DESIGN AND FABRICATION OF ROUGH SURFACE CLEANER

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Abstract: *Floor cleaner is a system that enables cleaning of the floor by the help of highly stabilized and rapidly functionalized mechanical control system. Current project work targets to use floor cleaner for large floor is house-hold purposes and Office floors. The cleaning purpose is specifically carried out by continuous relative motion between a scrubber and the floor surface. During the cleaning and moving operation of vehicle a propulsion mechanism such as driven wheels and guide wheels for the dry tracking on the floor surface to be cleaned, suction of water and large particles is carried out by vacuum pump, scrubbing action is done by the scrubber directing small dust and lust particles towards tail part of the structure. Preferably, a sweeper mechanism is mounted on the body forwarded by propulsion mechanism. The ultimate main of this project is to combine both the process of vacuum cleaning and scrubbing mechanisms, in order to achieve the high efficient cleaning.*

Keywords: *Vacuum Cleaner, Continuous relative motion, propulsive motion, scrubber, Motors*

1. INTRODUCTION:

Floor cleaner is very much useful in cleaning floors in hospitals, houses, auditorium, shops, computer centers etc; it is very simple in construction and easy to operate. Every unskilled man can operate this machine easily. It consists of moisture cotton brush; the brush cleans the floor and is further cleansed with aid of self-made vacuum cleaner. Hence it is very useful in hospitals houses, etc. the time taken for cleaning is very less as it can cover the area of 2sqft. Cost is less and when comes to the maintenance part cost is further reduced as of only D.C power supply is utilized. There are several varieties of machines available but when comes to the mechanical device combing vacuum and scrubber together, it reduces the cost and increase the cleaning efficiency. For public and office building about 80 to 90% of the dirt is tracked in from outside. Installing this device reduces the dust by 2/3rd of its overall amount of dust present.

2. MATERIALS:

MATERIALS	PROPERTIES
Sheet metal(galvanized iron sheet)	With thickness of 2mm
Wheels(*4)	Each wheel can carry 70kg
Motors(for vacuum *2)	With the 20,000 rpm and 12volt as starting current
Motors(for scrubber)	Gear motor with 100rpm and more torque
Nozzle	Small mouth to suck in the dust particle
Scrubber	Used in cleaning the floor surfaces.

TABLE 1.1

3. METHOD:

Scrubbing of surface is necessary for proper cleaning. The scrubber is given a rotational motion to scrub the surface. It ensures the surface to be properly cleaned. But here not only scrubber vacuum plays the major role in cleaning. Hence for the vacuum a suitable motor is to be selected.

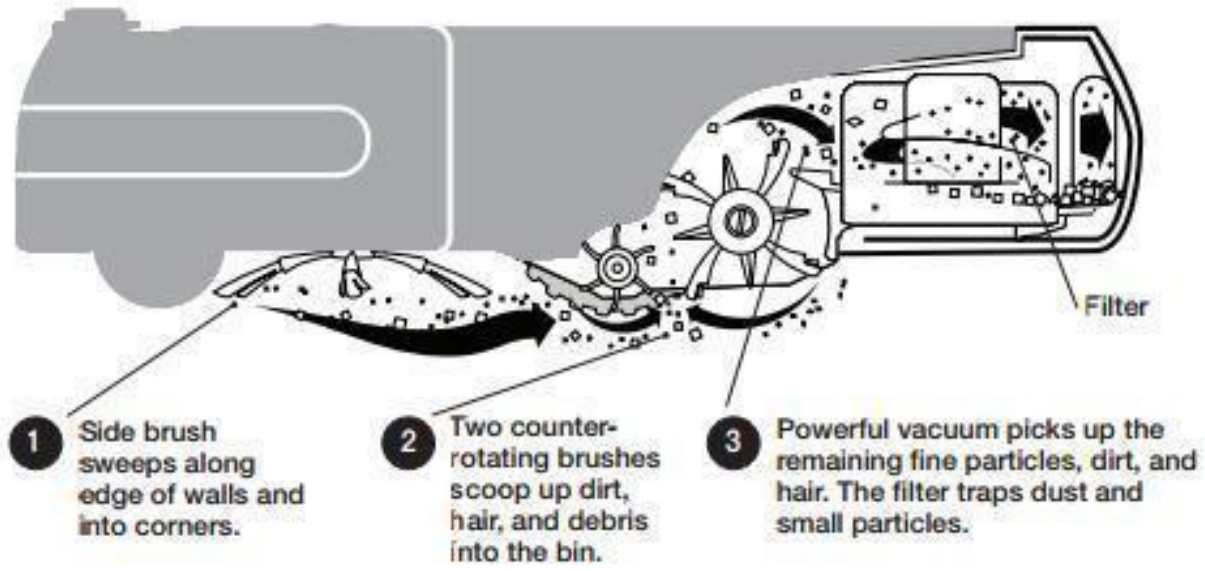

FIGURE 1.1

3.1. Selection of motors:

There are various types of DC motors available. For vacuum suction and deposing, DC universal motor is used. This is because it can operate at very high rpm and also has high torque. For scrubber DC series motor is used. This is because they can run at any speed or at constant speed. DC series motor which has high starting torque is used to start the scrubber with high force as it is necessary.

3.2. Selection of battery:

Batteries are literally used for electrical purpose. Here the main purpose of battery is to run the motor of vacuum cleaner and also for rotary motion of the scrubber. There are several kinds of battery available out of which lithium ion battery is considered to be weightless and at the same time it can be recharged easily when compared. The battery used here is 12v, 24 amps power supply.

3.3. Working of modules:

Vacuum cleaner requires an airtight storage in order to suck the dust particles, and also the blade fixed with motor inside the vacuum cleaner should run at anti-clockwise direction in order achieve the suction process. During the ejection of dust particles the blade should rotate at clockwise direction. When it comes to scrubber, a simple geared motor with low rpm and high torque is used for simple continuous rotary motion of the scrubber.

4. DISCUSSION:

- Rough surface utilizes the less power supply and gives the high and effective cleaning.
- Initial cost is very much less when compared with other cleaning devices.
- Charging time of the battery is also as lithium ion battery is used here.
- Maintenance cost is an advantage for this device since it can be maintained easily.
- Scrubbing action gives more strength to this device as to increase effectiveness of cleaning.
- It's normally used at various places especially at mechanical industries where the surface is mostly rough.

5. ANALYSIS:

- The storage unit of the vacuum cleaner is 20L, so as to store large amount of dust particle at a moment of time.
- The nozzles determines the cleaning area, if the width of the nozzle is increased large area can be easily cleaned.
- In this project, the nozzle clean area is 2sqft.
- For changing the direction as clockwise and anti-clockwise motion during suction and disposing DPDT switch is used.
- Filtration is very important in terms of cleaning ability because HEPA or other advanced filtration increases the resistance within the vacuum cleaner.
- In fact, the challenge of coping with higher resistance is one of the reasons that HEPA filtration vacuum cleaners can cost more.

6. FINDINGS:

- Rough Surface was cleaned with the aid of mop using the hand as a primary tool during olden days.
- The cleaning of Rough surface includes cleaning of different surfaces such as cement floors, Granite floor mostly present in urban and civilized areas which are covered by dust.
- In existing vaccum cleaner certain drawbacks are discovered the main drawback is that it can be used only on certain surfaces but this Rough Surface Cleaner can be used in any kind of surfaces.
- To overcome this problem and also to avoid the unnecessary employment to many peoples this Rough surface cleaner enables the cleaning process without Manpower.
- It uses compressed air to suck the unwanted or dust particles from the rough surface.
- It also consists of scrubber which replaces the traditional cleaning system, also increases efficiency of cleaning Just by aid of battery driven electrical source.

7. RESULT:

- This product is the best option for the both large scale and small scale industry.
- It is definitely an eco-friendly product.
- Easily portable with the aid of its four rolling wheel at any direction.
- High efficient cleaning at low cost.

8. CONCLUSION:

The foremost aim of this project is to bring a user friendly cleaning device at which any unskilled person can operate easily. Then for the motive, cost is very much reduced by placing scrubber and vacuum at one place for sufficient cleaning. Number of labours can be reduced by replacing them with this device. Time is comparatively saved as of it can clean large area at the same time. Large Space can be Cleaned Very Much Quicker. It can be used in Public Places like Railway Station, Bus Stand Platforms, Hospitals et**c.**

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