

3 BLOCK AUTOMATIC FOOTWEAR CLEANER

¹Atul Shriwaskar, ²Amit Ghade, ³Chetan Samarth, ⁴Prashant Malve ⁵Ms. J.A. Gotmare
Lecturers , Mechanical Engineering department, Shri Datta Meghe Polytechnic, Nagpur, India

ABSTRACT: - “3 block footwear sole cleaner” as the name suggest about the cleaning the footwear automatically. as we see in the day to day life in every commercial sector or even in schools, colleges, etc. large number of workers, labor required to clean the dirt and dust of manually. So, in order to reduce this labour cost with standardization we are developing the concept of winning the footwear automatically. In this model we have carried out the arrangement in three different blocks over which the man can walk step by step and arrangement inside blocks is made such that it will lead to clean the footwear the three blocks consists of

1. sensing and suction fan arrangement.
2. water sprinklers through the nozzles else on the layers of footwear using the pump.
3. hot blower arrangement with the electric heater

the overall effect of 3 blocks help to clean the dust and dirt of footwear.

IndexTerms – Design and standardization of Components.

INTRODUCTION

IN DAY TO DAY LIFE THERE ARE A LARGE NUMBER OF LABOURS CLEANING DIRT AND DUST OF SURFACES IN VARIOUS COMMERCIAL SECTOR SCHOOL, COLLEGES, HOSPITAL ETC. MANUALLY, SO HOW WE CAN REDUCE THE MANUAL WORKING OF LABOURS AND BRING THE WORK IN AUTOMATED WE DEVELOPED THE CONCEPT WHICH RESULT IN AUTOMATIC CLEANING OF FOOTWEAR SOLE WHOSE ARRANGEMENT IS CARRIED OUT CARRIED IN 3 BLOCKS. THE CONCEPT FOCUSES, ON THE REDUCING DAY BECAUSE AS WELL AS THE CLEANING FOOTWEAR AND ALSO BY REDUCING. THE WORK IT MAINTAIN THE STANDARD IN EVERY SECTOR.

“3 block automatic footwear sole cleaner”. As the name suggests project focuses on the cleaning the footwear in automated way. As we see Most of Industries, hospitals and Educational Institutes having the most preserve Laboratories like pharmaceuticals Industries etc. have to be free from the dust and dirt . which would be carried through the shoes of the employee to the work area, causing the untidy environment and also sometimes hazardous to the working environment.

METHODOLOGY

The experimental set of “3 block Footwear sole cleaner” consist of 3 blocks out of which the first block consist of three brushes and a suction fan between which logic is used to operate it with sensing circuit followed by sensors . The motor is used to rotate brush which is connected on motor shaft.

The whole setup is carried by common supply which are further divided in 3 blocks block. The pump and water tub is used in second block where water concept is used with nozzles. The hot blowers in the third block is attached at the two corner in such a way that it will work effectively.

The first block is fabricated into rectangular shape having length and dimensions “2 f*1.8f * 8”. In this we use Iron frame joined different links with one another . The three DC motors are used which are fixed on L- clamp with nuts and bolts . The three DC motors are on one side inside the block. The DC motors are 2 inch apart from each others. The suction fan are attached downward held on two wodden plates placed below the motors shafts and connected to iron frame outer cover.

The same frame of iron of same dimension are also fabricated in second block. In which a tub is used to collect water. A wooden plate is attached at the top on which grass mat is used. The pump at bottom is put in tub to carry water through nozzles on grass mat. The iron frame and block is put in tub. The overall arrangement consist the fabrication of second block.

The fabrication of third block is simple in which the inclined pipe tube as a fin is assemble on wooden plate fixed to iron frame. The pipe is of 2 inch diameter at bottom or inside the two blowers are fixed on iron frame with nuts and bolts. The wooden plate is drilled to 2 mm into number of holes through which hot air will come out. This completes the fabrication of third block.

Starting with the first block. The Assembly of the first block is as follows. The outer frame made of iron is acting as casing and the components are mounted inside the casing. The motor are firstly assembled on L- clamp fixed with nuts and bolts. On the motor shaft the brushes are mounted which rotates with motor shaft. At the bottom the suction fan is assembled downwards attached on two wooden plates to create vacuum attached to outer wooden casing. In second block the overall arrangement is kept and assembled in water tub having dimensions "2 feet × 1.22 feet × 6.6 inch" . The pump is placed in the tub which supplies water through pipes to the nozzles. The nozzle in the form of fine tubes is attached in pipes. A grass mat is placed between the pipes so that water from nozzle can flow through it. The third block assembly consist of hot blower and iron frame in which the wooden plate is fixed above the iron frame and the blower at bottom is fixed with fine steel wire. The lowest position is made such that it blow air to top through holes. The half cut pipe of 2 inch is assembled at wooden plate which helps to blow hot air on foot sole. In this way assembly of all three blocks are made.

LITRATURE SURVEY

Abstract

(1) In this work, it is proposed to design a shoe sole cleaning machine, incorporating shoe polishing facility with this machine. As all the employees, faculty etc required to wear clean shoes before entering their laboratories, as these laboratories have highly précised instruments, sensors etc and the air inside should be very clean.

Thus shoe sole cleaner with shoe polishing machine is designed, considering all the parameters with respect to customer need in terms portability and also economically available to them, thus providing not only clean environment but also provide the style quotient to the person with polishing effect .

(2) In this work, it is proposed to design a shoe sole cleaning machine, incorporating shoe polishing facility with this machine. As all the employees, faculty etc required to wear clean shoes before entering their laboratories, as these laboratories have highly précised instruments, sensors etc and the air inside should be very clean.

Thus shoe sole cleaner with shoe polishing machine is designed, considering all the parameters with respect to customer need in terms portability and also economically available to them, thus providing not only clean environment but also provide the style quotient to the person with polishing effect.

(3) In this work, it is proposed to design a shoe sole cleaning machine for automobile. As all the persons get into their cars with their dirty shoes which generally makes the car floor carpet dirty as these carpets are also expensive. Thus shoe sole cleaner machine is designed, considering all the parameters with respect to customer need in terms portability and also economically available to them, thus providing not only clean environment but also provide the style quotient to the person.

(4) Cleaning is a basic service occupation conducted by many worldwide researchers, manufacturers. Designers should work with user groups to improve equipment to ensure good musculo skeletal health, working posture and technique. Cleaning managers, trainers and purchasers should be aware of ergonomic guidelines for equipment selection for safe use at work. Today, great deal of research and effort to unravel the mystery surrounding the subject of deodorizing has been expended, and this model proposes to serve as an overview for professional cleaning and restoration technicians who desire more precise knowledge in this highly specialized field. Feet dust removal and deodorizing machine is developed which follows the engineering rules in designing and provides an insight to the cleaning equipments that are existing. The roller shafts mounted on the primary shaft rotates and the rest is driven through chain drive mechanism. A vacuum pump sucks out all the filth air and a blower blows a stream of fresh air along with the deodorizer. Microcontroller 8051 controls the timing and the relay of process. It is simple and compact in ergonomics which makes it all the more easily to operate and maintain technically. This project also aims at creating a clean and hygienic environment and thus avoids health in equalities. and safety concerns with regards to workers as well as common people.

OBJECTIVE

1. To study and describe importance of footwear sole cleaning
2. To bring a defined and applicable concept in engineering
3. To study of comparison between manual and automatic functioning in cleaning the dirt and dust
4. To keep standard in every commercial as well as industrial sectors

5.To keep the surrounding hygienic which is necessity in food processing industry

DESIGN PROCEDURE

A. Block no. 1-It consists of sensing circuit and suction arrangement . As the person put his/ her first step in the first block, the sensor comes into action and sensors that person put his first step. after the sensor comes into action it actuates the suction fan and sucks the dirt and dust from the footwear. the brushers arrangement is also provided for cleaning the footwear .the brusher are attached to a shaft of 10 RPM motor .the motor terminal are connected directly to the sensing circuit so that the motor comes only in action when the person put his her step on the block.

B. Block number 2- carry the arrangement in such a way that it leads to clean the footwear with help of water. In this arrangement we use pipe of different cross-section jointed together with T- joint. The water which is to be sprinkled on the footwear will flow through this pipe followed with the pump. the submersible pump is used to carry the water at high pressure from Below Reservoir and send it to the small opening nozzle sprinkler which will Sprinkle the water into the footwear with medium pressure which is sufficient to remove dust and dirt .The nozzle sprinkle are attached to the bent tube. This bent tube which carry water at high pressure from pipe to nozzle sprinkle.

C. Block no. 3-it consists of arrangement. The block is designed in such a way that it will soak the water by blowing hot air on the footwear as well as cleaning it. The system consists of an electric heater along with fan set in upward direction. The block is been converted into incline shape from upward so that the air from the fan after resistance and through fins of sheet metal it will directly allow to struck on footwear. The electric heater is same as that of the hair dryer.

3.3 FABRICATION

Fabrication

The experimental set of “3 block Footwear sole cleaner” consist of 3 blocks out of which the first block consist of three brushers and a suction fan between which logic is used to operate it with sensing circuit followed by sensors . The motor is used to rotate brush which is connected on motor shaft.

The whole setup is carried by common supply which are further divided in 3 blocks block. The pump and water tub is used in second block where water concept is used with nozzles. The hot blowers in the third block is attached at the two corner in such a way that it will work effectively.

Description of assembly /fabrication of all three block s

The assembly of three blocks are as follows :

Fabrication of first block :

In this we use Iron frame joined different links with one another . The three DC motors are used which are fixed on L-clamp with nuts and bolts . The three DC motors are on one side inside the block. The DC motors are 2 inch apart from each others. The suction fan are attached do The first block is fabricated into rectangular shape having length and dimensions “2 f*wnward held on two wudden plates placed below the motors shafts and connected to iron frame outer cover.





Fabrication of second block:

The same frame of iron of same dimension are also fabricated in second block. In which a tub is used to collect water. A wooden plate is attached at the top on which grass mat is used. The pump at bottom is put in tub to carry water through nozzles on grass mat. The iron frame and block is put in tub. The overall arrangement consist the fabrication of second block.



Fabrication of third block:

The fabrication of third block is simple in which the inclined pipe tube as a fin is assemble on wooden plate fixed to iron frame. The pipe is of 2 inch diameter at bottom or inside the two blowers are fixed on iron frame with nuts and bolts. The wooden plate is drilled to 2 mm into number of holes through which hot air will come out.

This completes the fabrication of block.





ASSEMBLY AND WORKING

Starting with the first block. The Assembly of the first block is as follows. The outer frame made of iron is acting as casing and the components are mounted inside the casing. The motor are firstly assembled on L- clamp fixed with nuts and bolts. On the motor shaft the brushes are mounted which rotates with motor shaft. At the bottom the suction fan is assembled downwards attached on two wooden plates to create vacuum attached to outer wooden casing. In second block the overall arrangement is kept and assembled in water tub having dimensions "2 feet \times 1.22 feet \times 6.6 inch". The pump is placed in the tub which supplies water through pipes to the nozzles. The nozzle in the form of fine tubes is attached in pipes. A grass mat is placed between the pipes so that water from nozzle can flow through it. The third block assembly consist of hot blower and iron frame in which the wooden plate is fixed above the iron frame and the blower at bottom is fixed with fine steel wire. The lowest position is made such that it blow air to top through holes. The half cut pipe of 2 inch is assembled at wooden plate which helps to blow hot air on foot sole. In this way assembly of all three blocks are made

COSTING

Costing

Components	Actual costing
• Brushers(3)	45/- each
• Motor (6)	275 /- each
• Suction fan	960/-
• Cooler tub	465/-
• Pump	400/-
• Two hot blowers	410 /- each
• Welding charges	900/-
• Carpenter charges	600/-
• Wooden sheet	510/-
• Wooden support	350

• L – clamp	13/- each
• Sensor and logic charges (electronics)	500/-

ADVANTAGE

1. Maintaining cost economy in every commercial sector
2. Maintaining surrounding clean and thus used in food processing industry.
3. Once the person enters in field there is no need of cleaning the foot sole again and again.
4. Modified and kept as per our need.
5. The labour is only utilized for maintenance of the system.
6. Resulting in overall economic growth.
7. Best suited for malls, hospitals and colleges where large number of labours are required to clean the dust and dirt manually.
8. Maintain standard in every sector by neglecting cheap manual work.

APPLICATION

1. It can be used for domestic purpose.
2. It can be used in hospitals.
3. It can be used in auditoriums.
4. It can be used in schools and colleges.
5. It can be used in small as well as large industry.
6. It can be used in cinema theatres.

DISADVANTAGE

1. The Brushers speed is constant because motor rotates with constant speed.
2. The sensors are need to be protect otherwise it may affect by the environmental factors.
3. The pressure of the hot blowers needs to be set as per the application every time.

RESULT

Result obtaiing for 1 minute and 15 second					
	Stay time of one person	Cleaning percentage (%) in all three blocks depend upon time			Average (%)
		1 st block	2 nd block	3 rd block	
1	5 second	40%	60%	40%	45%

2	10 second	50%	65%	60%	55%
3	15 second	60%	70%	65%	65%
4	20 second	70%	80%	75%	75%
5	25 second	98%	98%	98%	98%
				Average	98 %

After carrying the reading for 5 step the overall efficiency of model is find to be 898 %

CONCLUSION

As we seen in all three blocks, the operation of every block leads to clean certain amount of dirt and dust and at the end overall effect is observed. In every sector it is observed that the footwear dirt is major problem on the surface where every sector is giving charges to labour for cleaning of the surface. in order to reduce labour cost with standard which will effective for Digital India and economy of the countries is mainly depends on cost. So in order to maintain it we developed the concept which will helpful for citizens and economy and if we consider the point of hygienic factor this type of model can be used in every sector, such as food food processing where hygienic state is important consideration and leads to environment friendly concept.

FUTURE ASPECTS

- 1.The model focuses on cleanliness, so it can be used wherever clean surfaces in necessary
- 2.Can be used in any sector to maintain standard in future
- 3.The model also focuses on economy by saving labours cost which is big advantage in future
- 4.If modified and apply less manual efforts will lead to see in future
- 5.Satisfaction to human that they are wearing dirt and dust free footwear which entering to commercial sector ,malls.
- 6.Can be used in future for growth of any sector where cleanliness is necessary by saving cost

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