International Journal of Research in Engineering and Science (IJRES)
ISSN (Online): 2320-9364, ISSN (Print): 2320-9356
www.ijres.org Volume 10 Issue 5 ǁ 2022 ǁ PP. 29-32

Automatic Whiteboard Cleaner

Prof.Gaikwad.S.N.
Dept. of Mechanical
S. B. Patil College of Engineering, Indapur, India

Pandhare Sanmitra Sachin
Dept. of Mechanical
S. B. Patil College of Engineering, Indapur, India

Mane Saurabh Popat
Dept. of Mechanical
S. B. Patil College of Engineering, Indapur, India

Shinde Omkar Ratndip
Dept. of Mechanical
S. B. Patil College of Engineering, Indapur, India

Shinde Nikhil Rajendra
Dept. of Mechanical
S. B. Patil College of Engineering, Indapur, India

Abstract
The principle point of our task is to save time. It's exceptionally difficult to invest our energy dependably in cleaning of the white board. This project is implemented to make human work easier and can reduce the use of human power because of its potential applications. The report puts forward a kind of mechanism design scheme; this mechanism keeps the whiteboard clean. The duster which is mounted on a iron plate moves in forward and reverse direction horizontally. Duster is mounted on a iron plate which receives power from a Screw shaft, on which sliding bearing are mounted and a Dc motor is attached with it so that effective drive is being done. This appertains to new and useful improvements and more particularly to an apparatus whereby whiteboards can be cleaned in an easy and convenient manner. The object of the present automatic whiteboard duster is to provide an attachment for whiteboards in the form of a power-driven erasing apparatus which can be set in operation, thus eliminating the drudgery of automatically cleaning blackboards. In the teaching field, whiteboard, duster, and marker are crucial elements. To erase the writings from large size boards manually with a duster is a time-consuming task. It breaks the concentration of both lecturers and listeners. This paper represents the design and construction of automatic whiteboard cleaner.

Date of Submission: 13-05-2022 Date of acceptance: 27-05-2022

I. Introduction

It is a system that is generally used to clean the whiteboard automatically with the help of duster. By the use of this automatic system, we can save our time and energy. It is a new technology that is generally used now a day. A system for cleaning the whiteboard wherein a duster is mounted for longitudinal movement on the board and dc motor is mounted that is mechanically interconnected to a drive assembly for producing the movement of the duster in an erasing operation. It will use the screw shaft, slider bearing, shaft mechanism to convert the rotary motion of electric motor into linear motion of duster.[1]

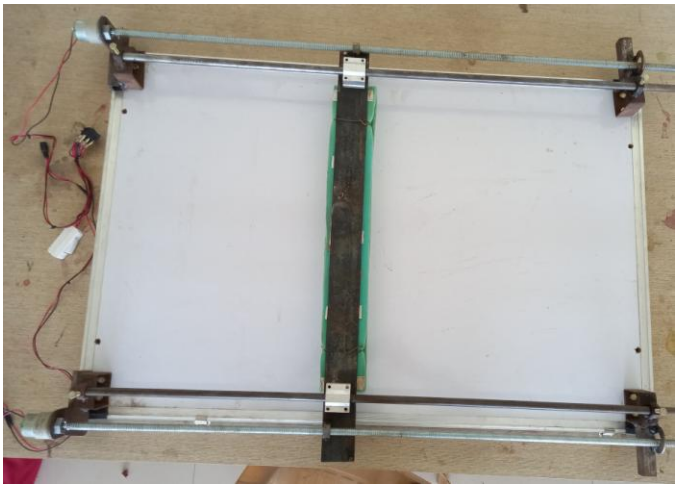
Automation or automatic control is the use of various control systems for operating equipment's such as machinery, processes in factories, boilers and heat treating ovens and other applications with minimal or reduced human intervention. Some processes have been completely automated. The biggest benefit of automation is that it saves labor; however, it is also used to save energy and materials and to improve quality, accuracy and precision.

II. Literature Review

The machine can operate in three selectable operatable modes. In the first mode, it cleans the left side of the board. In the second mode it cleans the right side of the board. In the third mode it cleans the whole area of the board. The machine uses two stepper motors to move duster in horizontal (x axis) and vertical (y-axis) direction. To move the duster in up and down direction linear motor is used. Infrared transceiver is used to detect horizontal direction of motor. Four limit switches are used to detect the boundary of the board. A dsPIC30F401 microcontroller which was programmed in C language is used as the main controller in the machine [1].

The design and principles of sliding type wipe mechanism and also carried out the implementation and experimentation for motion analysis. The paper puts forward a kind of mechanism design scheme, the mechanism can automatically detect the blackboard chalk stains, and erase the font, keep the blackboard clean.[2]

Image of the Project



Project consists of following parts

1. White Board

White Board is a sturdy board with perfect marker writing surface in front. The back of the board is G.I. Sheet for balancing and to make a water-proof surface. (3 x 2 ft)

2. Bearing slider bearing

The universal Ball Bearings are great for you to replace the damaged Ball Bearings in your devices to improve efficiency and save energy. SC12UU 12mm Linear Ball Bearing Slide Unit CNC 3D Printer

3. Slider rod

The slider rod is used to support the slider bearing which is fixed with square pipe. The square pipe is fixed on whiteboard using nut and bolts. The slider rod has 12mm diameter and 3ft length.

4. Screw

The screw is fixed with the cotter pin to the shaft of the dc motor. The material of screw is mild steel with galvanized coating. It has 12 mm diameter and 3ft length.

5. DC Geared Motors.

It helps to increase the torque and reduce the speed. The input is in electrical energy which makes direct current which is transformed into the rotation. It has 150 rpm and is of 12 volts.

Working

In the working of automatic whiteboard duster as the power is supplied to the motor through screw the shaft with slider bearing side starts rotating. Two screws are connected at both the side of shaft and slider is connected on the white board. Thus, movement of these each motor rotates the both screws rotate by which both the upper and lower supporting start rotating. By the rotation of these support, the screw shaft which is mounted on this slider in horizontal direction also starts rotating. A duster which is mounted on this support starts reciprocating thus clean the board.

Advantages

1) No conventional grid electricity required
2) Long operating life
3) Highly reliable and durable
4) Easy to operate and maintain
5) Eco-friendly

Disadvantages

1) High installation cost
2) Operating speed is low.

Applications

1) Very simple to operate
2) Low speed, same way as done by hand
3) Bidirectional
4)Timing control, sound indication and more
5)Easy handling

III. Conclusion

So, to help and give benefit to humankind the research and development of Automatic Duster Machine is an alternative machine that can help lecturer, teacher and student to keep their duty clean a white board by using this machine. Compared with manually wipe, smart wipe has a good effect and runs smooth with good reaction speed.

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.

Future scope

The project has covered almost all the requirements. Further requirements and improvements can easily be done since the as per requirements is mainly structured or modular in nature. Improvements can be appended by changing the existing modules.

Reference

[1]. Joshibaamali S. and GeethaPriya K., "Automatic Duster Machine" International Journal Of Emerging Technology In Computer Science & Electronics (IJETCSE) ISSN: 0976-1353 Volume 13 pp. 42-46 (2015).
[2]. Kewate Sunil R., Muzawaretal Inzamam T, "Development of New Smart Design to Erase the Classroom Blackboard of Schools/Colleges" IOSR Journal of Mechanical and Civil Engineering (IOSRJMCE) e-ISSN: 2278-1684, pp. 57-61(2014).
[3]. Kim Dong Yeop, et al, "Wall Shape Recognition Using Limit Switch Module", International Journal of Control Theory and Computer Modeling (IJCTCM) Vol.4, No.1/2(2014).
[4]. Shah Chirag, "Automated Board Eraser" Sep 27, 2005.
[5]. Mahadevan R., Design Data Handbook for Mechanical Engineers.