

# Design, Fabrication and Performance of Contemporary Duster

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**Abstract**—Contemporary duster has been designed and fabricated to avoid the spreading of light weight dust particles inside the classroom during erasing the blackboard. It consists with a cotton cloth wound around roller, a cylinder chamber with brushes covering 75% part of the roller and the rest 25% kept outside from the cylinder to collect the dust particles efficiently. The design concept and mechanism have been discussed in details and illustrated to collect the dust particles inhaling the human health. The duster is economically viable and potential candidate to replace the simple duster normally used nowadays.

## 1. INTRODUCTION

Blackboards and chalk pieces are being used since ancient times for teaching of subjects to students in schools/colleges. The color of board has been changed from black to green but the chalk pieces are continuing since then. These blackboards make an effective environment for the students to understand the subject what the teacher/professor is delivering to the students. The material used to write on the blackboards is the chalk pieces made from “plaster of Paris and calcium carbonate”, that is  $\text{CaSO}_4 \cdot (1/2)\text{H}_2\text{O}$ . During erasing the dust particles from the blackboard, the entire dust spreads over the environment which affects the teachers/professors and also students sitting near the blackboard. The dust particles accumulated inside the lungs and cause severe problem to breathe the students/teachers. Meanwhile, vibrator pivoted, automatic and electronic blackboard erasers have been designed and fabricated to solve the issue but these are not only complicated in design but need electricity to run and costly [1-4]. In this paper, the contemporary duster has been successfully designed and fabricated using a roller, cylinder chamber, brushes bearings, shaft and cap which is technically simple and very low cost. In addition, it requires no electricity to erase the dust into duster from the blackboard.

## 2. EXPERIMENTAL SETUP

The contemporary duster consists of a roller, cotton cloth, closed cylindrical chamber, brushes, bearings, shaft and cap. The brushes and bearings are inserted into the cylinder chamber made from plastic. The cylindrical chamber is cut in order to place the roller which occupies 75% of the space

inside the cylinder whereas the remaining 25% is occupied on the outside of the cylindrical chamber. It has two brushes. One brush is inserted opposite to the roller, this brush is in contact with the roller and other brush is inserted beside the roller where roller is leaving the chamber this brush is also contact with roller. The roller is wound with a cotton cloth. Another cotton cloth is attached to the cylindrical chamber above the roller, which touches the board. This cotton cloth helps in removing the remaining dust particles on the board and the dust falls on the roller, the roller collects the dust into chamber. The shaft is present inside the roller and bearings are placed on the sides of cylindrical chamber. The roller is fixed with the help of the bearings and shaft.

## 3. DESCRIPTION OF THE DUSTER

The duster is held into hands and this duster moves on the blackboard the roller will rotate and the dust is collected into the chamber. The duster will move in any one direction. The roller which is present outside helps in cleaning the board and the dust is collected into cylindrical chamber. The two brushes present inside the cylindrical chamber cleans the dust from the roller and the dust falls down into cylindrical chamber. After cleaning from any one of the end, the cap is opened and the dust is removed from it.

## 4. MECHANISM

As shown in figures, the cylindrical chamber consists of roller which is placed with the help of bearings and shaft. Bearings are fixed in cylindrical chamber and shaft is fixed in the roller. The shaft is fixed into the bearings which helps the roller in rotating. The dust on the blackboard is cleaned by roller with the help of cotton cloth and it takes into cylindrical chamber. The cylindrical chamber consists of two brushes one is opposite to the roller, which will clean the dust maximum. The remaining dust which is present on the roller is cleaned by the second brush which is present beside the roller which leaves from the chamber.

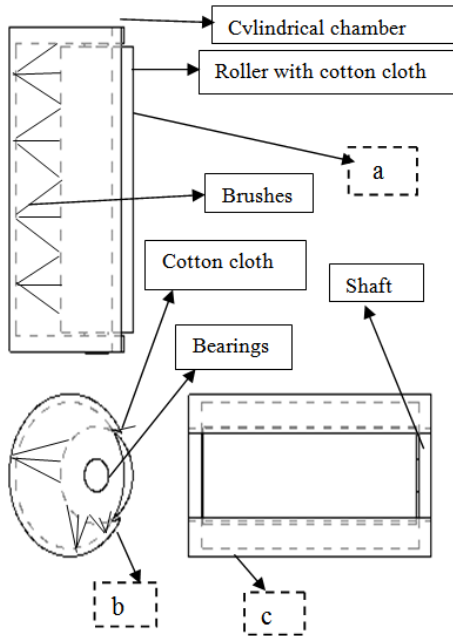


Fig. 1: a) top view, b) side view, b) front view

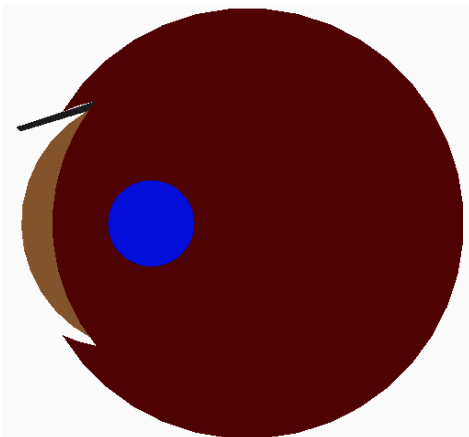


Fig. 2: side view of 3D

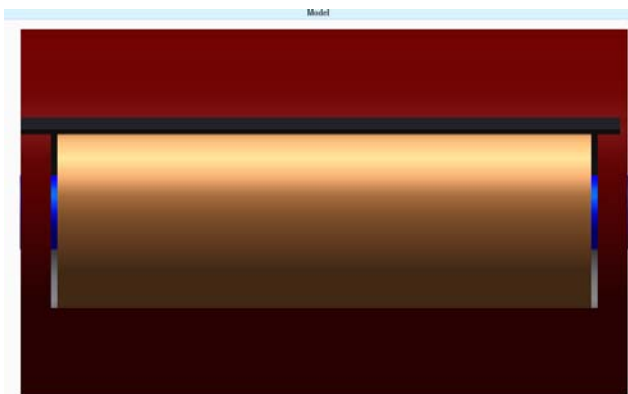


Fig. 3: right view of 3D

## 5. CONCLUSION

According to the survey and the medical report from specialist various doctors, it was concluded that the most of the teachers did not know or were ignorant about the problems caused by the chalk dust, which is an unwanted obligation thrust upon them. Putting in all our caliber and sincere efforts to help our teachers. This design made for Blackboard dust collection will be of great help to the teachers, as it will avoid dust inhaling.

## REFERENCE

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