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Fabrication of Switch Operated Sweeping and Floor Cleaning Machine

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ABSTRACT

A Floor-Cleaning Machine which is used indoors on a long corridor, comprising a support frame. On the support frame are installed a rotating cleaning organ at the center of frame which is in contact with the floor, the suction mechanism to pull the dust particles coming in contact with the floor cleaning machine and a motor to draw the cleaning organ in rotation, the rotating cleaning organ comprising a cleaning element made of cloths, which is destined to come into direct contact with the Floor. This machine cleans the floor with all the component which are installed over this machine in a single pass. Usually only a single type of cleaning can be done with a machine but this machine has ability to clean the floor in various ways, vacuum cleaner to suck smaller dust particles, Mop to clean the wet and dry floor and a wiper which slides behind the machine. The machine is provided with wheels which run on a motor so that it can be moved on the floor to be washed.

KEYWORDS: *corridor, suction, rotation, vacuum cleaner, dust particles*

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IJTSRD30001

I. INRODUCTION

To develop a switch operated cleaning assistance this helps in cleaning the flat surface with the ease with greater efficiency at work. This is solely aimed to replace the men at work to "no man at work. "The surface cleaning machine that is proposed in this the device that helps in cleaning of surfaces and vertical walls. The surface cleaning system has the advantage of providing efficient cleaning which can be performed semi-manned or fully automated. Here we considered semi-manned cleaning platform, where the directional control was established using a switch by a human operator to facilitate control over the machine from a distance

A. CLEANING:

Cleaning is the essential need of the current generation. Basically, on household floors, the floor has to be cleaned regularly. Different techniques are used to clean the different types of surfaces. The reasons for floor cleaning are

- Injuries due to slips on the floors are a cause of accidental injuries or death. Bad practice in floor cleaning is a major cause of accidents.
- To beautify the floor.
- Debris and obstructions are to be removed.
- Allergens and specks of dust are to be removed.
- Surface wears to be avoided.
- To make the environment sanitary (kitchens).

Traction should be maintained at the optimum level so that no slip will occur.

B. FLOOR CLEANING:

This process is still used in butchers, but it was common in bars in the past. In some places, tea leaves are also used to collect dirt from carpets and for an odor removing purposes. Different types of floor cleaning machines are available today such as floor buffers, automatic floor scrubbers, and extractors that can clean almost all types of hard floors or carpeted flooring surfaces in very less time than it would have taken using traditional cleaning methods. Again, the cleaning would be different for different floorings.

There are conventional floor cleaning machines available to perform floor cleaning operations in the above-said places. Generally, conventional floor cleaning machines require electrical energy for its operation.

A manually operated floor cleaning is developed with a major list of objectives;

1. To achieve simultaneous dry and wet cleaning in a single run.
2. To make the machine cost effective. Easy to operate.
3. Requires no training to operate/ fast.
4. Lower Maintenance Cost and Time.
5. Required less cleaning time.
6. High Cleaning Capability.
7. Clean more space in less time.
8. To reduce the maintenance cost of the manually operated floor cleaning machine as far as possible.

To overcome this problem, an alternative is made by using the consideration of assembly, weight, handling design machine is flexible. Provision is made for

- To reduce the human effort and cost.
- To make the environment sanitary.

II. Components Description

The main parts combining to form the overall structure are discussed below:

S. No	Name of the Component	Quantity
1	The Main Frame	10 Kgs
2	Wash Motor	1
3	Cooler Motor	1
4	Front and Rear Wheels	4
5	Shaft	2
6	Bearings	4
7	Belt	1
8	Switch Box	1
9	Mop	1
10	Forbes Vacuum Cleaner	1
11	Pulleys	2
12	Bolts and Nuts	15
13	Floor Wiper	1
14	Water Storage can	1
15	Pipe	1mt
16	Petcock	1
17	Sprinkler	1
18	Clamps	4
19	Wire	25mt
20	Miscellaneous: Cutting, Welding, Drilling, Grinding, Painting	

Table No: 1- Description of Components

Here some few important components are explained in detail below

2.1. The Main Frame:

The mainframe used is designed especially to serve its purpose of overall floor cleaning. The whole structure is made up of a heavy gauge square iron pipe having dimensions (1.5" * 1.5") so that it may handle and bear the load all the equipment that is to be fit on it to complete the whole structure. This had been cut and welded according to the design requirement

Fig No 2.1: The Main Frame

2.2. Wash Motor:

The Wash motor is generally used in washing machines. Here in this, the main purpose is to rotate the mob. This is a single-phase motor that requires power. It is also called a spin motor.

The motor that can operate on either AC or DC power. It is a commutated series-wound motor where the stator's field coils are connected in series with the rotor windings through a commutator. It is often referred to as an AC series motor. The universal motor is very similar to a DC series motor in construction but is modified slightly to allow the motor to operate properly on AC power. This type of electric motor can operate well on AC because the current in both the field coils and the armature (and the resultant magnetic fields) will alternate (reverse polarity) synchronously with the supply

The Specifications are
Voltage: 240V
Power: 125W
Frequency: 50Hz
Amps: 1.15A
Speed: 400RPM

Fig No 2.2: Wash Motor

2.3. Cooler Motor:

The Motor of **1** HP, 230 V, 2.5A, 1440 RPM Induction motor is used. It gives sufficient torque at 360 RPM which is required to rotate the bracket loaded by 5 kg. There is a torque requirement of 16 N-M to revolve the bracket without getting any load. This motor gives torque of 19 N-M at the speed of 360 RPM. This Motor is used to drive the wheels in the forward direction the motor shaft is connected with the pulley connected with V-Belt and it can be moved in a forward direction

AC motor is an electrical machine that utilizes electric power resulting in mechanical power output. Normally the motor output is a rotational motion of the shaft. The input may be a direct current supply or alternating supply. But in the case of AC motor direct current is used. The mechanism of ac motor is like a bar wound with wire is placed in between 2 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

Fig No 2.3: Cooler Motor

2.4. Belt drives and types of belt drives

The rotation motion is the ideal and simplest means of transmission of mechanical power with negligible losses. Rotational motion can be transmitted from one mechanical element to the other with the help of certain systems known as transmission systems or drives.

These systems are driven by a prime mover or transmit the rotational motion to the various parts of a machine within itself. Usually, shafts are employed to transmit rotational motion.

- The one that drives is called the driving system and The other which is driven is called driven system

Fig No 2.4: Belt with Pulleys

2.5. Belt Drives

Belt Drives are a type of frictional drives used for transmitting powers from one shaft to another utilizing pulleys which rotate at the same speed or the different speed.

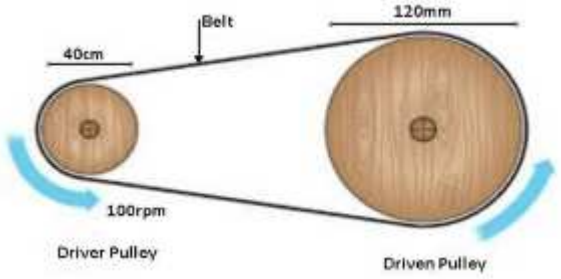

Fig No 2.5: Belt drive with Pulleys

A belt drive is shown in Fig. consists of two pulleys over which an endless belt it passed over them. The mechanical power or rotary motion is transmitted from the driving pulley to the driven pulley because of the frictional grip that exists between the belt and the pulley surface.

The portion of the belt which is having less tension is called the slack side and the one which has higher tension is called the tight side. The effective pulling power of the belt that causes the rotation of the driven pulley is the difference in tension on the slack and tight side.

The tensions in the tight and slack sides of the belt depend on the angle of contact, the belt drives have to be arranged such that the slack side comes above, and the tight side comes below the pulleys.

This arrangement increases the angled contact of the belt on the driven side. Sometimes in a belt-drive, there is always a possibility of some slipping taking place between the belt and the pulleys which cause the driven pulley to rotate at a lesser speed, consequently, reduces the power transmission. Hence belt drives are said to be not a Positive type of power transmission system.

2.6. MOP

A *mop* is a device used for cleaning floors, consisting of absorbent material, such as a sponge, fastened to a handle. A thick mass of hair is also called a *mop*. To *mop*, as a verb, means 'to clean or wipe with a mop,' or 'to clean as if with a mop,' even if you don't use one A mop (such as a floor mop) is a mass or bundle of coarse strings or yarn, etc., or a piece of cloth, sponge, or other absorbent material, attached to a pole or stick. It is used to soak up the liquid, for cleaning floors and other surfaces, to mop up dust, or for other cleaning purposes.

2.6.1. Dry mop, dust mop

A dry mop or dust mop is designed to pick up dry, loose contamination such as dust, earth, and sand from the surface of the floor. It consists of yarn and/or microfiber and is used as a first step in cleaning a floor.

2.6.2. Wet-mop, moist-mop

A wet mop or moist mop is, in professional cleaning, used as in the second step in the cleaning of a surface. The wet mop is swept over the surface to dissolve and absorb fat, mud and dried-in liquid contaminations. Professional wet mops consist of a flat sheet of microfiber textile or a sheet with a surface of looped yarn

Fig No 2.6: MOP

2.7. Vacuum Cleaner

A vacuum cleaner, also known as a sweeper or hover, is a device that uses an air pump (a centrifugal fan in all but some of the very oldest models), to create a partial vacuum to suck up dust and dirt from floors and other surfaces such as upholstery and draperies.

The dirt is collected by either a dust bag or a cyclone for later disposal. Vacuum cleaners, which are used in homes as well as in industry, exist in a variety of sizes and models

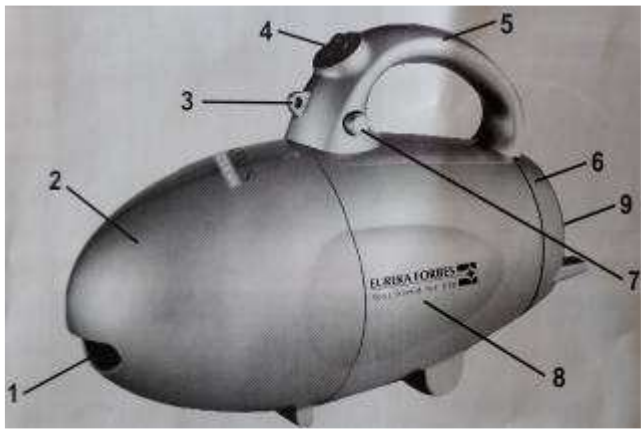

Fig No 2.7: Parts of Vacuum Cleaner

1. Suction end 2. Dust cup 3. Shoulder strap eye
4. On/Off Button 5. Handle 6. Rear filter Cover
7. Dust cup Release Button 8. Housing 9. Blower end

Fig No 2.7 (a): Vacuum Cleaner

2.8. Floor Wiper

The Classic floor wiper is the right choice for occasional thorough cleaning. The microfiber cover has excellent dirt and water absorption qualities. Also, the floor wiper is equipped with cloth clips, which enable the wiper cover to be replaced with disposable or reusable

Fig No 2.8: Floor Wiper

2.9. Water Storage can

Water storage can is used to store water here there will be a pipe connection for can and mob

Fig No 2.9: Water storage can

2.10. Water Pipe:

A water pipe is a hose used to bring water from one point in a vehicle to another or from a storage tank to a vehicle. It is commonly made of reinforced rubber to prevent splitting and kinking

Fig No 2.10: Water Pipe

2.11. Petcock

A petcock is a small shut-off valve used to control the flow of liquid or gas. Historically, petcocks were threaded valves controlled by a butterfly handle

Fig No 2.11: Petcock

2.12. Sprinkler

A Plastic PVC Pipe has used for sprinkling water in a series to clean the mob with water

Fig No 2.12: Sprinkler

2.13. Clamp

The clamps are used for supporting the wheel and here we can adjust the height with the help of clamp we have used four clamps for four wheels for the clamp we arranged shaft and bearing for freely moving of wheel

Fig No 2.13: Clamp

III. CONSTRUCTION AND WORKING PRINCIPLE

3.0. Chassis Construction

Iron is selected for the metallic base since it has heavyweight. The thickness of the chassis is 1mm. The dimensions were decided according to the design requirements considering the complexity of construction and overall weight of the setup. The steps carried out are explained as follows. Two 100mm diameter tiers are fixed in symmetry to balance the center of gravity of the chaise Provision for roller wiper was made by making holes. The thin flat wipers that are 'v' shaped were screwed to the chassis to adjust the height. The roller wiper is placed at the back inside the chassis. The two thin flat wipers are attached to the middle portion of the chassis. These two wipers are attached in a 'v' shape, inclined to each other. The v shape ensures that the dust is transferred to the same spot after cleaning, making the duct collection part for floor cleaning very easy. The wiper at the front that wets touches the ground lightly to apply water. These vipers are provided with a screw attachment such that it allows an advantage of adjusting the height as per the surface unevenness. This cleans the dust along the path that the vehicle moves

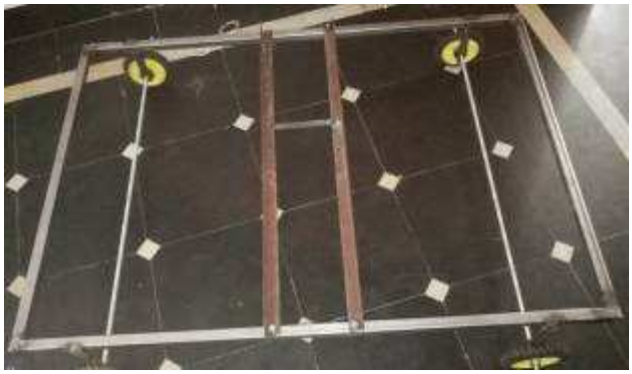

Fig No 3.0: chassis construction

3.1. CLEANING FLOOR

Cleaning is the essential need of the current generation. Basically, on household floors, the floor has to be cleaned regularly. Different techniques are used to clean the different types of surfaces. The reasons for floor cleaning are

1. Injuries due to slips on the floors are the cause of accidental injuries or death. Bad practice in-floor cleaning is a major cause of accidents.
2. To beautify the floor.
3. Debris and obstructions are to be removed.
4. Allergens and bags of dust are to be removed.
5. Surface wear to be avoided.
6. To make the environment sanitary (kitchens).
7. Traction should be maintained at an optimum level so that no slip will occur.

Floor cleaning is achieved by different techniques which might be of different kinds. Different types of floor need a different type of treatment. The floor should be totally dry after the cleaning process. Otherwise, it may result in a hazard. On some floors, sawdust is used to absorb all kinds of liquids. This ensures that there will no need of preventing them from a spill of. The sawdust has to be swept and replaced every day. This process is still used in butchers, but it was common in bars in the past. In some places' tea leaves are also used to collect dirt from carpets and also for an odor removing purposes. Different types of floor cleaning machines are available today such as floor buffers, automatic floor scrubbers, and extractors that can clean almost all types of hard floors or carpeted flooring surfaces in very less time than it would have taken using traditional cleaning methods. Again, the cleaning would be different for different floorings.

3.2. MOTOR-WHEEL SYSTEM

The complete product is a four-wheel-drive automation process. 4 wheels are independently connected to 1 different 12v AC motor.

The purpose of the wheels is

1. To give the bot proper motion.
2. Provide traction on all sorts of surfaces.
3. Make the movement easier in all direction
4. Not to slip off from its path.

The axis of the motor is bolted to the axis of the wheel. The motor-wheel arrangement is fixed to the chassis using clamps the movement of the system can be achieved by giving power to the required motor. The speed of the wheels is constant to a certain speed with a belt drive mechanism the diameter of the wheel is 10cm. The proper amount of rib for traction and movement on a wet floor surface.

Fig No 3.2: motor-wheel system

3.3. REAR WHEELS

Rear wheels are connected to the rear axle. The rear-wheel-drive is used to drive with the help of a belt drive.

A vacuum cleaner, also known as a sweeper, is a device that uses an air pump (a centrifugal fan in all but some of the very oldest models), to create a partial vacuum to suck up dust and dirt, usually from floors, and from other surfaces such as upholstery and draperies. The vacuum cleaner evolved from the carpet sweeper via manual vacuum cleaners. It can be simple tools such as floor mops and floor brushes, or in a form of walk-behind or ride-on machines to clean larger floor areas by injecting water with cleaning solution off the floor. With the advancement in robotics, autonomous are available as well. These are cleaning machines that can be doing single work at a time but this multipurpose floor cleaning machine doing many works at a single time.

Various ways to control the speed of AC and DC motors like hysteresis control and other control scheme are used. But following configuration is simple, low cost, noise-free and having least component of the system; make configuration is suitable for the water pumping system

3.4. WORKING PRINCIPLE

The main aim is to reduce the human effort while cleaning

1. We have a vacuum for dust collecting small particles
2. Then a water supply form tank with control flow to have wet surface cleaning
3. The mob with be operated for dry and wet surface cleaning
4. Wiper will move remaining water to the end
5. The all above operations are performed while running the chassis of the construction

3.5. VACUUM DUST COLLECTING CUP:

It is mechanical machinery that creates negative pressure which helps in sucking air. Vacuum pump exchanges the mechanical input power rotating shaft into pneumatic or hydraulic power by evacuating the air or liquid contained in a system. The pressure levels thus become lower than the outside atmospheric pressure. The amount of power produced solely depends on the volume of air evacuated and the pressure difference is produced. In mechanical vacuum pumps, the mechanism is so designed that air or liquid is sucked from the closed area and being thrown to the atmosphere. The major specialty of vacuum pumps is that the pressure here is below atmospheric pressure. The low pressure is achieved by moving a cycle of blades by a motor.

The motion of air through the pump will be like the diagram shown.

3.5.1. Specifications

Physical Specification
Dimensions mm (W x D x H)
300 x125 x 170 mm
Weight
2.20 kgs
Dust Capacity
0.5 Litres

3.5.2. Features

Powerful suction and blower function with an 800-watt motor. Wide range of 7 accessories to suit varied cleaning needs Lightweight, handy and portable with shoulder strap for easy usage and dust cup for easy dust disposal.

5-meter-long power cord for feasible round and home cleaning.
Power: 800 watts
Suction power: 1600mm of the water column

3.6. VACUUM DUST COLLECTING CUP:

The dust collector is used to collecting the dust. It is made upon the plastics. Different types of dust collectors using domestic purpose till now and this one of the types of dust collectors. A dust collector is a system used to enhance the quality of air released from industrial and commercial processes by collecting dust and other impurities from air or gas. It is distinguished from air cleaners, which use disposable filters to remove dust.

Fig No 3.6: vacuum dust collecting cup

3.7. ADVANCED VEHICLES:

A street sweeper or street cleaner may refer to a person's occupation or a machine that cleans streets. A street sweeper cleans the streets, usually in an urban area.

Street sweepers have been employed in cities since sanitation and waste removal became a priority. A Street-sweeping person would use a broom and shovel to clean off litter, animal waste, and filth that accumulated on streets. Later, water hoses were used to wash the streets.

Fig No 3.7: M60 Vehicle

3.7.1. Manual sweeping

The need for rubbish to be removed from roads in built-up areas has existed for centuries.

Sometimes a local law in a town or city ordered the owner or occupier of each address to clean the length of that road that passed his address.

Sometimes when much traffic was horse-drawn vehicles or ridden horses, there were street cleaners who selectively removed horse droppings because of their value as fertilizer on nearby rural areas.

Sweeper manufacturers in Asia have also developed less sophisticated mechanical and regenerative air sweepers which differ in design to the American and European sweepers. China and Taiwan have both adapted the mechanical sweeper design of using two main brooms mounted vertically at the back of the hopper to carry debris into the hopper. This design is less complicated and more cost-effective than the mechanical belt and broom setup.

3.7.2. Mechanical sweeper

The first industrial city Manchester had one of the largest textile industries of that time. As a result, the robust metropolis was said to be England's unhealthiest place to live In response to this unsanitary environment, Joseph Whitworth invented the mechanical street sweeper. The street sweeper was designed with the primary objective to remove rubbish from streets to maintain aesthetic goals and Safety

Fig No 3.7.2: Handling and Storage Cleaning machine

3.7.3. Reasons for cleaning floors

The The principal reasons for floor cleaning are:

1. 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.
2. To beautify the floor.
3. To remove stains, dirt, litter, and obstructions.
4. To remove grit and sand which scratch and wear down the surface.
5. To remove allergens, in particular, dust.
6. To prevent wear to the surface (e.g. by using a floor wax or protective sealant).
7. To make the environment sanitary (e.g. in kitchens).
8. To maintain optimum traction (e.g. for dance floors).

3.7.4. Methods of Floor Cleaning

The treatment needed for different types of floors is very different.

Slipping is a common safety hazard for cleaning methods that involve water or other liquids, especially if the floor is left wet.

Sawdust is used on some floors to absorb any liquids that fall rather than trying to prevent them from being spilled. The sawdust is swept up and replaced each day. This was common in the past in pubs and is still used in some butchers and fishmongers.

It used to be common to use tea leaves to collect dirt from carpets and remove odors.

There are also a wide variety of floor cleaning machines available today such as floor buffers, automatic floor scrubbers and sweepers, and carpet extractors that can deep clean almost any type of hard floor or carpeted flooring surface in much less time than it would take using a traditional cleaning method.

Fig No 4.7.4: Heavy Cleaning machine

3.7.5. Wood flooring

1. Different types of wood flooring may require completely different care depending on whether they are waxed, oiled or have a polyurethane coating. It is important to determine the type of finish of a wood floor and always treat it in the proper manner, for instance, it is difficult to clear wood floor wax from a floor coated with polyurethane. Simple cleaning instructions:
2. 1. Clear the floor of any furniture that is easy to move.
3. 2. Sweep or vacuum all loose dirt and debris.
4. 3. Mop the floor, going along with the grain. For a polyurethane-coated floor, dampen a mop with water and a few drops of dishwashing liquid. Be sure to ring out the mop thoroughly before using it on the floor. Run the mop back and forth, going with the grain of the wood in smooth strokes. Do not use water for lacquered or shellacked floors, as it can stain the wood and cause buckling.
5. Buff the floor with a soft cloth to remove any soapy residue. Cloth diapers work well for buffing since they are very soft and absorbent.

3.7.6. Tile and stone

Tile and stone flooring is common in kitchens, stairs, and bathrooms. Its cleaning process can be divided into three steps:

1. Dirt or dust should first be removed with a vacuum cleaner or a broom.
2. Have a floor cleaning solution or spray bottle for the appropriate floor. If you are cleaning stone floors (marble, granite, travertine, etc.), make sure the cleaning agent states that it is for stones. An acidic tile cleaning solution can be used on ceramic and porcelain floors
3. After spraying the tile or stone floors in a small area, use a mop to clean and scrub floors. Then wipe it with a dry cloth.

3.7.7. Vinyl composite *tile*

Vinyl composite tile or VCT is a common commercial floor type. Cleaning this type of floor is done with either a mop or bucket or with a floor scrubber. VCT requires a polymer coating or floor finish to protect it. This needs to be kept clean with dust mopping and wet cleaning (i.e. wet mopping or floor scrubber).

Fig No 3.7.7: Three Wheel Vehicle

3.7.8. Reducing the need for cleaning

A well-maintained entrance matting can dramatically reduce the need for cleaning. For public and office buildings, about 80 to 90% of the dirt is tracked in from outside. Installing a total of 15 feet of matting consisting of both indoor and outdoor sections will remove about 80% of this. Thus about two-thirds of the dirt can be removed at the entrance.

3.7.9. RIDER 1201 VEHICLE:

The Rider 1201 ride-on sweeper is a combination of technology and ideas which enables all operators to keep large industrial and commercial areas perfectly clean, working in total comfort, quickly and at low cost.

Machines were created in the 19th century to do the job more efficiently. Today, modern street sweepers are mounted on truck bodies and can vacuum debris that accumulates in the streets.

Fig No 3.7.9: Three Wheel Vehicle

3.8. Supporting the Vacuum Cleaner

We arranged vacuum cleaner so it can fix rigidly in the space provided for the frame

Fig No 3.8: Supporting the Vacuum Cleaner

3.9. Way to Vacuum Cleaner Pipe

Through the hole provided the vacuum cleaner pipe is inserted at the front of the frame which can suck the small dust particles. Here we can change the suction end with various accessories which was given in the kit based on our requirement

Fig No 3.9: Way to Vacuum Cleaner Pipe

3.10. Blower End:

To use the blowing function, first remove the rear filter cover and replace it with the blower adapter (As per fig i- a & b)

- Insert the flexible hose into the blower adapter and attach the desired accessory
- Press the ON / OFF button to switch the appliance ON. (As per fig ii- a & b)
- The shoulder strap can be used when using either the cleaning or blowing function (As per fig iii)

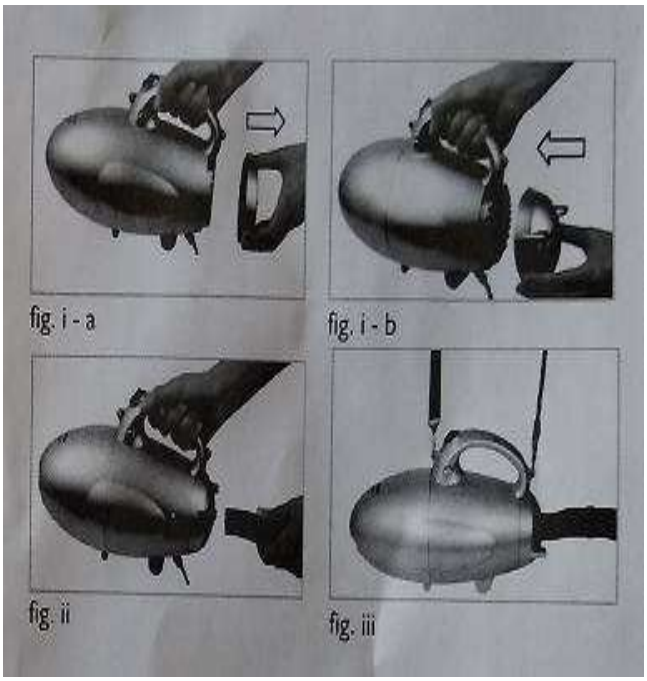

Fig No 3.10: Blower End

3.11. Accessories for daily cleaning

1. Flexible Hose: Gives you the flexibility to reach hard to clean areas
2. Multipurpose brush: for cleaning corners, crevices, tabletops, and window grills.
3. Accessory adapter / Nozzle: helps you connect other accessories to your easy clean plus and can be used to pick up dust directly as well.
4. Upholstery Brush / Nozzle: For cleaning sofas, mattresses, pillows, cushions, and curtains.
5. Floor and Carpet Brush: For cleaning hard floor surfaces as wells as tough to clean carpets with the same efficiency.
6. Shoulder Strap: Gives you flexibility in cleaning without holding the vacuum cleaner in your hand ;
7. Blower Adapter: Helps you to use blower end
8. Be sure the power switch is in the position off before adding or removing attachments. Accessories can be attached by the siphon and extension tube..

Fig No 3.11: Accessories for daily cleaning

Fig No 4.11 (a): Applications of daily cleaning

IV. CALCULATIONS

4.0. Design of Frame

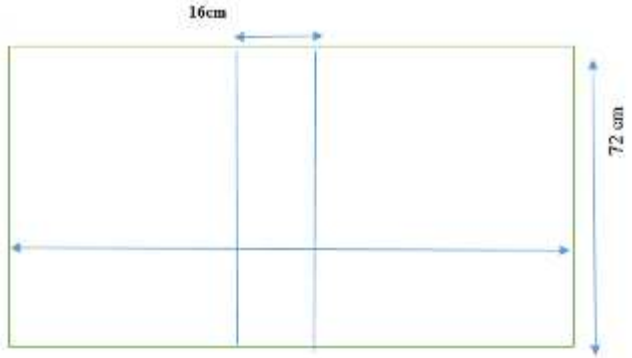

Fig No 4.0: Design of Frame

4.1. Calculation

To calculate the force of a suction cup,
F=P.A
Where F = force, A = area, P= pressure.
Calculation of the speed of the model:
The rpm of the motor taken into consideration: 40 rpm
The diameter of the tire: 100 mm
The distance covered in one minute is 25132.8 mm or 25 m
The weight of the entire set up = 2.1 kg
Height of the frame from the base = 17 cm

4.2. DESIGN CALCULATIONS

4.2.1. Torque requirement and selection of motor

Coefficient of friction in between sponge/ brush and floor = 0.8
Load on the bracket =5 kg
The diameter of bracket=40 cm.
Torque required= F x R = (0.8 x 5 x 9.81) x 0.4 = 16.87 N –M
Formula P= 2πNT / 60
Where, P= Power
N= Speed in RPM
T = Torque 1 hp motor torque = 4.94 N-M at 1440 RPM.
Then at 360 RPM Torque will be19.78 N-M.
Hence, here 1 hp motor at 360 RPM can be used.

4.2.2. Selection of Belt

Smaller pulley =2" =5.08 cm
Bigger pulley = 8" = 20.32 cm
Center distance (C) = 28 cm
Formula for length of belt = $2C + \pi (D+d)/2 + ((D-d) *(D-d)) / 4C$
Where, D= Diameter of bigger pulley d= Diameter of smaller pulley Hence,
Length of belt is = 97.97 cm.
Referring to the table no.13.24 from the book 'Design of Machine Elements' by V. B. Bhandari, we select belt A-39. (Width=13 mm, Thickness = 8 mm)

4.2.3. Merits

This makes possible to get more done in the same or even less time than a walk-behind a machine. Employee productivity is also improved and production cost is low. since the operator rides instead of working, fatigue is reduced meaning they are physically able to maintain a more productive rate of work after they have finished cleaning the floor. Generating savings in labor costs. Since they are mechanically propelled, navigating is easier when riding.

4.2.4. Applications

The floor cleaning machine is widely used in the following places:-Hospitals, colleges, Industrial floors, Airports, Offices, Hotels, Commercial Complexes, Dairies, Laboratories, Canteen, Health centers

4.2.5. The Entire setup of the floor cleaning machine

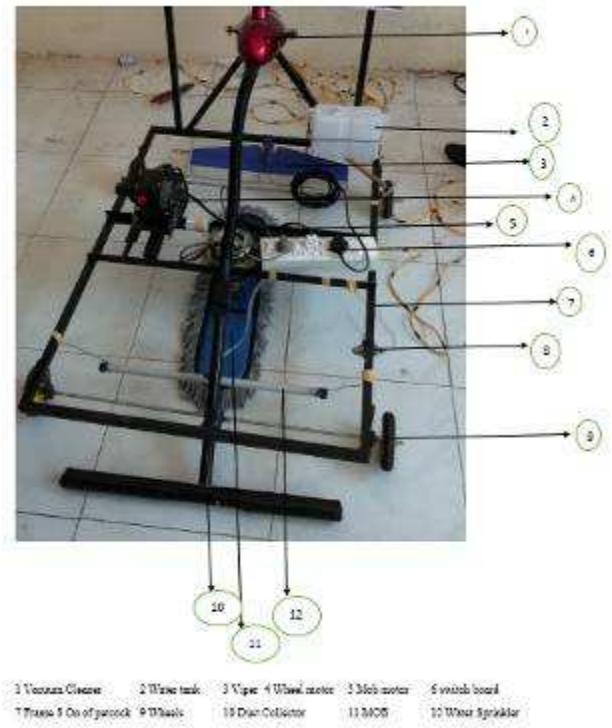

Fig No 4.2.5: The Entire setup of the floor cleaning machine

V. CONCLUSION

An automatic floor cleaner is a system that enables cleaning of the floor by the help of a highly stabilized and rapidly functionalized electronic and mechanical control system. This can have five operations they are suction of dust with a vacuum cleaner, wet cleaning, dry cleaning, wiping the water, moving the vehicle at a single time. The two directions of the wheels are forward and backward

5.1. Feature Scope

By changing the wheels we can move in any direction we can also move by using voice command by writing a program. The mob can be changed according to our requirements. By changing the design we can also clean the corners easily

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