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FABRICATION OF CANDLE MAKING MACHINE

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Abstract - A candle making machine is designed, which is cost effective to bridge the gap between candle production from large scale and small scale enterprises in Nigeria A computer simulation model of the designed candle making machine was also developed to determine the technical and economic viability of the machine. A survey of candle making machines currently used in the local industries was carried out to establish their cost and source, Data to this effect was also obtained. From the survey, it was discovered that most of the candles making machines currently in use in Nigeria were imported either from USA, China or India and at a cost range of N180000 to N300000. This machine can only be afforded by large scale industries leaving out the small scale entrepreneurs who cannot afford it. A design of a candle making machine using our local standard material was therefore designed to accommodate small and medium scale enterprises interested in candle production. AutoCAD design software was an important tool used. A technical and economic evaluation of the design was carried out in terms of performance, environmental factors, maintenance, aesthetics/ergonomics, size and weight, safety and cost. The cost of production will be N80, 000.

Key Words: Gear Box, Paul And Ratchet, Pulley, Motor

INTRODUCTION

Norma Coney (1999) defined a candle is an ignitable wick embedded in a wax or another flammable substance such as tallow that provides light and in some cases, a fragrance. It can also be used to provide heat, or as a method of keeping time. A candle manufacturer is traditionally known as a chandler.

The candle making has been practiced and despite the introduction of mass production methods, candles can still be made by well-established methods which require only simple equipment. Much of this equipment can be made by rural craft men.

If the wick used is too thick, it will cause a large flame which generates so much heat that it prevents the formation of the bowl of molten fuel by melting the outer edge. On the other hand, if a wick which is too small is used, the small flame cannot generate enough heat to form a proper reservoir of molten fuel, as the heat radiated will not reach the edge of the candle until it is so far down that it will go out through lack of oxygen. the wick size, therefore, must be related to the diameter of the candle (as well as to the type of fuel). Although a rough guide to wick size is given later on in this profile, the only way is to provide a good candle is by trial and error.

The main purpose of the wax is to provide the fuel for the flame so the burning characteristics of the wax are extremely important. A good candle wax should produce a candle which burns steadily, lasts for a long time, produces very little, smoke and gives a good quality light. In addition, candle wax has other functions. It must be rigid enough to support the wick in a vertical position; it must be suitable for processing by one of the various candle making techniques; and it must look attractive.

The candle molding machine is a vital device which cannot be done without, in any nation. This is because of the indispensable role candle plays, especially when there is no either source of light.In order to enhance adequate supply to both urban and rural consumers, the production of a candle molding machine is important. The major components of the candle molding machine are: the castled aluminum body, the

adjustable screw, which serves as a separation between the two moulds cop and drag (male and female).
The reason why there is no cooling system is because the body is made of non – ferrous metal (aluminum) which does not create much vacuum for heat addition as much as steel do and also the mould has operate in opening system which admit natural air inside the mould when opened to cool the max and enhance the quick solidification of the wax. The mould due to its opening system, it works more efficiently under cool whether condition.

There are various ways of candle making. According to Wikipedia encyclopedia (2015), the methods include press method, single mould method and machine candle making process. The most popular candle making process is the use of machine. This process involves:

1.1 Wick centering

The first step of the machine candle making process is to fix the wicks at the bobbing from where it is made to pass through the ejectors to the catch board. The wick is set to be on tension by proper adjustment of the screw on the catch board. Wick centering is more important task so that wick should be at right position when its burning.

1.2 Melting and additives adding

The petroleum wax is heated externally until it melts. Stearic acid, colour and perfume can be added to the molten wax at calculated quantity to improve quality and have particular characteristic. Wax is heated at precise temperature so that to get feasibility for wax to move in mould.

1.3 Cooling and finishing

The molten wax is poured into the mould where it is cooled and solidified. Excess wax is cut out and the candles ejected out.

The candle making machine is made up of two main parts namely

a) The mould which is designed to be housed by the cooling chamber

b) The ejection system which is used to extract the solidified candles from the mould. The machine is made of mild steel because mild steel is cheaper and has good properties such as toughness, has good tensile strength.

c)After the candles are ejected they need to be properly cooled and later on inspected so to make sure that candles are in desired shapes

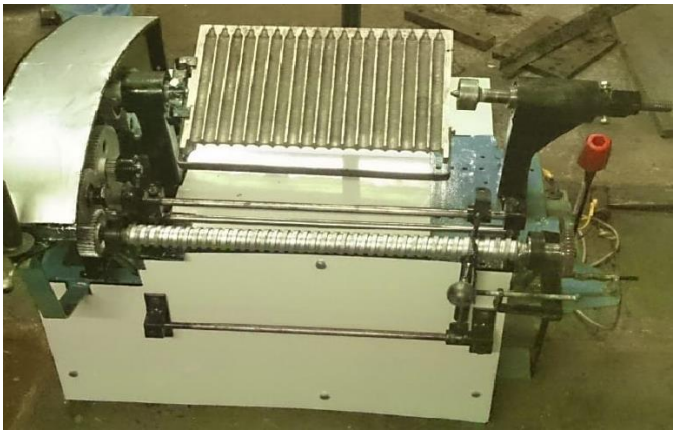

Fig -1: candle making machine

2. LITERATURE REVIEW

1] A Solar candle making machine was designed by Dr.Pravin Potdukhe at Rajiv Gandhi College of Engineering, Research & Technology, Chandrapur, India and he completed his project in year 2007.The machine is based on the principles of solar flat plate collector. The above work has got wide application in rural areas. The farmers &agro processing industries will be greatly benefitted by the work. Based on the above work one research papers was published in national conference.

2] Donald James Njus and Jon Nicolaisen developed method of making a vegetable Oil-Based candle.Date of patent is Dec.7,2010 and patent no.US 7846372 B1.The present invention provides a method of making a candle from a vegetable oil-based candle wax that provides a smooth, solid vegetable oil-based candle having fully integrated color and fragrance.

3] Inventor Werner Gross from Germany invented method of making candle and its apparatus. He patented it on Nov.28,2000 and patent no.6151767.This invention relates to making of candles . More particularly this invention concerns a method of and apparatus for making candles.

4] Ronald R. Renoe, Mission, Kans invented Method of Producing Compression Molded Candles. He patented on Nov.14,1972nd patent no.3702495.A method and apparatus for forming a candle from a particular wax material utilizes a compressive force of at least 2000 p.s.i to form material into self sustaining body for a freestanding candle comparable of same size.

5] Lars H. Karlsson, Sweden invented apparatus for manufarturing candles.It was patented on Mar.23,1982 and its patent no.4320575. The present invention relates to an apparatus intended for use in manufacturing candles of types conspiring an open container with candle wax composition, wick and wick holder.

6] In 1834, Joseph Morgan began to industrialize the production of candles. He invented a machine to manufacture 1,500 per hour from the mould. A chemist called Laurent distile paraffin from schist in 1830. Another chemist, Dumes obtained paraffin from coal-tar in 1935. Not until 1850 did paraffin became commercially viable when James young filed a patent to produce it from coal. Paraffin could be used to make inexpensive candles of high quality.

7] In 1919, Lever Brothers purchased prices candles and in 1922, a joint owned company called "candle Ltd" was created. By 1991, the last remaining owner of "candle Ltd" was shell oil company, who sold off the candle making part of business from this point, candles became more of a decorative item.

2.OBJECTIVE

The main aim of this project is to develop eco-friendly, cost effective and non-polluting environmental friendly machine. The candle making machine can operate indoors and outdoors under normal working conditions. Keeping the machine on a flat surface will reduce vibration and prolong life. Frequent lubrication of the candle making machine should be carried out. In addition to this general observation should be made to ensure that all the joints, bolts and nuts are well secured.

For the above candle making machine innovation, maintenance takes a short time since it is smaller and most parts can be easily accessed. This project is also aimed at cutting down the prices of candle making machines which are imported. By introducing this cheap and economical candle making machine into the indian market, there would beThis project is also aimed at cutting down the prices of candle making machines which are imported. By introducing this cheap and economical candle making machine into the Nigerian market, there would be

4. CONCLUSIONS

1] As per industry requirement our project is suitable for all-weather conditions.

2] Reduction in working stage and working area so that it can work on compact places and suitable for both small scale industries and large scale industries.

3] Economical for small scale industries.

4] It take less time to give more productivity.

5] The winding operation reduces the labour cost

5] The cost of this machine is less as compared to the injection moulding machine.

6] The floor space required for this machine is less

7] The winding operation is done with the help of gear mechanism.

5. OUTCOMES

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6. REFERENCES

[1] Khurmi, R. S. (2004). A Textbook of Machine Design (14th Edition) Eurasia Publishing House(PVT) LTD. New Delhi.

[2] Micheal Ashby, Hugh Sherdiff and David Ceba (2007) Material Engineering Science Processing and design.

[3] George E. Dieter, (1988) .Mechanical Metallurgy SI Metric Edition. McGraw-Hill Book Company

[4] William D. Callister, Jr and David G.Rethwisch, (2010) Materials Science and Engineering an Introduction – 8th edition. John Wiley & Sons. Inc

[5] Cavitch, Susan M. The CANDLE NAKING MANUAL (1995): Making scented and Beautiful candles.

[6] aine, Sandy. (1995) Candle Makers Companion: small business. Interweave Press. London

[7] Okogwu I, (2008): Design and Fabrication of candle Moulding Machine. Unpublished HND Project, Mechanical Engineering Department,Akanu Ibiam Federal Polytechnic unwana, Ebonyi state.

[8] Fabrication and Evaluation Performance of Palm Nut-Pulp Separator. Journal of Emerging Trends in Engineering and Applied Sciences (JETEAS), Volume 3 (1): 144-151

[9] Khurmi, R. S. and J.K. Gupta. A Textbook of Machine Design, Seventh Multi-Colour Edition, Eurasia Publishing House Ltd, Ram Nagar, New Delhi. pp. 16-52[10]. Khurmi R.S. (2010). Strength of Materials – Mechanics of Solids. S. Chand publications, New Delhi.

[10] Khurmi R.S. (2010). Theory of Machines. Ram Nagar, New Delhi: S. Chand and Company Ltd.

[11] Nwankwojike B. Nduka*, Onwuka S. Osinachi and Orji G. Nkemakolam Design and Development of Integrated Slurry Food Processing Machine submitted to the Department of Mechanical Engineering, Micheal Okpara University of Agriculture, Umudike jikeobodo@gmail.com*

[12] Sharma P. C., and D.K. Aggarwal. Machine Design. S.K. Kataria and Sons, Nai Sarak, Delhi. pp. 19-58, 483-839. 2013.

[13] Sulaiman M.A. and Adigun R.A, (2008). Fabrication of cassava lump breaker.Unpublished project report submitted to the department of Mechanical EngineeringKwara State Polytechnic Ilorin.7. http://www.peakcandle.com/category/Candle-Making-Kits.aspx

[14] http://www.candlesandsupplies.net/Candle-Making/Starter-Kits

[15] www.duakuda.com/palm_wax