Design and Fabrication of Incense Stick Making Machine

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Abstract- The burning of incense in religious and social functions has been practiced in India since early times. Dhup an aromatic powder or paste is burnt in Indian homes as a fragrant fumigant and is reputed to possess insecticide and antiseptic properties. Agarbatti also is known, as Udubattis similar to joss sticks are a development of Dhup. Agarbatties are obtainable in different colours and with different perfumes. The burning time of an agarbatti varies from 15 minutes to e hours according to quality and size. Agarbatti is also obtainable in other forms such as dashang. India is the largest producer of agarbattis in the world. The focus of this project is to improve the design and fabrication of the incense sticks making machine. The aim of micro enterprises in India focusing functionality, ergonomics, hygienic the project is to design a manually operated incense stick making machine for micro and safety. Through the automatic incense stick making machine the variety of incense sticks are formed. The overall efficiency is high and also time period for the production of incense sticks is reduced.

Key Words: Incense sticks, Ultrasonic sensor, Piston set, Automatic Feeder

I. INTRODUCTION

The system we designed is a DESIGN AND FABRICATION OF INCENSE STICK MAKING MACHINE. India is a vast country and the Indian people follow various religions, speak different languages and follow different customs and traditions. Inspite of this diversity, all people use agarbatti at all the places of worship, religious functions, festive occasions, weddings. This itself speaks volumes of the high importance agarbatti has. The burning incense in religious and social functions has been practised in India since early times. The demand for agarbatti is increasing both in the domestic and export markets because of the improvement in quality and increase in the types of products. About 75% of the agarbatties manufactured are of cheap quality containing only charcoal powder or low quality sandal wood powder with a mixture of 50% of wood gum powder. Cheap perfumes are used to give them a top note. In superior varieties, essential oils, purified resins, natural fixatives like amber, must and civet is used along with synthetic aromatics. Absolutes are used in the costlier types.

The Development And Fabrication of multi-purpose incense stick making machine to alleviate the labor intensive work associated with the production of bamboo-cored incense sticks is the main purpose of this paper. The machine is based on the mechanism of extruding the stick paste over the bamboo sticks.



Fig.1-Block diagram of Incense stick making machine

II OBJECTIVE

The main objective of our project is to determine the problems associated with the manual operated pedal type agarbatti making machine. To improve the overall efficiency of the system in terms production rate of agarbatti. Design the system in affordable price for all rural people and also medium scale enterprises.

III SCOPE OF PROJECT

In future, it is applicable to all the high production industries. There is also some advanced modification is possible to like on the basis of the sensor. For the rural and small scale industries overall cost of the incense stick making machine reached with affordable price segment.

IV. COMPONENTS

- Ultrasonic sensor
- DC motor
- Togal switch
- Piston set

Ultrasonic sensor

Ultrasonic detection is most commonly used in industrial applications to detect hidden tracks, discontinuities in metals, composites, plastics, ceramics, and for water level detection. For this purpose the laws of physics which are indicating the propagation of sound waves through solid materials have been used since ultrasonic sensors using sound instead of light for detection.



Fig 2-Ultrasonic sensor model

DC MOTO R

It converts direct current electrical power into mechanical power. The speed of the motor is counted in term of rotation of the shaft per minute. Dc motor is designed for two-speed operation. It consists of three brushes namely common, low speed, high speed. Two of the brushes will be supplied for a different mode of operation. The DC motor does not oscillate back and forth, it rotates continuously in one direction like most other motors. The rotational motor is converted to the back and forth wiper motion by a series of mechanical linkage. This type of motor is called a gear head or motor ends DC motor. It has the advantage of having lots of torque. This DC motor works on 12-volt DC battery.



Fig 3-12v DC motor

TOGAL SWITCH

Togal switch is a type of electrical power controlling switch for the ON/OFF process. In between the process if the sticks comes non uniform manner then the power supply to the automatic incense stick feeder is shut down. Normally an 10A-250V togal switch is used in this mechanism. The purpose of using this switch is to ON/OFF the supply not for control the voltage levels.



Fig 4-Togal switch

PISTON SET

Piston set is an important tool to apply powder mix up on the incense stick surface. Through using high hydraulic pressure of the piston arrangement, powder mixer drawn by the nozzle setup. While the signal is obtained from the ultrasonic sensor then the motor starts to rotate and then the piston arrangement along with the shaft also starts to rotate.

V. SYSTEM DESIGN

The system is designed before the practical implementation for the higher accuracy and the overall system performance improvement. In this the mathematical model for the piston diameter and it's circumference has been calculated. The model designed mainly for,

- Piston set movement
- Automatic incense stick feeder arrangement
- Piston strokes per minute



Fig 5- Piston set movement



Fig 6-Automatic incense stick feeder arrangement

Piston calibration is the main think to make a continuous flow incense sticks towards the nozzle and rocket setup. From this the external force can be created through the rotation of motor shaft which is connected along with the piston valve. Where the piston force is very important to suck the incense stick inside the die setup as well as through out after finishing of agarbatti powder over the incense stick surface. Thus the cylindrical structure of the nozzle towards the rocket is to make powder setup in the continuous 3mm diameter flow. Horizontal arrangement of the piston from the feeder disc makes straight suction of the incense bamboo stick on by one continuously. That will be a most important thing to maintain the overall hydraulic pressure on the incense stick suction and rejection. Where total time period for fixing the incense powder on the incense stick surface is based on it's piston pressure.

Feeder arrangement is placed nearer to the powder mixing funnel and below that the piston arrangement is provided. From this automatic incense stick feeder fetch sticks one by one. All the operations are controlled by the ultrasonic sensor provided above the feeder roll bearings. Sensor senses the incoming incense sticks and the starts to rotate the piston for pushing the powder mixer towards outside. That powder mixer is makes small pieces of placing over the incense stick surface and then the stick is comes out from the die setup. Where piston set totally controlled by sensor signal.

VI. EXPERIMENTAL RESULTS



From the Fig.7 shows that the design of automatic agarbatti making machine overall outlook with an piston setup and it's automatic incense stick feeder disc chamber.

Fig 7- Overall system design

From Fig.8 shows that deep view of an piston setup to insert a powder mixer into the common path of die and nozzle setup. Here as per the rotation of dc motor the turns per minute has been decided. When the incense stick is sensed by the sensor the motor turns ON and then mixer attached with the raw bamboo stick.



Fig 8- Piston rotation angle

From the Fig.9 shows that Automatic incense stick feeder contains of a roller set, speed control switch, feeder disc and then togal switch. Thus feeder control is totally accessed by the DC gear motor. Purpose of installing the gear motor is to make one by one fetching of bamboo sticks towards the nozzle. Total speed is based on the piston rotation and the outlet of powder mixer. Initially the bamboo sticks are placed on the feeder slots and the feeder disc is supplied. Feeder disc is used to fetch the incense stick separately from the bundle of sticks. This portion is connected at the end of automatic incense stick feeder. When the feeder starts to work as per the speed adjustment the stick will be taken one by one. The flow of sticks will be controlled by using speed adjustment provided along with automatic incense stick feeder.



Fig 9- Automatic incense stick feeder

VII. CONCLUSION

Through our project incense stick making machine which gives employment to the people in rural area. Also the time period and the labour requirement is reduced. The fabrication cost of our machine is way cheaper than the other automatic incense stick making machine available in the market. The quality of incense-sticks, various cross-sectional shapes and length that can be produced by the machine cannot be achieved manually. Also the uniformity of the incense stick along with it's incense powder can be maintained for the entire action. Due to the demand of incense sticks in the daily use there is a good scope for fabrication and marketing of incense sticks. The fabrication of the machine is done in such a way that it can be easily portable from one place to other and compact in size. So that our fabrication model will help full to the small as well as the medium scale industries around the country. This machine can be used in small villages of India where people can works from house.

VIII. FUTURE SCOPE

Although this machine performs its functions there is a room for further development. These are specific areas where machine can be further improved.

- Can change the design of nozzle and can make that particular part better.
- By using heating coil at the nozzle exit, a dry agarbatti stick can be obtained. Which intern reduces the production time.

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