



Dewaxing Device and Its Effectiveness on Fabric Decoration

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Abstract: This research paper is to look into an invention relates to the field of textiles and fabric decorations, the apparatus and method for dewaxing dyed fabrics and recovering of lost waste wax. However, The invented device will guide on how some small and medium scales in the industries know the economic impact the device the help of an electric dewaxing device constructed to the level of which hot water in the dewaxing device, wax is separated from the textile to form wax liquid and floated to form scruff, and the scruff is picked up and recovered with the wax recovering device. The present invention can avoid wax to enter waste water. In particular to a device for dewaxing and recovering from fabric applied to the batik factory. Wherein, the fabric is guided to pass through the hot water in a dewaxing device by means of a fabric guiding device. Meanwhile, this reseach will examine the recovery ratio of the dyed wax is improved.

Key Words: Dewaxing, Device, Effectiveness, fabric Decoration.

1. INTRODUCTION:

A de-waxing machine or de-waxing device of glass fiber is an electric heating furnace and it comprised of a furnace body, electric heating devices, a first guide-in roll, a second guide-in roll and a de-waxing fiber cloth guide-out device where in the furnace body is provided with a furnace pipe; the furnace pipe is formed by the joint enclosing of a first heat insulation wall and a second heat insulation wall which are arranged face to face in the long edge direction as well as a pair of third heat insulation wall which are arranged face to face in the short edge direction; a de-waxing cavity is arranged between the first heat radiation plate and a second heat radiation plate, and the top and the bottom of the de-waxing cavity are not closed; the electric heating devices are arranged between the first heat insulation wall and the well as between the second heat insulation wall and the second heat radiation plate; the first guide-in roll is pivotally arranged at the bottom of the de-waxing cavity; the second guide-in roll is arranged at the top of the furnace body and corresponds to the top of the de-waxing cavity and the de-waxing fiber cloth guide-out device is arranged on the furnace body. The de-waxing machine has the advantages of reducing the whole volume, saving the occupied area in the using state, and especially being capable of saving energy consumption. The machine provides a high efficiency wax removing and its structures comprises a wax removing box, a textile moving device and a floating wax collecting device. The wax removing box is provided with an upper box cover and the upper box cover is provided with the floated wax collecting device. Compared with the prior art, the utility of model of high efficiency wax removing machine, has the advantages of reasonable design, environment protection and energy save, high efficiency of wax removing and ease in maintenance of utilization. Thus, the machine has a great popularization and utilization value.

These machine also comprises a frame, a power transmission device, a rolling device and a guiding device, where in the power transmission device is arranged at one end of the frame, the rolling device in the transmission connection with the power transmission device, the guiding device is used for guiding the de-waxing glass fiber cloth after de-waxing to the rolling device to roll; the rolling device comprises a first friction roller, a second friction roller and a rolling roller, the first and second friction roller are horizontally arranged on the frame through keeping a parallel rotating manner are in transmission connection with the transmission device, and the rolling roller is laid aside above the first friction roller and the second friction roller. The machine has the advantages that the rolling mechanism is favorable for increasing the speed of changing the rolling roller and reducing the labor intensity for workers, the rolling roller has good rolling effect, gyroscopic effect does not occur to a rolled object, thereby ensuring no barrier subsequent process.



1.1. Objective of the invention in solving the problems in the prior

Technology has propelled the growth of human society in innumerable ways. From the basic needs of food, clothing and shelter to advanced robotics and health care, technology has rapidly assumed the status of an arguably indispensable and highly effective tool in the modern era. Clothing has always been both a necessity with regard to human civilization and a means of showcasing one's culture and interests. Social status, religious leanings, cultural diversity and professional status can all be amply reflected by one's clothes. A wide array of different styles of clothing is now possible, aided by powerful technological tools that supplement and shape the creative ideas of fabric designers.

- To design, Construct, fabricate a dewaxing device using locally sorted materials.
- To produce a fabric with optimum efficiency.
- To construct a device with less operational skill and minimal and affordable cost.
- To produce a faster and durable textile dewaxing device for small scale and medium scale enterprises.

Evolution of Fabric Design: In accordance with principles, man is a remarkable example of adaptability. And a look at the way clothes have evolved only goes to illustrate this. In addition, the progress of man's concept of fashion has also transformed over the ages. Starting from merely covering one's body with natural fur to protect it from the vagaries of the natural elements in ancient periods of human existence to designing special suits and fabrics woven out of exotic materials to meet adverse environment requirements like space and desert surroundings, man has always shown ingenious capability to engineer requisite changes in the fabrics. The concept of fashion too has seen a marked shift with the variety of choices available in the present times. Of course, technology is a major driving force behind fashion trends.

The Role of Technology in Fabric Design: One of the most significant outcomes of the famed Industrial Revolution was the mechanization of textile manufacture. The power loom and the mechanized cotton mill resulted in a huge increase in the quantum of production by shortening the time required for production manifold. In the more recent times, there has been a proliferation of novel materials designed, and this has enhanced both the quality and adaptability of fabrics. The so-called smart materials enable the production of clever fabrics, with high-end technology like atomic force microscopy and polymeric nanofibres going into the design, manufacturing and testing of these fabrics. Ranging from special applications like the design of suits for space travel, swimsuits and suits for military purposes to the usage of more durable and adaptable garments for daily use, these methods have proved to be extremely effective. Several research centres have sprung up to investigate these exciting possibilities. The role of computers is unarguably prominent in fashion technology. The visualization of the final design right at the conceptualization stage, down to the finest detail, making suitable modifications if so desired, automating several stages in the manufacturing process and, finally, executing quality control procedures - all of them involve computing at various levels of complexity.

2. LITERATURE REVIEW :

The dewaxing device is an automatic device that accelerates the speed of dewaxing effects on a fabric. Many reviews have been said about this textile device and some of these reviews include the followings;

The development of a dewaxing device will deliver better understanding of the wax removal as such processes is affected by rate of these factors on the shape and number of dyed cloth. As many parameters are involved in the waxing process can accomplish the control of the unit to keep the operation in the standard design range. United States Patents Applicants (2000) is of the opinion that de-waxing device includes a platform, a heating plate, a first linear actuator, a second linear actuator, and an operating plate. The platform includes a base and a support positioned on the base. The heating plate is positioned on the base. The first linear actuator includes a first rail fixed to the support, in parallel with the heating plate, and a first slider slidably riding on the first rail. The second actuator includes a second rail and a second slider riding on the second rail. The second slider is connected to the first slider in such a way that the second rail is perpendicular to the heating plate. The operating plate is fixed to the second rail at an end far from the first linear actuator and in parallel with the heating plate.

Alex T. (1973), claims that a dewaxing machine is used to provide favorable conditions for the growth of wax removal and to dilute the resultant in a dyed cloth so as to permit continuous wax separation. When introducing automatic control systems in textile designing, a description is required for the processes to be controlled. Wolff (2002) stated that the performance of the device is monitored by the industry so that it may withstand the demands of the various stages of the investment in dewaxing of dyed fabric the modeling wax pattern used in the process is a relatively complex mixture of candle wax. While, Bleier K. (2002), stated that the wax originated from this process presents dirt and water, demanding extra processes, i.e., purification, for the re-use of the wax on the dyed fabric. Thus, the machine is used in performing the above explained features.

Sabau V. (2003) , proclaims that the performance of the device is usually assessed by evaluating properties like melting point, volumetric expansion, ash content, filler content, resistance to oxidation and chemical reaction on the fabric. Benitez, R. (2006), describes that the device is actually a conversion process. Its main process is to remove wax from a waxed fabric. It is classified as a separation process. It is obviously the best way to de-wax fabrics because it results in a product with lower pour points, high yield, and high stability. Meanwhile, John K. (2008), is of the opinion that the de-waxing machine is an electric heating furnace device and it comprised of a furnace body, electric heating devices that makes a waxed fabric de-waxed effectively and efficiently.

Dewaxing Machines Available Before Construction

There are various types of dewaxing machine used. They are of different size, shapes, technology and methodologies. Some of these machines include the followings;

- i. **Steam De-waxing Machine:** This is a high boiling device for high de-waxing efficiency, big heat raising, safety, without inspection, without license and space saving. De-wax furnace is manufactured from high pressure resistant steel plate.
- ii. **Electric Heating De-waxing Machine:** This is a machine with double jacket designed, with the characteristics of thermal insulation and air gathering fast allows the furnace to achieve 7kg/ cm² above pressure and less water production in about 3 seconds. Steam is generated by electric, making maintenance easier.
- iii. **Electric Inner Double De-waxing Machine:** This de-waxing machine is the electric heating inner double boiler tank machine, which its special purpose is for de-waxing fabric materials.

3. SIGNIFICANCE AND BENEFITS OF THE DEWAXING DEVICE :

The Adire, Kampala and Batik (Tie and dye) business in Abeokuta Ogun state in Nigeria provides substantial contribution to the economy in the form of income, employment generation and possibly foreign exchange generation. An innovation such as this designed and locally fabricated dewaxing device will expand the frontiers of production of such artistic pieces with greater uniformity and consistent pattern design. This device will therefore serve the needs of effective teaching and learning in academic studios while creating frontiers for expanded production to the cottage textile outfits in Abeokuta, Ogun State and Nigeria at large. This is buttressed by the fact that there will be reduced cost of production as well as time saving and also increases production volumes.

4. ANALYSIS AND PROCESSES INVOLVED IN CONSTRUCTION OF DEWAXING DEVICE

- a) **SCRIBING:** This involves marking out the provided materials to be fabricated into the required specifications.
- b) **CUTTING:** This involving cutting either by sawing or using grinder to chop off materials to the required specifications. There is no way fabrication can be done without cutting either by sawing, grinding or use of gas to cut the metal to shapes and the desired pattern.
- c) **GRINDING:** This involved the use of electric grinder or pneumatic to chop off excess materials, it is highly essential during fabrication in order to ensure adequate smoothness and good surface finished.
- d) **WELDING:** This involve mating of two parts under high temperature, it may be by arc or by gas welding. During the fabrication, this two methods was adopted ,gas welding was use to cut out the desired pattern of the drum mixer, and the electric arc welding machine was used to weld all the intricate and assembled parts together.
- e) **PAINTING:** This involves coating to prevent rusting and corrosion, it also adds to the beauty of the component, which makes it attractive.
- f) **TEST-RUN:** This involves pre-test of the fabricated components to see if the performance is up.





S/N	Construction and Electrical Part	Experiment
1.	In above-mentioned dewaxing recovery system, preferably, described dewaxing device comprises the dewaxing groove that is holding described hot water, and the dividing plate groove that will dewax is divided into dewaxing district and goes out fabric zone, and fabric dewaxes in described dewaxing district, and goes out fabric zone and drawn the dewaxing groove described.	Water temperature: 60-100 °C, be preferably 75-95 °C, temperature cross low wax be difficult for softening with break away from the too high then water of temperature instability, scum silica frost instability.
2.	In addition, preferably, described fabric guides device comprises: guide-in roller, and it is used for fabric is imported in the dewaxing groove; A plurality of deflector rolls, staggered arrangement is in the dewaxing district, so that fabric moves along the zigzag path about them; And roll is right, and the top that it is located at out fabric zone is used for the fabric after the dewaxing is drawn.	Water level: require to be higher than top deflector roll certain height, generally should be preferably 600mm-1000mm at 200mm-1200mm. Cross the low water level instability, it is too slow to float, and then the water consumption power consumption is bigger for the too high water surface.
3.	In addition, preferably, described wax retrieving arrangement comprises: pick up the wax cylinder, it is located at the top in dewaxing district, and contacts with the water surface bottom it, is used to pick up the scum silica frost of the wax that floats on the surface; And scraper, its wax layer that is used for being formed on by scum silica frost on the ten wax cylinders scrapes.	Fabric speed: depend on treatment time and water temperature in hot water. General fabrics and hot water duration of contact are 0.5-5 minute, are preferably 40 seconds to 110 seconds.
4.	In above-mentioned dewaxing recovery system, can also comprise the direct steam heating tube of the water that is used for heating dewaxing device.	pick up logical cold water in the wax cylinder, keep the lacquer drum surface temperature not to be higher than 30 °C., pick up wax speed with raising so that make the scum silica frost fast setting. Cylinder surface should the hard smooth paraffin cutting that is beneficial to.
5.	In above-mentioned dewaxing recovery system, preferably, the temperature of the water in the dewaxing device is 60-100 °C, and fabric and hot water duration of contact are 0.5-5 minute.	Wax spatula: stainless steel, elastic scraper.



6.	Preferably, the distance that is between the water surface of the deflector roll on top and hot water is 200mm-1200mm. In addition, pick up in the wax cylinder by water quench, surface temperature is not higher than 30 °C, and the surface is hard smooth.	Heating: should heat with open steam.
7.	In addition, the present invention also provides a kind of dewaxing recovery method that utilizes above-mentioned dewaxing recovery system from fabric dewaxing and recovery, comprise: utilize the fabric guides device with fabric guides by the hot water in the dewaxing device, seal wax on the fabric breaks away from fabric and forms wax liquid under the effect of hot water, wax liquid floats and forms scum silica frost, and described scum silica frost is picked up and reclaims by the wax retrieving arrangement.	Dividing plate: stainless steel, available 1-3, the dress rolls is right on dividing plate of outermost.
8.	In above-mentioned dewaxing recovery method, preferably, the temperature of the water in the dewaxing device is 60-100 °C, and fabric and hot water duration of contact are 0.5-5 minute.	

It is much higher that the wax rate of recovery that top data presentation should be invented the dewaxing groove reclaims wax efficient than common air supporting. Though the wax rate of recovery of this invention dewaxing groove is lower than organic solvent slightly and reclaims wax efficient, the cost that wax is reclaimed in this invention reclaims low many of wax than organic solvent, and cannot resemble and can cause secondary pollution to water body the organic solvent absorption method. Therefore this invention combines high-level efficiency and reclaims wax and advantage with low cost.

According to technique scheme of the present invention has reach the final stage which following technique was effect:

- i. Fabric dewaxes before washing, and the dewaxing rate reaches more than 95%: dewaxing had kept the original quality of wax before
- ii. were washed, and direct reuse has reduced cost;
- iii. Wash preceding dewaxing rate height by son, alleviated the washing load greatly, saved water;
- iv. Compare with existing each dewaxing technique, the pollution load that enters waste water alleviates greatly, and wax does not enter waste water basically, and wastewater treatment is become easily, has greatly alleviated the pollution to environment.

5. RECOMMENDATION:

This research will recommend helping the people in the industries that have passion for textile designing,

1. They should research more on the equipments and facilities used for textile design which makes work faster and suitable in the market.
2. They should also visit other tertiary institution to see more of these machines that are being used.
3. This work does not claim to have exhausted all the factors or method needed to be known in dewaxing dyed fabrics. Due to time cautiousness, it is believed that this work will guide other artists on dewaxing. With the great level of production of this work of art by the It is therefore hoped that cooperate bodies will also assist artists willing to undertake projects such as this in form of funding and materials production.

6. CONCLUSION:

The main objective of this research is to construct a dewaxing device that can dewax Batik fabric in large quantity. This work was done to reduce man's energy in dewaxing much dyed fabric. The aim has been achieved the project was a great success which has increased in the equipment or machine to be used in the textiles industrial design. Technology is scaling tremendous heights and with it, so are all its applications. Textile and fabric design have in store



lots of promises and continue to be a standing example of the prowess of technology. As the finest clothing ever made is a person's skin, but of course, society demands something more. So the quest for better clothing, better fabric and trend garments continues unabated aided by technological advancements.

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