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SOLAR OPERATED MULTIFUNCTIONAL FLOOR CLEANING MACHINE

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Abstract: **Automated floor cleaning machines are commonly used in developed countries since many years because of high cost of labour, time, efforts and affordability. The concept is not popular in developing or emerging economic countries. Reasons for non-popularity are cost of machine and operational charges in terms of power tariff. This project is based upon on our innovation to design, develop and manufacture semi-automatic floor cleaning machine which will work on solar energy, battery or electricity. This machine is multifunctional. Five functions of cleaning like garbage collecting, scrubbing, mopping, drying and wiping can be performed using this machine. A semi-automatic floor cleaning machine having advantages like less energy consumption machine as well as operational cost reduction, reduce the human effort, environment friendly and easy to handle. Base of the paper was to use renewable energy which is abundant in most of the countries, will have less environmental impact and easy to construct for commercial scale in future.**

Keywords- *Solar energy, Floor cleaning mechanism, Air- dryer, Garbage collector.*

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I. INTRODUCTION

Cleaning machine is very much useful in cleaning floors and outside ground in hospitals, houses, auditorium, shops, bus stands and public place etc. In modern days interior as well as outside cleaning are becoming an important role in our life. Cleaning of waste is a very important one for our health and reduces the man power requirement. Many of floor cleaning machines are available but we developed machine is very simple in construction and easy to operate.

Anybody can operate this machine easily. Hence it is very useful in hospitals, any large area space. The time taken for cleaning is very less and the cost is also very less. Maintenance cost is less. Much type of machines is widely used for this purpose. In our project we have made the machine to operate in a fully mechanical way with a little amount of electrical components. The Floor cleaner is of very simple construction and is very easy to operate, anyone can operate it without any prior training of any sorts with safety. It is very important one in any hospitals, hotels, bus stands etc.

II. METHODOLOGY

After studying the various research papers of floor cleaning machines we have concluded that there are certain limitations in floor cleaning machines which can be worked upon. For example cleaning machines are made with an aim to clean only dry surface of the floor. This means that they are only sufficient in the summer and winter season but not in rainy season this is the major issue for cleaning the floor surface but during the rainy season floor cleaning machines are required which can perform the tasks when the surface contain moisture or little amount of water on the surface of floor. So we are developing the machine which can work in both dry and wet conditions. This machine is also called as dry and wet floor cleaning machine. This machine can remove the dust in summer season and also it can remove and clean the dirt, water from floor in rainy season.

III. OBJECTIVE

- To develop a machine that helps in easy and quick cleaning. To reduce human efforts.
- To save the time.
- To reduce the cost.
- To prevent injuries due to tripping or slipping. Injuries due to slips and trips on level floors are a major cause of accidental injury or death. Bad practice in floor cleaning is itself a major cause of accidents.
- To remove grit and sand which scratch and wear down the surface.
- To remove allergens, in particular dust.

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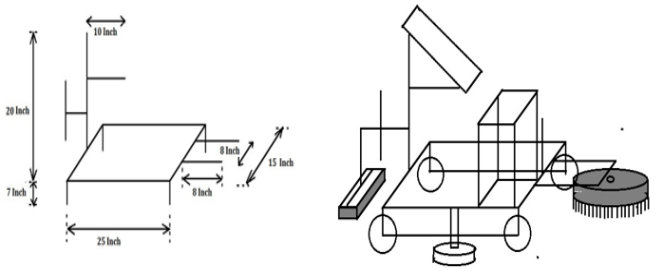
IV. WORKING

When Solar Panel of 20w is applied and their electric energy stored in battery. 12v DC battery supply is provided to the electrical switch board of the machine. The main supply from electrical board is supplied to SMPS and vacuum cleaner, during working DC is supplied to the vacuum cleaner and SMPS. Vacuum cleaner is used to operate the DC motors which performs a key role in cleaning operation. There are three D.C motors one is used to rotate the mop for cleaning the middle surface that is covered by the chassis.



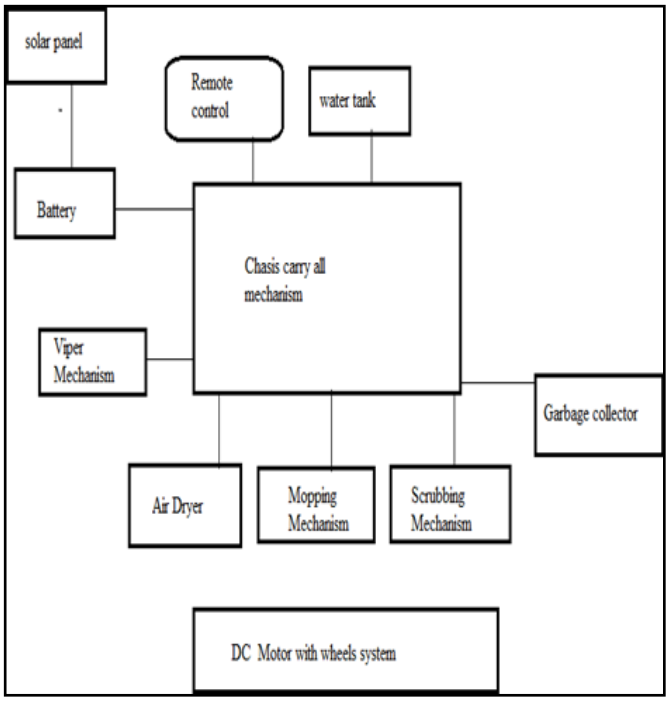


Figure 1: Block Diagram

The DC motor used for rotation of the mop having high torque than the motor used for the brushes. The other two DC motors having high RPM are used to clean the front section of the floor the DC motor rotates the brushes through the shaft which is connected to the shaft of the motor through nut and bolt. During summer season the uneven particles which collects on the surface of the floor are clean through the front two brushes and from the middle slots the dirt particles enters into vacuum cleaner from the suction pipe and the position of the mop can be adjusted with the help of arc provided on the left hand side of the chassis. During the dry cleaning the supply of water is disconnected.

During the rainy season the working of floor cleaning machine slightly changes in this condition the water and dust or dirt particles are brought into the middle section of the chassis through the rotating brushes. The rotational direction of the bushes are opposite to each other in order to collect the more amount of water in the middle section and this mixture of water and dirt is collected into the vacuum cleaner through inlet pipe which is located in between the two brushes. The third motor rotates the mop for efficient cleaning. At the bottom of the water tank water spray pump is provided which supply the fresh water for efficient cleaning the supply of fresh water is controlled through the control valve. In the water flowing tube number of holes are created for equal amount of water Different button in the electrical board is provided to control the electrical supply of each equipment of the floor cleaning machine.

V. ADVANTAGES

- Manual effort is reduced.
- Operating time is less.
- Cleaning and polishing can be done at same time.
- Power consumption is less.
- This machine requires low Maintenance cost.
- In this machine Easy control of cleaning solution supply by controlling valve.
- It can be used on various places other than rough surfaces.
- By further modification the drive or movement can be made automatic.

VI. DISADVANTAGES

- Floor cleaning machine produces vibrations when used on rough floors or rough surfaces.
- Floor cleaning machine is Suitable for only flat surfaces.
- Floor cleaning machine is Semi-automated machine.
- It is heavy to lift.
- It is not capable to clean stair of any building.
- Maintenance of mop is required.

VII. FUTURE SCOPE

If panel used of high watt, then the machine can be used during night time for garden lighting or room lighting. Because we can store more power. And at night time however you keep it aside. So the power in the battery can be used for this purpose. By using one valve in the pipe we can also use it for gardening i.e. pouring water for plants. By connecting one box type carrier we can use it to transport files, books or other stuffs from one place to other in office or any other place.

VIII. CONCLUSIONS

In our project we introduced a floor cleaning machine. One of the key motives of our project was to cover the aspects of cleanliness in the society. The multiple applications provide a wide range of functions.

Since our machine is Solar operated, it helped in making an environmentally friendly project. The use of innovative technology in our project helps in reducing human effort and also consumes less time in cleaning procedure. This means more floor cleaning which results in increase in overall cleanliness and supports healthy well being. Small steps in technological advancements like these will have higher impact in the long run in future.

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