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MOSS REMOVAL MACHINE

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Abstract - *One of the most common problems faced in our country during rainy season is that of the mosses. They grow randomly on wet surfaces and make the place slippery. There are several methods that are used to overcome this problem, but some of the techniques require lot of human effort, some are not efficient, some methods use chemicals which is not good for human health, some are in time consuming, some use a lot of water resulting in water wastage and some of the machines used to remove moss are not affordable to the common man. This project a moss removal machine. The mosses are removed and then the removed mosses are collected in the collecting tray thus leaving the place clean. This machine saves time, water and requires less human effort. It is portable and affordable, as this machine helps in removing the moss it keeps this surface dry and hence prevents slipping. This moss removal machine utilizes a battery to operate the brushes and this battery is rechargeable. It is also observed that by the use of this moss removal machine it not only does the job of removing the moss but also helps in cleaning the surface the surface by removing dry moss which otherwise spoils the look of the place.*

Key Words: Moss removal machine, algea removal.

1. INTRODUCTION

A small flowerless green plant which lacks tree roots, growing in low carpets or rounded cushions in damp habitats and reproducing by means of spores released from stalked capsules. Mosses are small flowerless plants that typically grow in dense green clumps or mats, often in damp or shady locations mosses are commonly confused with lichens, hornworts and liverworts. As the monsoon begins one of the most common problems faced by most of the people in our country as well as in the countries abroad is that of the mosses. This makes people and sometimes even animals to slip and fall and which might result in fractured bones. The mosses that grow on the concrete surfaces as they dry up can cause a lot of problems to the vehicles passing over them as they tend to skid over dry layer of the moss. To overcome this problem caused by these mosses they have to be removed from the surface where they have grown. Some of the common methods that are used are:

1. Traditional method
2. Scrubbing method
3. Bleach cleaning method
4. Pressure water cleaning method
5. Kersten's Moss removal machine

Fig 1: Scrubbing method

2 LITERATURE SURVEY

This paper is based on "Manual driven platform cleaning machine" which provides the basic need of cleaning very large floor areas such as railway platforms, hospitals, malls and many investments have been made for the same. In recent times Indian Railways has purchased platform rider scrubbers and platform cleaning machines from various companies to ensure hygiene. Due to absence of electricity at bus stand, railway platforms and other commercial places, the automatic cleaning machine isn't suitable in every condition[1]. The author fabricated a four wheeler cart with the help of accessories such as belt, pedal axle, scrubber brush, U-clamp cleaning process is executed.

This paper presents the design and fabrication of Tricycle operated street cleaning machine with the related search[2]. At present we have few automated machines which are foreign made and can be used in our country. This basically instigates to thing for an alternative mechanism called Street cleaning process.

The multipurpose road cleaning machine has a wide range of applications. It can be used on all kind of roads in rural as well as the urban. Working on the basic principle of science, the project is a collaboration of mechanical, electrical and electronic devices[3]. To overcome the rising issues of cleanliness in India the multipurpose road cleaner can play a vital role. The cleaner solves the problem of dusty roads, choked pipelines and manholes, removal of metal particles from road and also obstacles. The machine is an assembly of various rigid components, a chassis, some motors, micro controllers and various electromechanical devices whose working takes place on the various laws of physics and simple science. In this paper, our motive is to present a detailed qualitative study of cleaning system using the

cleaner, the main focus being cleanliness with minimum utilization of resources available with us.

Cleaning was a daily routine in every hotel, office, hospital, house, farms etc. hence, everyone expect easy and quick cleaning. Due to this reasons people are attracted towards electromechanical equipment's hence there was a huge demand for this machines in the market. Keeping these factors in mind, in this work "design and development of animal shed cleaning machine" a model was designed fabricated and performance evaluation was been done. The machine was manually moved, contains two rotary brushes and one scrubbing brush. The rotary brushes are operated using single motor which helps in cleaning the floor, scrubbing brush scrub the floor has the machine moves. Two scrappers were used one scrapper at the front end pushes the waste and another scrapper at the backside pushes the water left in the floor in the wake of cleaning. During cleaning, ordinary water was supplied at the front end, which wet the floor. It was trailed by supplying compound water stored in a tank of the machine, which further wet the floor, and revolving brushes clean the floor[4]. At last ordinary water is supplied at high speed through nozzles. Finally air blowing machine can be utilized if brisk dry was required.

3. WORKING PRINCIPLE

Dc motor is an electrical machine that utilizes electric power resulting in mechanical power output. In this project we are using a DC motor to rotate the brush. As the battery is switched on the DC motor shaft starts to rotate thereby rotating the brush connected to the motor. The brush is connected to the motor. The brush is connected to motor using chain and sprocket mechanism. The chain drive mechanism reduces the direct load acting on the motor and thereby safeguards the motor and also increases the speed of the brush. Normally the motor output is a rotational motion of the shaft. The input may be direct current supply or alternating supply. But in the case of DC motor direct current is used. The mechanism of DC motor is like a bar wound with wire is placed in between two magnets having north and South Pole. When it is provided with electric supply the wire becomes energized resulting in rotational motion which leads to rotational output. As the primary brush starts rotating and when it comes in contact with moss surface, the brush will start to remove the moss. The removed moss is pushed backwards. A secondary roller brush is placed behind the primary brush helps the removed moss to pass to the collecting tray. These removed mosses are pushed into a tray arrangement with the help of the secondary brush which is placed just behind the primary brush. The moss collected in the tray can be later removed as the tray can be sided in and out. As caster wheels are used here, the machine can be moved in any desired direction.

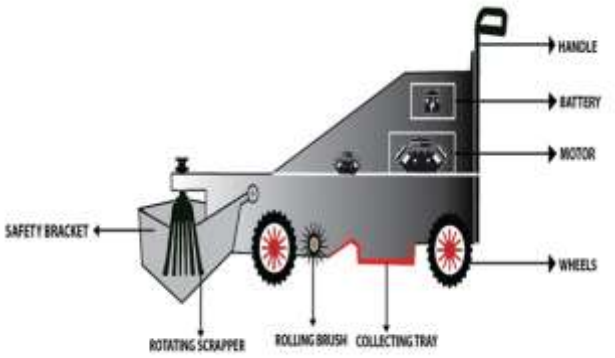

Fig2: 2D Diagram

Fig 3: 3D Diagram

4. CALCULATION

BATTERY SPECIFICATION

Voltage =12V, 65AH

MOTOR SPECIFICATIONS

Speed, N=70rpm

Torque =13Nm=132kgcm

Required force is 3kg

Diameter of the main brush=120mm
r=60mm=6cm
Required torque $T_r=F\times r$

$=3\times6=18$kgcm

$T_r=18$kgcm.

PRIMARY BRUSH SPECIFICATION

Area of weed brush =A

$$=\frac{\pi d^2}{4}$$

$$=\frac{\pi\times120^2}{4}$$

$=11309.733 mm^2$

Amount of moss removed/min =A×N

=11309.733× 70

=79168.3487 mm^2/min

=8.5172Sq.ft/min

SECONDARY BRUSH SPECIFICATION

Diameter of the roller brush, d=100mm

Length of the roller brush, L=250mm

Surface area of the roller brush, A_r=πdL=78500mm^2

Moss collected/min=A_r× N

=πDL×N

=78500×140

=10990000 Sq.mm^2/min

=118.29 Sq.ft/min

5. RESULT

This machine helps in removing and collecting the moss. The rotator brush is placed in front portion of the machine, which is covered with an enclosure so that the moss does not spread around. The brush is placed at the mid portion of the machine which is placed in front of the collecting tray where the moss gets collected in it. This machine runs with the help of battery. The main scrubber runs with the help of a motor and the secondary brush with the help of a wiper motor. Wheels are mounted to the chassis to help the machine move. The machine is maneuvered with the help of human effort.

Fig 4: Result

5 ADVANTAGES AND DISADVANTAGES

- Human effort and time can be saved.
- This method is most efficient as complete moss can be scrubbed out as no chemicals are used it is user friend.
- Removed moss is collected in a collecting tray hence time is saved for connecting the removed moss.
- The machine can be easily operated with less human resource.
- Simple in mechanism. The moss cleaning machine can be used to clean the surrounding that is covered with the moss.
- It can be used on the concrete roads that can be very dangerous for vehicles.
- It can also be used on the interlock pavement.

DISADVANTAGES:

- The battery needs to be charged frequently.
- Using it on slopes is little difficult.

6. CONCLUSIONS

Thus we conclude by saying that moss removal machine is successful as it is able to remove moss from the concert and interlock pavement surfaces and collect it. The prototype model is tested by working it and is able to remove moss at the speed of 70 rpm and 13Nm torque by the primary brush. And also able to collect the moss that is been removed at the speed of 200 rpm of secondary brush. The collecting tray has the capacity of 11309.733.mm^2 area.

This proves that the moss removal machine is able to remove the moss and collect the moss that is formed on the concrete or interlock pavements and the surface clean and safe. This machine can be used for both wet and dry moss as well but it is found that it is more suitable to remove dry moss as removing wet moss consumes more time and bristles of the brush would wear out at faster rate. It is also found that the efficiency of the moss removed can be increased at greater extent by using powerful moors in large capacity batteries. It is also found that moss collected in the tray wills more in the case of dry moss and very less or no moss in the case of wet moss.

7. FUTURE SCOPES

This moss removal machine is very useful in the future, because it can remove moss efficiently without using much of the human power. In future there might be no need to use the older methods to clean out moss off the concrete or interlock pavements. Using this machine the moss can remove in an efficient way and can also is collected. The surface after cleaning the moss will be prevented from slippery, so that no accidents can happen because of the moss. The maintenance of the machine will be also easy. To

operate the machine no skilled labored are required, therefore it can be used by any member of the family. Hence the Moss removal machine is plays a vital role in removing the moss off the floors.

8. REFERENCES

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