

A REVIEW DESIGN AND FABRICATION OF ELECTRICALLY OPERATED BOARD CLEANING MACHINE

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Abstract— Automatic blackboard cleaning machine are made to reduce the man-power involved in cleaning blackboards and also to reduce the fatigue caused due to traditional wiping device. The dust which is generated while cleaning is so hazardous to health which causes many respiratory problems and also manual method is time consuming. To reduce such problems Automatic Blackboard dusters are one of the alternatives. This paper work presents the design and Fabrication of automated blackboard wiping device. The system consists of following basic units: Blackboard, DC motors, crank and lever mechanism, cross rail, slider. The system uses to and fro motion of the cross rail mechanism and duster having up and down motion to clean the blackboard. The device makes teaching efficient and reduces human efforts.

Introduction:

An automatic blackboard duster is a device that is generally used to clean board automatically with the help of duster. By the use of this automatic blackboard duster we can save time and energy. It is a new technology that is generally used now a day. A device for automatically erasing a blackboard wherein a duster is mounted for longitudinal movement on the blackboard which is done by using suitable mechanism to drive assembly for producing the movement of the duster in an erasing operation. This appertains to new and useful improvements and more particularly to an apparatus whereby blackboards can be cleaned in an easy and convenient manner.

Literature review:

The growth of technologies requested higher performance machine in order to full fill human needs and market. This project is implemented to make human work easier and can reduce the use of human power because of its potential applications. The project automatic blackboard duster is device that clean the blackboard automatically and reduces the time consume in hand erasing.

Miss. Rubhinet Shaha Miss. Mrunalini dixit(1) Have used embedded system. They had used DC motor of three different types for the movement of the instruments. This equipment moves forward and backward for the erasing the board and collecting the dust automatically from the erasing material due to the rotation of roller. For this

process they had used PIC16f877A microcontroller. This device avoids the dust flow in the environment. Because of this there is no problem of dust to teacher and students.

This system contains following units blackboard, wiper mechanism, wiper, DC motor, water sprayer and remote controller. This system works same as the wind shield wiper mechanism of car. The system uses oscillatory motion of the four bar wiper mechanism to clean the blackboard.

Mr. Sunil Kawate et al. (2) In this, they are used simple logic for implement this innovation in actual. They required comprises there guide rails, and three sliders with powering and controlling with sensor. this compressed rail mounted to the top periphery edge of an existing chock board having a cleaning apparatus attached there to & extending from the top to bottom of the board. The device is compressed of an adjustable frame and sponge which is easy to installation during fitting of frame.

This type of wipe mechanism consists of two motors. They guide rails, three sliders. The slider 1&2 are connected by cross guide rail c and cross rail guide rail c is installed on them, can be moved parallel with the slider 3.the power driven provided by two motors A&B. Motor A drives the left & right movement of cross rail beam C & motor B drives the vertical movement of slider 3 to rub the black board surface for cleaning by moving the wiper system along the rail C together. The sensor is fitted at right most of the blackboard to sense the right end position & signal passed to return the wipe system along the C rail in original position.

Methodology:

Phase I - Literature Survey

In depth literature review will be carried out on working of automatic board cleaning machine, study of different elements of automatic board cleaning machine and its design, study of different theories & concepts related to automatic board cleaning machine. This phase is for getting information regarding the previous work that has been carried out till date. These will be carried out by referring journals & research papers.

Phase II - Design

In this phase we design our design of board cleaning machine. While designing of automatic board cleaning machine we also

calculate the all design parameters required for automatic board cleaning machine.

Phase III- Material Procurement

In this phase we collect the all electrical, mechanical & electronics components which are required for our machine.

Phase IV-Manufacturing

In this phase we manufacture our required sub parts by using various machines and measuring instruments according to our design.

Phase V- Assembly

In this phase we assemble all the components of our machine according to our design parameters.

Phase VI – Results and Discussions

This phase includes the different types of results like cleaning of board; travel time required to duster for cleaning all board etc. will be obtained during automatic board cleaning machine performance testing. The results of analytical study & simulation will be compared and validated.

Construction:

The slider type wipe mechanism consists of two motors, three guide rails, and three sliders. The brief construction of mechanical structure is that slider 1 and slider 2 are connected by cross guide rails C and guide rail C is installed on them, can be moved in parallel with the slider 3, power driven provided by two motors A, B. Motor A drives the left and right movement of cross rail beam C and motor B drives the vertical movement of slider 3 (wipe system) to rub the blackboard surface for cleaning by moving the wipe system along the rail C together. The sensor is fitted at right most of the blackboard to sense the right end position and signal passed to return the wipe system along the rail C in original position.

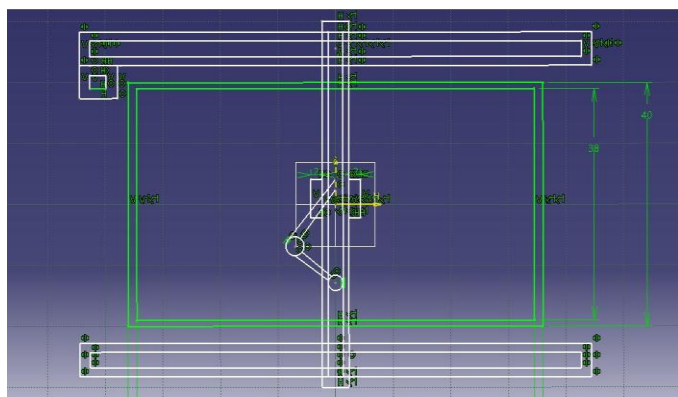


Fig.1 Design of model in CATIA

Working:

The power of cross guide rail C comes from the motor A, the rail transfers the power. Motor A forward and reverse rotation, drives the cross guide rail C forward or

back movement. Motor A forward and reverse rotation, at the same time drives the slider 3 upward and downward movement. The method is able to reach the special position, and then eraser cleans the blackboard and then sensor at the end sense the position and cleans the blackboard in second stroke. Motor B is installed in cross guide rail internal provides power for Slider 3, pushes the slider 3 up-and-down along the rail C. Slider 3 is a combination of the movement of Cross guide rail C along with wipe system, performs wipe. When the wipe is finished, A motor work and B motor stop, blackboard eraser returns to the original position, waiting for the next wipe. The further research work will be based on computer processing i.e on two parts of information processing unit and motion control unit. In future work, when the eraser begins to wipe, Cross guide rail C is at the left-most of the blackboard, and eraser on the top. Cross guide rail C and eraser back to the original position after wiping completed. Before the eraser to wipe, CCD camera takes pictures of the entire blackboard. In the program am, the stains are contained in the rectangle. By computer processing, the Program determine the coordinates of the stains PC can calculate the upper left corner of the rectangle's coordinates, this is the coordinate which the eraser should be reached. Then motors release pulse signal, motors rotate a certain number of turns, eraser arrives at the designated location. The black board surface is as the X-O-Y plane as shown in fig.2.[7,8]

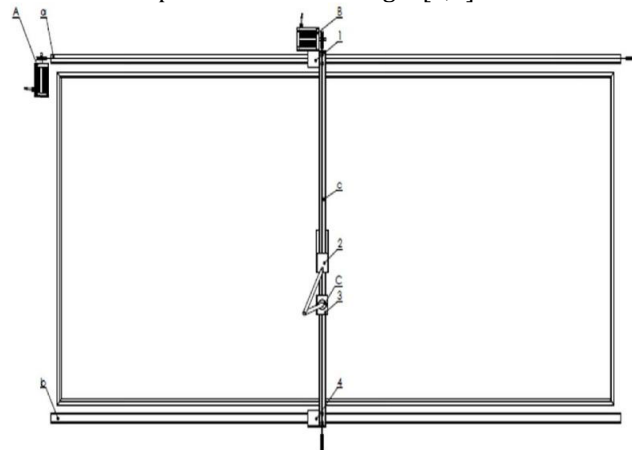


Fig.2.Reference model of automatic bord cleaning machine.

Conclusion:

Compared with manually wipe, smart wipe has a good effect and runs smooth with good reaction speed. The rate of rotation of the motor can be set in accordance with the requirements of the wiping speed to suit the requirements of different occasions. The smart eraser has a simple structure, easy to operate, easy to obtain raw materials, manufacturing equipment simple process. Its Control functions, and less susceptible to interference, high reliability, ease of use, can make products with high performance and low cost. The product is suitable for large, medium and small institutions, the promotion of certain significance. The authors can write the conclusion as a whole in a paragraph or by making points. An example is given as under.

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