CREATIONS de UiTM

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Gotta Go Heater

[1]Adrieana Husna Shahrul Anis, [1]Nur Najihah Melan, [1]Fahirah Auni Suhaimi, [1]Naja Alea Hasnol Nazim, *[1,2]Aida Fazliza Mat Fadzil

[1]Centre of Foundation Studies, Universiti Teknologi MARA, Cawangan Selangor, Kampus Dengkil 43800 Dengkil, Selangor, Malaysia

[2]Institute of Science (IoS), Kompleks Inspirasi, Universiti Teknologi MARA, 40450 Shah Alam, Selangor, Malaysia

*E-mail: aidafazliza@uitm.edu.my

ABSTRACT

An electric kettle is a home appliance that is commonly used nowadays to prepare hot water in a short time. However, most of it is only available in large sizes, has a separate power base, and requires to be plugged into a socket for a power supply. On the other hand, the existing portable kettle still has a wire. All of the criteria mentioned make these kettles unportable and not really travel-friendly. Thus, we came up with the idea to innovate the kettle to go cordless by using rechargeable lithium batteries and also in the thermos. This will make our Gotta Go Heater portable and travel friendly. The target market is students, working people, travelers, and parents with babies. As our product is rechargeable and affordable, it will be convenient for the users to own and use them anywhere at any time. Hence, we believe our Gotta Go Heater will receive high demand from all users worldwide.

Keywords: Kettle; portable; cordless; lithium batteries; thermos

INTRODUCTION

An electric kettle is a home appliance that we commonly use in our daily life to boil water. There are various types and designs of kettles that have been sold in the market. However, all of these designs offer a large-sized kettle with a separate power base. On the other hand, to use these kettles, it needs to be connected to the power supply. Due to these criteria, it brings an inconvenience for the users to use it at anytime and anywhere.

There are a few problems we have taken into our discussion before we decide on our product. Based on our findings, the normal kettle that is being sold in the market only comes with a big sized kettle and needs to be connected to the socket for the power supply. In addition, the separate power base and size of the kettle requires large spaces for storage. Thus, this raises problem especially for parents with babies. They find it hard to have no easy access to hot water to prepare formula milk for their child mainly when they are traveling or going for a trip. On the other hand, students and workers who love hot beverages in the morning cannot have their drinks when they are rushing for class or work. Furthermore, having safe and clean hot water has been an issue among travelers [2]. Not to mention, people who go camping also having hard time to access hot and clean water as the electric kettle requires plug and socket for power source in order to work the kettle. To sum up, normal electric kettles are not capable of preparing instant and clean hot water for users when they are in a hurry or while traveling.

Considering this problem, our group has resolved to come out with a market-beneficial innovation for preparing on-the-go hot water. We decided to innovate the normal electric kettle to be a portable kettle packaged in the thermos. This product is a combination of an electric kettle and a thermos named Gotta Go Heater.

INNOVATION DEVELOPMENT

Our Gotta Go Heater is an innovation inspired by a common kettle. This product functions the same as a kettle except it enables the users to make hot water anywhere and anytime. Our Gotta Go Heater is compact in size and wireless so that it can easily be carried anywhere and is ideal when intent to make quick beverages. This provides a travel-friendly option to the users as well as enable them to have easy access to hot water.

There are several physic theories that we have implemented in building this product. The inside body of our product is made of 304 stainless steel, this material is suitable to use as it is an alloy, which then makes it resistant to corrosion. Stainless steel is also environmentally friendly because it doesn't leach chemicals when exposed to heat. Next, stainless steel is a metal with a low specific heat capacity. It can heat the water at high temperatures in a short time. Thermos bottle has a component of insulated material which is silicon that can keep the hot temperature of water by minimizing the heat loss [7]. The capacity of the portable water heater is 400ml. The heating element that is being used on this product is made up from nichrome, nickel and chromium. These are ideal materials to boil water faster as it has high resistance to electrical current [3]. The lithium battery charger module is connected to a lithium battery that will act as electric storage. The lithium battery charger module has been equipped with a USB micro connector. The portable water heater can be recharged as it uses the rechargeable lithium battery as power supply. The thermostat is installed in our product to regulate the temperature in the heating system. The thermostat allows the circuit to transfer heat to the heating element which then transfers to the water to start the heating process. Once it has reached the desired temperature, the heating process is stopped. A bottle pouch is included in this product, specifically made of silicon, a durable and heat-insulating material. This is so that the users can hold the bottle despite having hot water inside the bottle. Copper wire has low resistivity which makes it a good electrical conductor [6]. The diameter of the copper wire used is wide, following the physics concept of lowering the resistance. Thus, increasing the power efficiency.

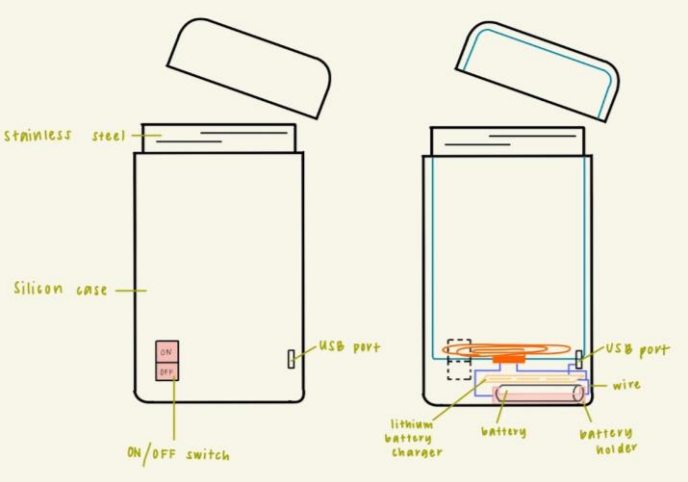

Figure 1: Schematic Diagram of Gotta Go Heater

Figure 2: Product Design

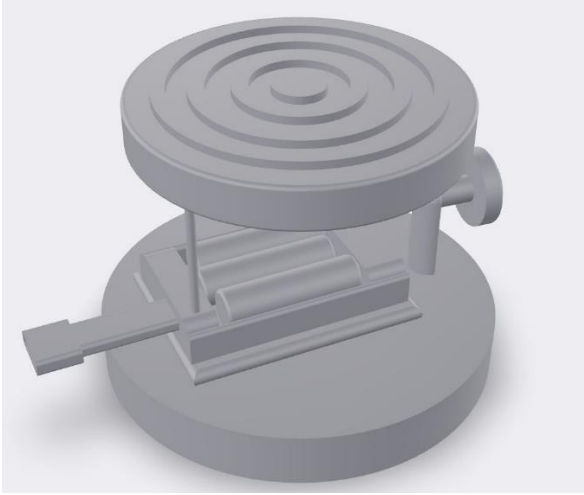

Figure 3: Circuit design

COMMERCIAL POTENTIAL

Gotta Go Heater was idealized for the purpose of reducing the energy and time in getting hot water. Most times, a heater requires a plug to switch it on which makes it difficult for some people who are on a trip. Not only that, it will also be a problem towards the students that do not have much time as they have a very packed schedule or the parents with babies and toddlers that require a lot of attention. Therefore, one of our main target markets is referring to the large and active travelers out there.The presence of this new product applies several physics concepts. The travelers can have convenient devices to have hot water. Thus, this will help to remove all the worries and concerns while traveling.

On top of that, we also include the students as our main target market as we want to help students keep active and energetic in the classes by providing instant hot water for students to have their breakfast and coffee in the class with the easiest and fastest way. Other than that, parents with babies and toddlers also become one of our main target markets. As we know, the babies always need to be fed on time, so the parents need to have access to hot water everywhere they go in order to make formula milk for their babies. Hence, by having this product on the

market, it will ease the parents.

The various functions of our Gotta Go Heater have made it very convenient for people to bring it anywhere without worries of not having any plug nearby. Thus, it is undeniable that our Gotta Go Heater will receive high demands from all the users regardless of any age.

Table 1: Price of Product (1 Unit)

ITEM	QUANTITY (UNIT)	PRICE (RM)
Thermos	1	15.00
Heating element	1	8.00
Lithium battery charger module	1	2.00
Lithium battery	3	20.00
Thermostat	1	4.50
Switch	1	0.60
Copper wire	1	1.30
TOTAL		51.40

CONCLUSION

Our Gotta Go Heater has numerous advantages for students, parents, travellers, and others. It is compact in size and lightweight, making it accessible to put into a backpack or suitcase easily. Moreover, it is designated in a thermos, allowing it to maintain the water temperature so that users can have warm water for a longer time. In addition, it also has a double lid to keep the water warm and avoid any leakage. This portable kettle also facilitates users with a rechargeable lithium battery. Thus, it doesn't need to plug into the socket for a power supply. Last but not least, the cable used to charge the portable bottle heaters can be put into the cup, which makes storage easier. This feature will make our product efficient and travel-friendly, which will achieve our objective.

Our Gotta Go Heater will continue to be upgraded by others by adding more features. Currently, our portable bottle heater maximum capacity is 400ml. However, with larger capacity available, users are able to prepare more hot water at once. Other than that, features that can be included are using renewable energy as the power source. For instance, a transparent solar panel is used for optional settings. This solar panel is indeed useful as it is very sensitive towards light. When the battery of this bottle heater is used up, it can still be used as long as it is exposed to sunlight. Not to mention, it is also eco-friendly.

ACKNOWLEDGEMENT

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