

DESIGN AND FABRICATION OF FLOOR CLEANING MACHINE -A REVIEW

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ABSTRACT

This project deals with the design of new products. In recent years, floor cleaning and fabrication of manually operated floor cleaning machine. The conventional floor cleaning and machines is most widely used in airport platforms, railway platforms, hospitals, bus stands, malls and in many other commercial places. These devices need an electrical energy for its operation not user friendly. In India, especially in summer, there is power crisis and most of the floor cleaning machine is not used effectively due to this problem, particularly in bus stands. Hence it is a need to develop low cost, user friendly floor cleaning machine. In this project, an effort has been made to develop a manually operated floor cleaning machine so that it can be an alternative for conventional floor cleaning analysis of the floor cleaning machine was done using suitable commercially available software. The conventionally used materials were, considered for the components of floor cleaning machine.

KEYWORDS: Floor cleaning machine, Design and Fabrication, Analysis.

INTRODUCTION

Effective cleaning and sanitizing helps and protect the health of the human beings directly and indirectly. Also, cleaning and sanitizing prevents the pest infestations by reducing residues that can attract and support bees, pests etc. It also improves the self life of the floor, walls etc due to regular cleaning and maintenance. In recent years, most of the people prefer to use trains or buses for commuting and hence these places are littered with biscuits covers, cold drink bottles etc. Hence, it is necessary to clean the bus stands and railway stations at regular interval.

There is no one single cleaning method that is suitable cleaning technique and also the equipment should be user friendly. Cleaning work can be physically demanding and a need has been identified to developed methods for systematic ergonomics evaluation robots are getting more popular for busy and aging populations due to lack of workers. However in India, unemployment is more and hence there is a need to develop less labour oriented cleaning machine. Hence, the present work is aimed to design , development and evaluation of a manually operated floor cleaning machine.

In recent years, conventional floor cleaning machines are most widely used in airports , railway stations, malls, hospitals and in many commercial places, as cleaning is one of the important parameter for the sanitation and government regulations . For maintaining such places, cleaning the floor is the major task

which is necessary. There are conventional floor cleaning machines available to perform floor cleaning operations in above said places. Generally a conventional floor cleaning machines requires electrical energy for its operation. In India, especially in summer there is power crisis, in majority of places. Hence cleaning the floor using the conventional floor cleaning machines is difficult without electricity. In this project an effort has been made to develop a manually operated floor cleaning machine so that it can be an alternative for conventional floor cleaning machines during power crisis.

A manually operated floor cleaning is developed with 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. No external power requires.
5. Lower Maintenance Cost and Time.
6. Required less cleaning time.
7. High Cleaning Capability.
8. Clean more space in less time.
9. To reduce the maintenance cost of the manually operated floor cleaning machine as far as possible.

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

(1).THE MAIN FRAME

The main frame used is designed especially to serve its purpose of overall floor cleaning. The whole structure is made up of heavy gauge square iron pipe having dimensions (1.5" * 1.5") so that it may handle and bear the load all the equipment that are to be fit on it to complete the whole structure.

(2).REAR WHEELS

Rear wheels are connected to rear axle. The rear wheel drive is used to drive the cotton with the help of chain drive. The rear wheel having a big chain sprocket.

(3).SPROCKET

Chain Drive is relatively easy to install. Assembly tolerances are not as restrictive as those for gear drives. Chain drives are a better choice for less experienced builders working with a minimum of machine tools. Sprockets are used in bicycles, motorcycles, cars, tracked vehicles, and other machinery either to transmit rotary motion between two shafts where gears are unsuitable or to impart linear motion to a track, tape etc. Early automobiles were also largely driven by sprocket and chain mechanism, a practice largely copied from bicycles.

We use sprocket chain mechanism because of following some advantages;

1. Chain drive has maximum efficiency it is positive drive.
2. Chain drive can be readily redesigned and reconfigured in comparison to gear drive system.

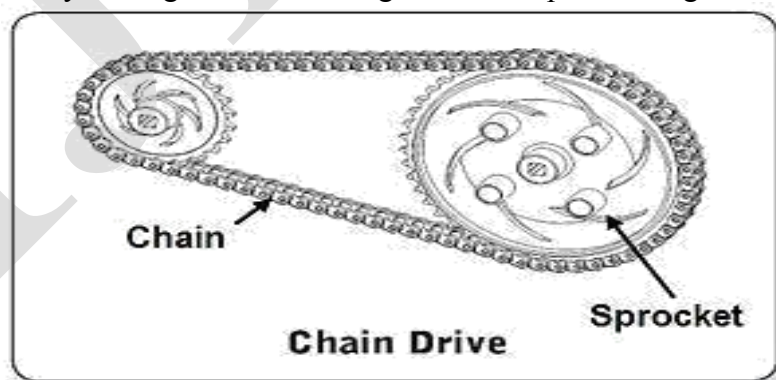


Fig: Sprocket Chain Drive.

3. Chains perform better than gears under shock loading conditions.
4. Chain drives spread operating loads over many teeth whereas the operating loads acting on gear drives are concentrated on one or two teeth.

4. Chain drives do not require tension on the slack side (Belt drives do) thus bearing loading is reduced.
5. Chain drives require less space for a given loading and speed condition than pulleys and belts.
6. Chain drives systems are (usually) less costly to build and maintain than an equivalent gear drive.

(4).PVC PIPE ROLLER

In this project we use the rollers made from PVC Pipe Roller. The main purpose of roller is that to guide or circulate the cleaning cloth. In this project seven rollers are used of having diameter 45mm and length 1.5 feet. Cost of each roller is 200 rupees.



Fig: PVC Pipe Roller

(5).COTTON

we can use this cleaning cotton cloth for cleaning flat surfaces. This cotton cloth wound around the Rollers mechanism. The material for cotton is absorbing type used.

WORKING METHODOLOGY

Cleaning machine is very much useful in cleaning floors and outside ground in hospitals, houses, auditorium, shops, bus stands and public places etc. Many of floor cleaning machines are available but we developed machine is a 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 cost is also very less. Maintenance cost is less.

In our project we have made the machine to operate in a fully mechanical way. The floor cleaner is very simple in a construction and very easy to operate, anyone can operate it. Without any prior training of any sorts with safety.

Machine consist of rollers ,water tank, sprocket & chain mechanism, collector brush assembly, drive wheel, and cotton etc. cotton is wound around supporting roller and main rollers. but main roller is placed in water tank so that wetted cotton is transfer forward for cleaning. Cotton is rotate due to use of chain drive. and for chain drive gives the drive from wheel. two small rollers is mounted on surface. The compression rollers are used for removing the excess water. In front of machine the collector is placed for collecting the dirt, dust particle before the cleaning of surface. When we are push the machine forward direction cotton will be rotate around the rollers which will clean the surface. This cycle of rotation of cotton will repeated.

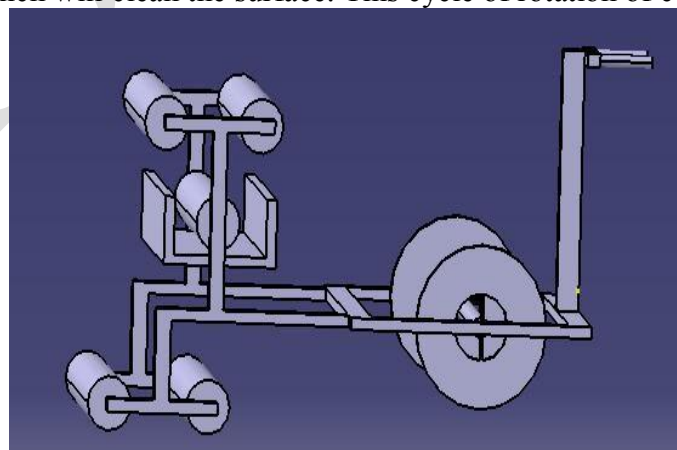


Fig: Floor cleaning machine

APPLICATIONS

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

FUTURE SCOPE

Floor washing machine ideal for small & medium size Super- markets. Floor washing machine ideal for hospitals because of the low noise level. Essential tool for maintaining high level of hygiene for Hotel - kitchens and restaurants Safety feature includes pedal to secure the handle intact. Floor Washing's easy maneuverability and easy to reach beneath the furniture. No tools required to change brushes.

CONCLUSION

Manually operated floor cleaning machine is an alternative for an automated floor cleaning machine during power crisis. The equipment purposely design for cleaning floors, but can only be use in outdoors with large ground like the hospitals, bus stands, railway stations etc. The equipment will result more beneficial when it is compared to other existing floor cleaning machines. Our project is based on very simple chain drive mechanisms which can be easily operated by any person. Any fault in machine can be easily identified and can be corrected on the spot.

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