

DESIGN AND DEVELOPMENT OF AUTOMATIC COTTON WICK CUTTING MACHINE

**Hemant Shete¹, Atharv Desai², Digvijay Kurkute³, Raies Shikalgar⁴, Priti Lagade⁵,
Sonali Sonavale⁶**

Professor, Mechanical Engineering, AGTI's Dr.Daulatrao Aher College Of Engineering, Karad, India¹

Student, Mechanical Engineering, AGTI's Dr.Daulatrao Aher College Of Engineering, Karad, India²⁻⁶

Abstract: Cotton is the one of the cash crop of India .The total percentage of cotton that is grown in India is 67%. Cotton is grown where climate is uniformly high temperature between the range of 21 to 31 . The fiber is almost pure cellulose, and can contain minor percentages of waxes, fats, pectins, and water. Under natural conditions, the cotton bolls will increase the dispersal of the seeds. Cotton is known for its comfort and Softness. Cotton can catch fire due to small fiber in it.

This two property makes cotton use for making Wicks. When wicks are immersed into oil it's absorb the oil. Diya are designed such that the one end of the wick remain up and other at the bottom, The down part of the wick absorb the oil and pass it to upper part. These wicks are required to have in specific cutting length and this is presently done manually which is time consuming and more manual efforts for this in thispaper a automatic cotton wicks cutting machine designed and developed.

Keywords: Cotton, Cotton wick, Wick Cutting machine, Automatic cotton wick machine.

I. INTRODUCTION

The market price for cotton is 1800/Quintal. Cotton is a soft, fluffy staple fiber that grows in a boll, or protective case, around the seeds of the cotton plants of the genus *Gossypium* in the mallow family Malvaceae. Cotton is the most significant material and a symbol of comfort in nature everywhere. A seedhair fibre primarily comprised of cellulose is cotton. About 87 to 90 percent of the fibres are made of cellulose. India produces 462 kilos of cotton per hectare annually. In terms of cotton production, India comes in 38th. In India, cotton is employed in a variety of industries, including the medical field (Insulator). In India, one of the everyday uses for cotton is to make wick for wards deity offerings such as diyas and nilavilakku.

The majority of cotton wick for diyas is made manually. Wicks for diyas are quite small and feature a bulbous bottom to keep them stable. For the making of cotton wide manual processes are exist but for increasing production rate with optimum price needs to design the automatic cotton wick cutting machine. The goal of the designed machine is to boost the small scale industries and to reduce the work load of the human being. As a result, this machine will help the increasing the production of the small scale industries.

II. EXISTING SOLUTION

There are many machine related to cotton wick. Semi-automatic cotton bubble machine is mostly used machine in India for making wick for diyas. Vbtechno trading company has created a cotton wick twisting machine ,the machine process the cotton to form a cotton wick with fix length ,the length of cotton wick does not vary in this machine.

DISADVANTAGES OF EXISITING MACHINE

Even the machine are semi-automatic all other woks are done manually machine only twist the cotton wick.

- Fix length cotton wick manufacturing.
- Required skilled workers.

Change is the number of count of cotton wick cannot be done.

III. PROPOSED SOLUTION

Proposed machine will be consist of Guide box, Pair of rollers, Cutting blade, Conveyor, Collecting box .The machine is control by Arduino Uno R3. The work guide box is to give the path to cotton wick's which is to be cutted with required length. The pair of rollers will press the cotton wick so that it does not get separated from the bundle and it will also help the cotton wick to travel Cotton wick guide box to cutting mechanism. The cutting blade will cut the cotton wick according to the need and giving length. After the cutting the wick will travel from cutting part to collecting part with the help of conveyor. The collecting box will collect the wicks, when desire no of wick are collected it will open the box. All the process will be control and monitored by sensor and the Arduiono uno R3.The machine will do all the specific work automatically. This is how hole machine will work.

IV. BLOCK DIAGRAM

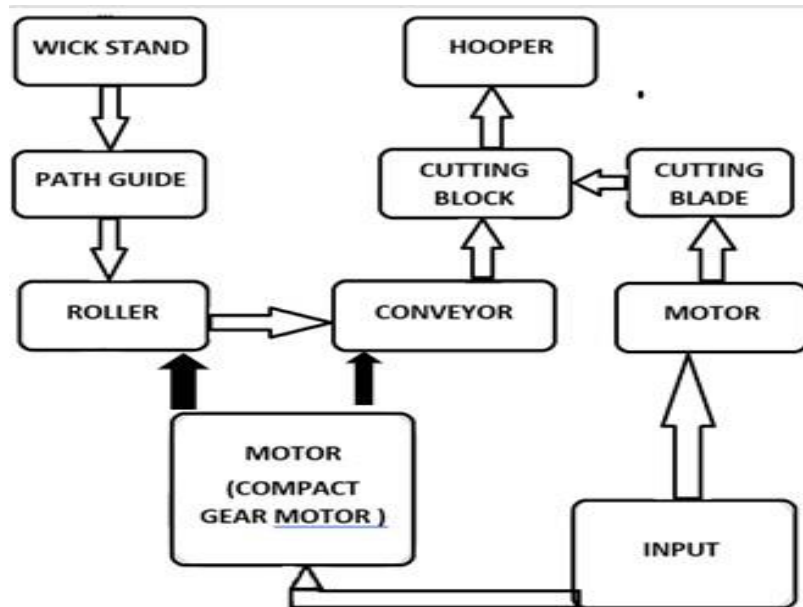


Fig 1. Block Diagram

V. CAD DESIGN

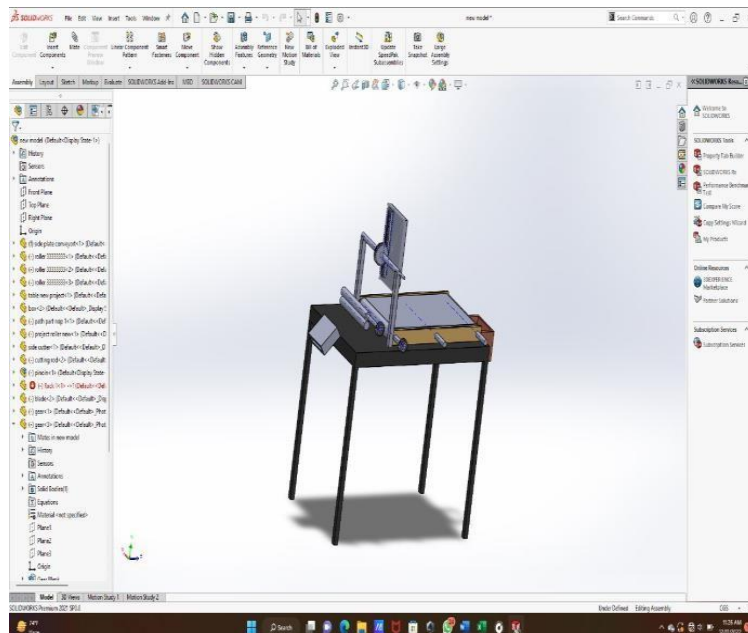


Fig.2.CAD Diagram

VI. WORKING

The goal of this machine is to create a machine that will cut and pack the cotton wick's with total number of count. The machine will be operated with the help of a controller which will operate the motors that are used in a machine. The controller will also give the feed to the display showing the total count of wicks that are cut. The machine basically work in 4 parts Guide, Rolling, Cutting and packing. The machine may be slow, but the accuracy of the machine will be 90%. The length that is giving as a input will be cut accurately. This machine will save a lot of time.

ADVANTAGES OF PROPOSED SYSTEM

- It will proceed everything automatically.
- It costs extremely little to operate and very little manpower is needed.
- Total number of count will be shown, no need of extracounting.

This machine can accurately cut the cotton wick.

VII. MACHINE PART

1. **Guide box:-** The guide box is a sheet metal box same like a hoop. The guide box have the larger opening at the input and small opening at the output, due to this guide box all the wicks will close into a bundle and will be easy to get cut. The guide box will help the wicks to get into the line

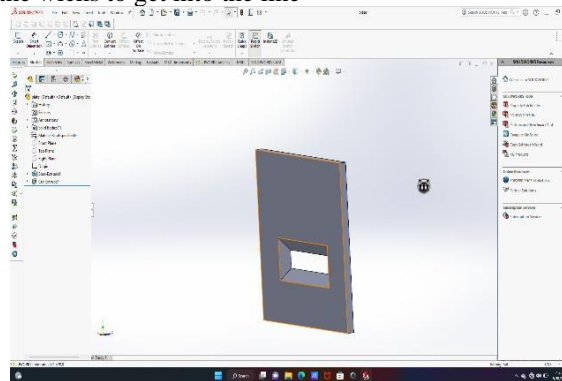


Figure 3 Guide box

2. **Pair of Roller's:-** The pair of rollers are made of steel pipe fix with roller bearing at the outer face That will help the roller to move freely. The rollers will cotton wicks to get press. The rollers provided to give the pull force to the wicks. The cotton wicks will only get pull force by the rollers. The rollers will press the cotton wick's so that it does not get separate.

3.

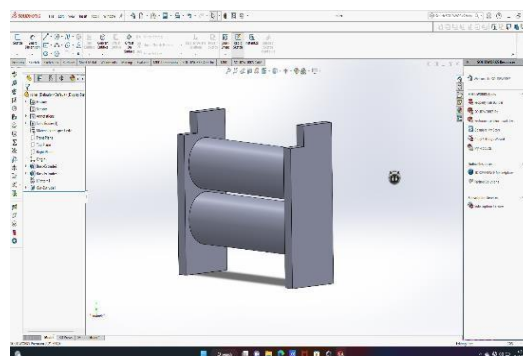


Figure 4 Pair of rollers

4. **Cutting Mechanism:-** The cutting mechanism is the important part of the machine. The mechanism is arrange with the help of rack and pinion. The feed to the pinion is provided by the motor. The variation in the length of cotton wick will done by the cutting mechanism. High Speed Steel blade is used to cut the cotton wick with given length.

5. Conveyor:- Conveyor is provide to carry the cutted cotton wick from cutting mechanism to the collecting box. The conveyor is arrange in a such a way that when the blade cuts the cotton wick conveyor is arrange in a such a way that whenthe blade cuts the cotton wick.

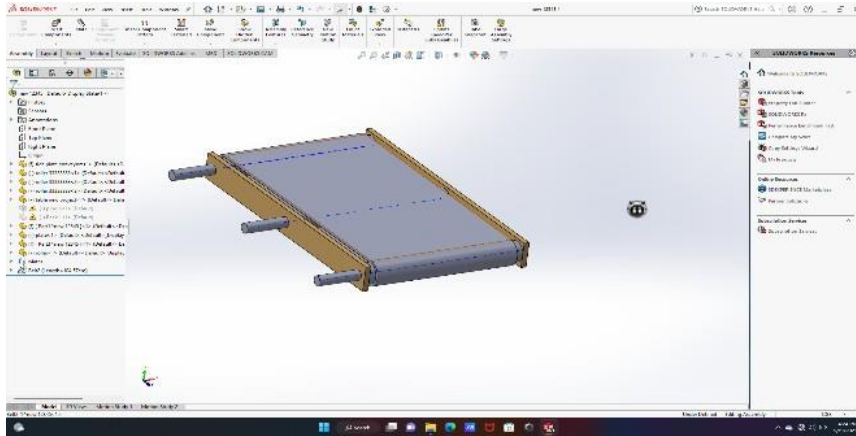


Figure 5 Conveyor

6. Collecting Box:- Collecting box is the last part of the machine. The cutted wicks from the conveyor will fall into the collecting box. When desired number of cotton wicks are gained the collecting box will open and the cotton wicks will fall in the packing machine.

7. Display unit:- The display unit consist of a display that will give the total count of wick that are cutted it will also show the dimension of the cutted wick. The button that are placed on the control unit will be used to set the dimension and the number of count of the wick that is to be packed total number of count on screen.



Figure 6 Display Unit

VIII. CONCLUSION

The conducted research in several applications after taking into account all the information in the introductory part and came up with a solution. The machine is very helpful for the small scale industries.

This machine will be a turning point in an industrial field. The machine will process everything automatically; only need is to put the input raw material. The machine will cut and pack the wick bundle automatically with total number of count on screen.

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