.3: Shaft diagram**



**Fig:4 Adjustable bush trimmer**

SL.NO	NAME OF PARTS	MATERIAL	QUANTITY
1	Cutter bush	A.L	3
2	AC MOTOR	C.I	3
3	Cutter strips	plastic	3
4	Lead screw	M.S	3
5	Wheels	Rubber	4
6	frame	MS	1
7	Lock Nut	M.S	15
8	Handle	M.S	1
9	Bearing	Steel	2

**RESULTS**

1. 3 Way adjustable bush Trimming Machine is manufactured as per the designs
2. The component is designed for 3 feet height and 2 feet width lawning
3. Allowance is given up to 0.5 feet above the prescribed dimensions for lawning

4. 3 way adjustable bush trimming machine is operated with electrical power supply for this purpose electrical ac 100W motor is used
5. The adjustable wheels are given to ensure flat surface lawning
6. The wheel base is adjustable up to ½ feet in the vertical direction

**CONCLUSION**

Thus this project work is much useful in all industries. For practical applications this is fabricated for light duty. Its height, weight and other mechanical designs are not suitable for any other heavy work or work on hardened material.

We are proud that we have completed the work with the limited time successfully. The LAWN MOVER is working with satisfactory conditions. We are able to understand the difficulties in maintaining the tolerances and also quality. We have done to our ability and skill making maximum use of available facilities.

In conclusion remarks of our project work, let us add a few more lines about our impression project work. Thus we have developed a “LAWN MOVER” which helps to know how to achieve simple manual drive mechanism. The application of this machine is high when compared to the cost of the machine. So for in future the same project will be remolded and designed to carry out multi functional operation.

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