

Design and Development of round sticks segregation machine for Incense stick

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ABSTRACT:

Agarbatti/Incense Sticks production is a well-established cottage industry and is a 5 crore worth growing market in India. Base material for incense sticks is bamboo stick which accounts for one third of its weight. Cost of bamboo is only about one percent of the final finished product but is the most essential raw material for agarbatti production. However due to shortage of gregarious flowering of the major species of bamboo used in stick production i.e. Muli bamboo, there can be shortage of raw material and decrease in supply of sticks. Further, due to decrease in import duty from 30% to 10% on bamboo sticks, 70% of bamboo needs of agarbatti industry are fulfilled by imported bamboo sticks from China and Vietnam. The imported bamboo sticks are better with respect to uniformity of dimensions and quality because of large scale mechanization. Bamboo Mission is focusing on development of bamboo sector through encouraging bamboo plantations and introducing mechanization. Cooperative Society members were involved in stick making activity through manual process. Now, with focus of Govt. on this sector the society wants to move to mechanized stick production process as a full-fledged business activity.

Keywords: Bamboo Plantation, Mechanization, Agarbatti(Incense), Bamboo Mission

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I. INTRODUCTION:

India is a vast country and the Indian people follow various religions, speak different languages and follow different customs and traditions. In spite of this diversity, all people use agarbatti (Incense sticks) 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. India is the largest producer of agarbattis in the world. In India, the burning of incense in religious and social functions across all communities is being practiced since early times. Agarbatti which was once a staple feature of Indian devotional activities has now branched out as products associated with aromatherapy, meditation and yoga.

Agarbatti sector of India is largest in the world. Agarbatti production is a well-established cottage industry and is a 5 crores worth growing market in India. Though India is second in bamboo production, a large part of agarbatti industry is

importing 70% of its bamboo needs. Despite availability of a large number of species of bamboo, the most commonly used species for stick production are *M. Baccifera* (Muli), *Bambusa vulgaris* (Bari), *Bambusa tulda* (Mritinga), *Bambusa balcooa* (Barak) and *Dendrocalamus longispathus* (Rupai). As compared to manual sticks produced in India, the imported bamboo sticks on the whole are better with respect to uniformity of dimensions and quality.

Agarbatti making is a traditional industry in India with a size of around Rs. 7500 crore annual production with involvement of about 5 lakh people and export of about Rs. 750 crores. Based on the interaction with industry on 20th August 2020, it came out that, today the industry is facing problem in the area of raw materials like saw dust, charcoal powder, Joss powder etc because of increase in Agarbatti production in last one year. In addition there is also a problem with respect to bamboo sticks being used for Agarbatti making. While these raw materials may not constitute major cost towards making of Agarbatti (about 20% by these raw materials) but their indigenous production will provide good opportunity to create more jobs and also to assure regular supply of raw materials at reasonable rates. This, in the long term,

will help keep the price of finished goods reasonably stable. Other important area to look into, includes inputs on 'fragrance' and the machines manufacturing capability in the country for making Agarbatti. India is strong in the 'fragrance' portion but needs to develop strength in machine making which is largely imported, presently. Accordingly a holistic approach is required to strengthen this traditional industry so as to sustain the present growth rate of about 10%, and to capture more and more export markets.

II. LITERATURE SURVEY:

Literature survey and review has been carried out based on the reference gathered, on agarbatti manufacturing, and discuss about the aspects of technical, economic, safety and ergonomic aspects from the project materials collected. Besides, this chapter will also explains about data requirement and the basic concept in designing machine, the required functions and finally obtain details of The literature reveals agarbatti (incense stick) has a huge demand and a sizeable market both in India and abroad, very little development has taken place in this field.

- The people involved in this trade are mostly below the poverty line and still use primitive ways of manufacturing incense sticks.
- It was concluded from the existing literature that there is no proper safety measures during agarbatti manufacturing to the workers.
- The literature review concludes there is a need for improved ergonomic machines and safety design to be introduced there is low or almost no awareness of the new designs and techniques that have been developed in our country.
- Emerging of new technology in agarbatti manufacturing will make India leading producer of agarbatti throughout the world.
- The government has come out with loan facility which helps interested people in starting up business of agarbattis manufacturing especially of rural peoples.
- All India Agarbatti Manufactures Association (AIAMA), the main purpose of the association was to overcome the problem of sales tax. But now the association addresses the issues facing the industry at a national level.
- The study reveals there is lot of business opportunity in agarbatti manufacturing were design intervention is required fill those gaps
- Latest Powder mixing technology and different types of mixing methods and their mixing ratio, how to find the perfect mixing and which type of blenders shafts are suitable for best mix and their specification detail was carried out in the study.

manufacturing specifications sufficient for fabricating and assembling the desired project.

III. PROBLEM DEFINITION:

In bamboo round stick making process the round sticks form of different sizes and shapes. For making of agarbatti (incense) the stick should of same size and are of good quality. There is a large production of round sticks in industry. Generally, 1.3mm to 1.5mm of round stick is required for making of agarbatti. But in large production all round sticks are not in proper size and shape, few round sticks are breaks, few are of small size such defective pieces will formed by large production. If we directly transfer the round sticks without checking them then the defective pieces of sticks are stuck in the machine and the machine stopped. Then we have to remove that stick then further process will starts, it's very time consuming process. To overcome this problem we have to do the sorting of round sticks of same size. Till now the sorting of the round sticks are done by manually or by visual inspection, but in visual inspection human errors are occurred and also it takes too much time for sorting. So we identified this problem and develop a machine for segregation of round stick for making of incense. In this machine same size of round sticks are sort out and we can easily remove the defective pieces of round stick, the machine is motor operated.

IV. OBJECTIVES:

The objectives of the Khadi Agarbatti pilot project are the following:

- Our main objective of the project is to develop a round sticks segregation machine for making of incense or agarbatti for achieving the highest productivity in less time with maximum efficiency.
- to increase the local production capacity of Agarbatti in order to build self – sufficiency in the country.
- to train and distribute the Agarbatti making machines to the selected artisans to create sustainable employment.
- to upgrade the earning capacity of artisans involved in the hand rolled Agarbatti making by providing pedal operated machines and to increase the production of Agarbatti manufactured by Khadi institutions.
- to provide automatic Agarbatti machines to SHGs or similar groups and entities for making them entrepreneurs and to make tie-up with the successful Agarbatti manufacturers for support including supply of raw materials with buy back arrangement of final products.

- to provide on the job skill development training to all the selected artisans through trained Master trainers in FFDC.
- to tie up with the professional institutes like IITs, FFDC, Kannauj, MGIRI Wardha, MSMETC, VNIT, Nagpur, Indian Institute of Packaging etc for technology intervention in the machines, alternate raw material, packaging, etc.

Description of the proposed work
Methodology:

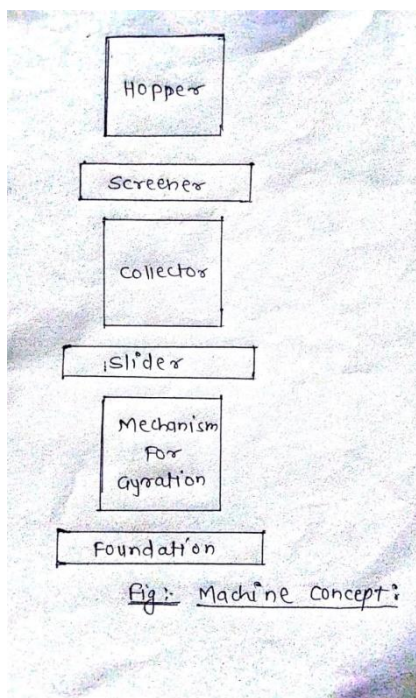


Fig: Flow Chart

Design Calculation:

Total height of the machine= 135cm
 Total weight of the machine including motor= 60kg
 Motor used= 0.5 Hp (1440rpm)
 Motor speed is simply measurement of the revolutions per minute, while vibration frequency is expressed in hertz. Therefore, vibration frequency (F) = 1440/60

$$= 24 \text{ Hz}$$

Balanced weight= 750mg
 Hopper= 25cm*26cm
 In hopper there are nine chambers each of size 8.5cm*8.5cm
 Screener= 25cm*25cm
 Screener clearance= 1.4mm
 Collector= 34.5cm*26cm
 Slider= 37cm*18cm
 Springs= 8nos
 flange mounting,
 Outer diameter= 35cm

Inner diameter=25cm
 On the flange mounting there are 8 collars mounted on both side above the base and below the balanced weight region
 Collar diameter=8cm
 0.5mm thick mild steel plate is used

Components of machine:

1. Hopper: In hopper there are nine chambers, each chambers have a multiple holes of clearance size 1.4mm. The clearance is maintain 1.4mm for 1.3mm of round stick which can easily passes through this holes.



Fig : Hopper

2. Collector : collector collects the segregated round sticks for further process on it.

3. Balanced weight section

4. Flange mounting: On flying mounting 8 nos of collars of 4cm diameter are mounted.



Fig: flange mounting

5 Springs: A spring is an elastic object which stores mechanical energy.



Fig: spring

6 Motor: In this we used 0.5HP(1440 rpm) 3phase electric motor.

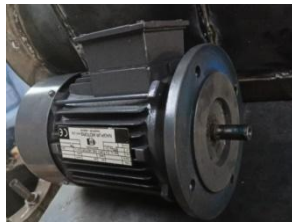


Fig: Electric Motor

5.4 Working Principle:

The working principle of round bamboo stick segregation machine is based on the concept of go and no-go gauge. It refers to an inspection tool used to check a workpiece against its allowed tolerances via go/no go test. Its name is derived from two tests; the check involves the workpiece having to pass one test(go) and fail the other(no go).

Advantages:

1. This machine provides employment opportunities to the women in rural areas.
2. The incense stick is adhered properly.
3. No electric power consumptions.
4. Less maintenance charges.
5. Less initial cost.
6. Easily can be disassembled.
7. Reduces man power.

Disadvantages:

1. Disadvantage of this machine is that only motor maintenance is required.
2. We can sort out only same size of the round stick not of the same length.

V. CONCLUSION:

The main objective of our project is to prepare round stick segregation machine for making of incense stick which gives employment to the women in rural area. The fabrication cost of our machine is way cheaper. The fabrication of the machine is done in such a way that it can be easily portable from one place to other. This machine can be used in small villages of India where women can work from house.

REFERENCES:

- [1]. Improvement of women employment in rural area, (IOSR-JBM), e-ISSN: 2278-487X, p-ISSN: 2319-7668. PP 59-65, www.iosrjournals.org
- [2]. Patchouli in fragrances-incense stick production from patchouli spent charge powder, March, 2013, Agric Eng Int: CIGR Journal, Open access at <http://www.cigrjournal.org> Vol. 15, No.1 187.

- [3]. Krishna S. Vishwakarma, et al Int. Journal of Engineering Research and Applications, www.ijera.com, ISSN: 2248-9622, Vol. 4, Issue 4(Version 1), April 2014, pp.442- 447.
- [4]. International Journal of Emerging Technology and Advanced Engineering, Website: www.ijetae.com, ISSN 2250-2459, Volume 2, Issue 5, May 2012.
- [5]. International Journal of Application or Innovation in Engineering & Management (IAIEM), Web Site: www.ijaiem.org, ISSN 2319 – 4847.