Design and Development of Gas *Canting* Tool

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Abstract
Gas *canting* tool is designed and developed to maintain the temperature of batik's wax where it is long been a problem in conventional batik making industry. This product has a lot of different between the conventional canting tools that can assist the user in easing the process of batik making. The original canting tool takes more time in making a design due to constant solidified of the wax in the wax container and the user also have to add the wax in the wax container from the hot wax pot again and again to finished the design of the batik . This gas canting tool is specially designed using a burner that keeps the wax in the container in molten state. The special design of the gas canting tool enables even the inexperience new user to operate the batik design process with ease. The gas canting tool is able to achieve the objective of this project, where it is the main problem faced by the batik industry; maintaining a constant temperature of 125°C which kept the wax in molten state throughout the batik design process.
Keywords: canting wax, wax container, heater, gas burner

1.0 Introduction

In this informational and manufacturing century, many simple inventions have evolved to extraordinary invention. These particular scenarios also can be seen in our country. *Batik* is a technique of using the molten wax concept in designing before the process of dyeing. Batik is made either by drawing dots and lines of the desired design with a spouted tool called a canting or by printing the molten wax with a copper stamp called a cap (Victor, 2002). After applying the molten wax resists, the cloth is then dye with color selectively by soaking the cloth color dye. The wax on the cloth is then removed by soaking in boiling water. The process is repeated based the design where more colors are desired.

The main objective of this project is to solve the problem of molten wax solidified too fast in the wax container which requires constantly reheating. This process of reheating is time consuming and the solidified wax will affect the overall design of the batik. So, the objective of this project is to design and develop the canting tool that can maintain the wax temperature in the wax container of the canting tool. The scope of this project is to understand how to design a tool that is able to maintain the temperature of batik's wax at 125°C.

2.0 Methodology

This project was aimed to solve a problem in the traditional canting tool made from a stick of a selected wood with a wax container attached to it. The copper made of wax container is design in a specific way so that it can accommodate the molten wax and at the same time enables the wax to flow through an orifice in the process of the batik design canting (Baker, 1982). Common wax or paraffin, resins, animal fats is mix with beeswax for its adhesiveness, liquidity, malleability and friability (Freund et al,. 1982). The canting, consisting a molten wax container made with copper, which is connected to a short bamboo handle or specific wooden stick. The container is connected to an orifice which allows the molten wax to flow out from the container to the cloth surface for design drawing or canting process. Figure 1 shows an example of the conventional canting tool using in current batik industry.

Figure 1: Conventional Canting Tool

According to the canting tool, a device for batik canting comprising; a container; a spout connected to one side of said container; a handle connected to one side off said container; characterized in that a detachable means between said spout and said container; a stopper lever connected to the container; the said stopper lever having a resilient device acting on the stopper lever to allow the lever to actuate and retract; a lid connected to the stopper lever to intercept the said spout; and a heating element connected to said container. Preferably, the heating element connected to the gas burner. Butane gas are inserted into the gas container. Then, ignite the lighter at the gas igniter to make an ignition. The gas in the gas container flow to the gas igniter to make the ignition long lasting. Gas igniter heated the wax heater to melt the canting wax. As the wax heater temperature are stable, it supposed to maintain the canting wax temperature in the wax container. Process flow of the gas canting tool showed in Figure 2.

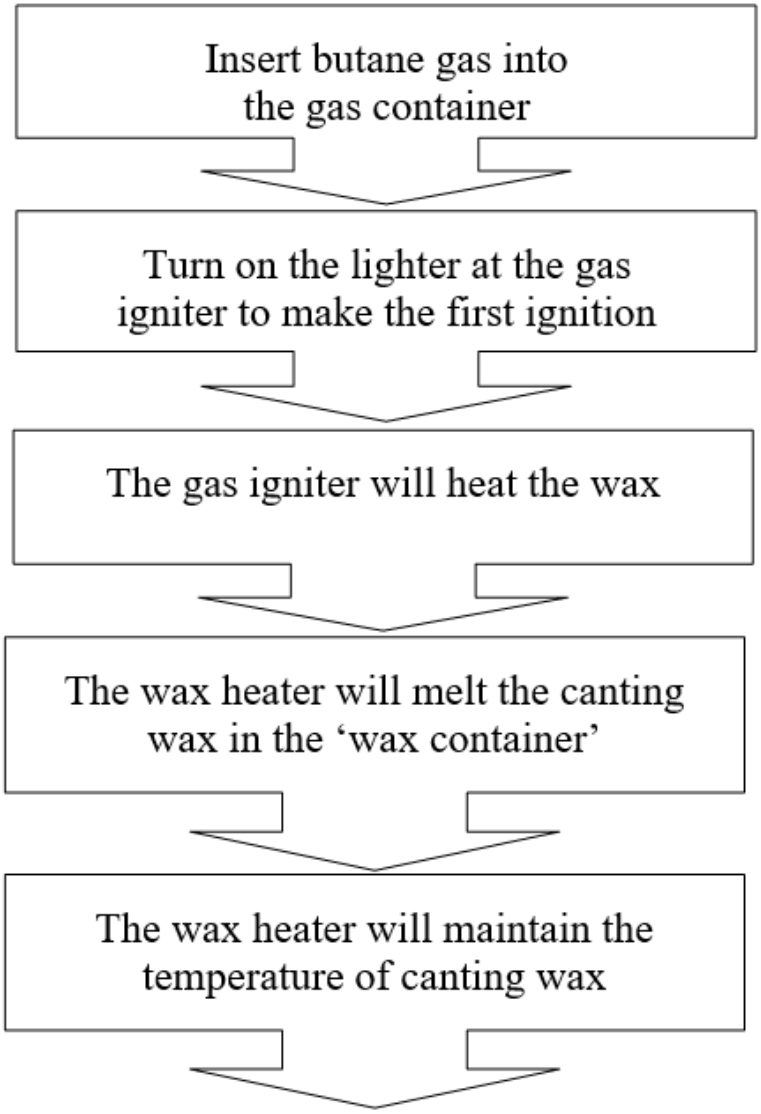

Figure 2: Process flow of gas *canting* tool

2.1 Basic Concept of Canting Process

Batik originated from jawa word '*amba*' which means drawing or make dot on the clotch. To draw the batik design, we need a tool called '*canting*' where wax flow out through an orifice of the canting to make the batik design. The conventional canting tool consist of a wooden or bamboo stick and a copper plate call '*nyamplung*' to store the molten wax. The problem occurs when the wax in the wax container started to cools down, which lead to solidifying of the molten wax. The artisan will then need to reheat the wax in the wax container in order to continue the batik design. This repeating process of drawing and reheating cause the decrease in production and obstruct the creative flow of the artisan.

In order to solve this problem, this project uses gas flame which will continuously generate and supply heat to the wax container. This allow the wax to constantly stay in the molten state without the artisan needing to

reheat the wax (Kaye, 1995). The second problem is to control the intensity of the flame. By controlling the intensity of the flame, the wax in the wax container will be supply with a steady constant heat (Brannt, 1893). The flame generated able to constantly kept the molten wax in it desire molten state which is at 125°C.

2.2 Design Details

There are few components use in the project such as gas container, gas Igniter, wax heater, wax container and end hole. The important part in gas canting tools is a process to make a wax container shown in Figure 3. The design use a stainless steel to make a 'wax container'. The steel are cut into square shape. The cutting process must be done properly and same as the measurement of the prototype. Next process is the welding process. Every edge of the steel are welded smoothly to make a perfect edge. Certain part of the wax container are make through the wire cut process. Wire cut or an EDM (Electrical Discharge Machining) is a process of metal machining in which a tool discharges thousands of sparks to a metal workpiece. A non-conventional process, EDM works on parts resistant to conventional machining processes, but only if these parts are electrically conductive; usually, they are non-ferrous, and include steel, titanium, super alloys, brass, and many other metals.

By referring to the Table 2, the wax container can maintain the wax's temperature at 125^{o}C. It also reduce time in the batik canting process when compare to the conventional canting tool, by users no need to put the wax into the wax container repeatedly. At the top of the wax container, a copper plate is mounted at the aluminium soldering iron holder shown in Figure 4 to absorb heat from the aluminium and flowing the heat back into the wax container. This innovation prevents heat loss to the environment. The heat flowing back into the 'wax container' helped in providing heat to maintain the wax in wax container. The copper that mounted also helped in reducing heat in aluminium soldering iron holder. This soldering iron are mounted into the wax container using a high temperature silicon shown in Figure 3. At the tip of the soldering iron, its main function is to heated and maintain the wax in wax container. The gas that are flowed in the soldering iron can be set according to the users needs, when the wax reached at 125^{o}C, set the gas at the medium, so the wax are heated continuously and maintain that temperature.

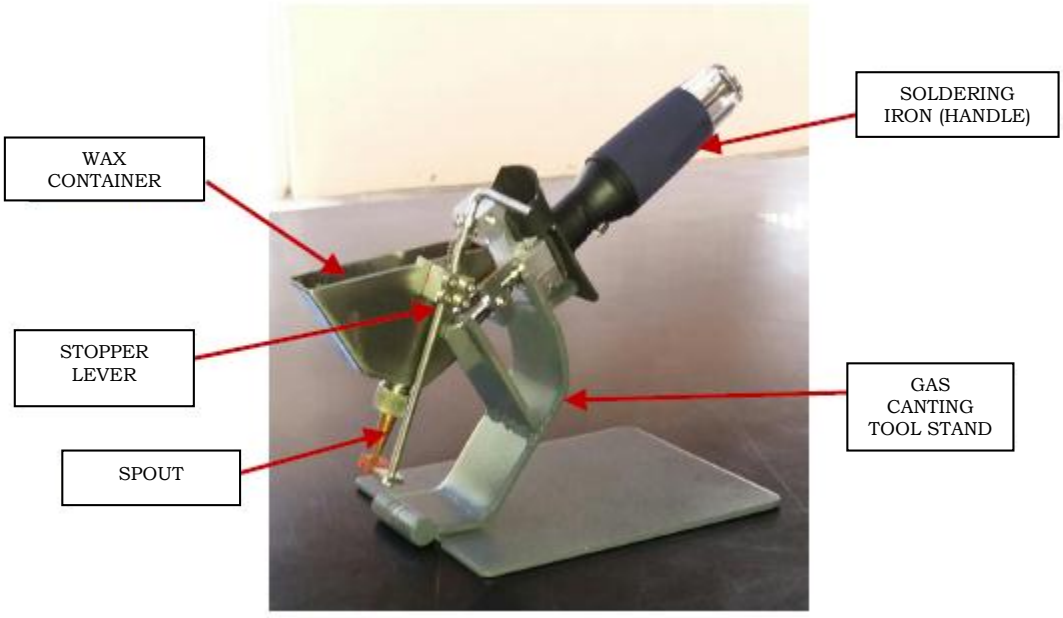

Figure 3: Gas canting tool

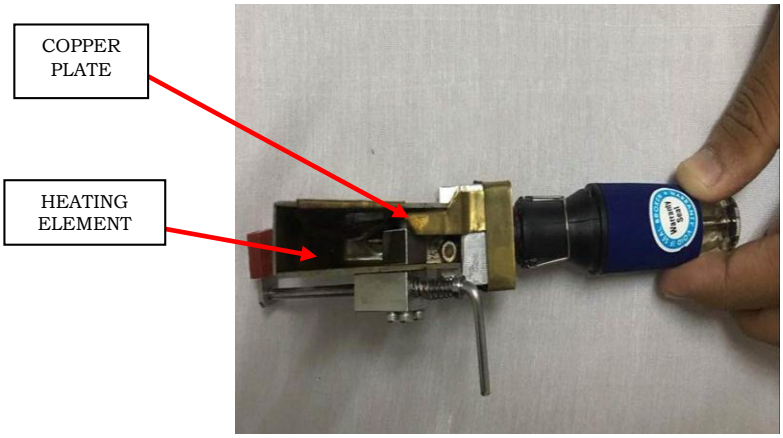

Figure 4: Copper plate at the aluminium soldering iron holder

3.0 Result and Discussion

The material of gas canting tool consists of stainless steel, spring, lighter, cooper and refill the butane gas if the gas in the lighter tank is low. The experiment between original canting tool and gas canting tool shown in Table 1 and Table 2. The original canting tool takes more time to make a design of batik. This gas canting tool is specially designed for the users that are new in batik making. The design is small and comfortable for users to hold and easy to use. The original canting tool, due to the inconsistency of the temperature and unable to control the temperature, create inconsistance in quality of batik compare to this gas canting tool.

Table 1: Wax temperature in original canting tool

Time (s)	Temperature (°c)			Average Temperature (°c)
	1st	2nd	3rd	
20	119	115	119	118
40	122	118	122	120
60	128	122	126	125
80	123	118	123	121
100	120	117	121	119
120	118	115	119	117

Table 2: Wax temperature in gas canting tool

Time (s)	Temperature (°c)			Average Temperature (°c)
	1st	2nd	3rd	
20	125	125	128	126
40	134	133	138	135
60	135	135	138	136
80	134	135	139	136
100	135	135	139	136
120	135	135	139	136

4.0 Conclusion

This design and fabrication of gas canting tool is a suitable idea for all Batik industries. It ease the user by reduce time during the batik making. Furthermore, this tool helps to ease the process of painting the pattern and the wax absorption process on the cloth.

Other than that, this product also can be potentially commercialized as it has potential to be marketed into the batik manufactures in Malaysia. As we all know, it's hard for the new workers to maintain the wax's temperature during the painting process. So with this method, other workers can get the benefit from this tool. Last but not least, gas canting tool is a product that plays a very important role in order to develop national industry. This project met the objective and feed back from the industry are positive.

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