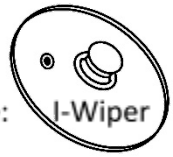
NATIONAL DESIGN PROJECT

Our Project Title:  I-Wiper

(Improved, Innovative, Inexpensive)

Our Team Name: 5A da Great

Our Team Members:

Lam Rossa
Natalie Law Enrui
Neo Zhe Kai
Zhao Yiquan

Henry Park Primary School
Name of Teacher IC: Mrs Elaine Chua
Email of Teacher IC: ng_yean_yee_elaine@moe.edu.sg
Contact Number: 6466 3600

I. Project Overview

"Mrs Chua often gets frustrated during cooking. Every time she removes the pot lid from the boiling pot and leave it on the countertop, there will be water droplets left on the countertop and she has to find a cloth to wipe the countertop." This is a typical scene in the kitchen.

When the pot lid is removed from the pot during and after cooking, the water that condenses on the lid naturally flows down to the rim of the lid. Hence when the lid is tilted, the water may spill onto the countertop or even onto the floor if the user is not fast enough to rotate the lid, causing it to create water spill. The user needs to clean up while still cooking. This is not good as, for example, if you are cooking boiling hot soup, you would want the most heat to be trapped and the least heat to escape from the pot as it is more flavorful when tasted hot. By spending time to wipe the mess, we are allowing more heat to escape. Moreover, if we continue to cook without wiping, the water spilled onto the floor might cause us to slip if we are not careful.

We hope to address this common problem faced by people who cook by looking for ways to prevent water from being spilled into the countertop/floor when the pot lid is removed from boiling pots.

II. Research Findings

The water droplets on the pot lid are formed when the air that is near the surface of the lid is cooler than the boiling water in the pot, hence the steam loses some of its heat as it rises and comes into contact with the lid. As the steam cools down, its molecules slow down and become more tightly packed, which causes them to lose their energy and condense back into liquid form.

Although the formation of these droplets on the inside of the lid is a sign that the lid is effectively trapping the heat and steam inside the pot, which can help to cook the food faster and more evenly, it can be a hassle to the user if they cannot turn the lid around in time when they remove it.

One common experience is the cooking of pasta. The condensation of water on the surfaces of pot lids while boiling the pasta is a hassle. The lifting of the pot lids to check if the pasta is cooked is a hassle when water drips from the lid of the pot. Many people will encounter such inconveniences during cooking.

<u>Results from Interview</u>

We have interviewed eight housewives on this issue. Our qualitative interviews aim to find out their struggles, needs and how our suggested solution might be beneficial to them. Through our interviews, we found that all of them had encountered such inconveniences and struggles with the water spill from the pot lids while cooking.

Some of their responses included …

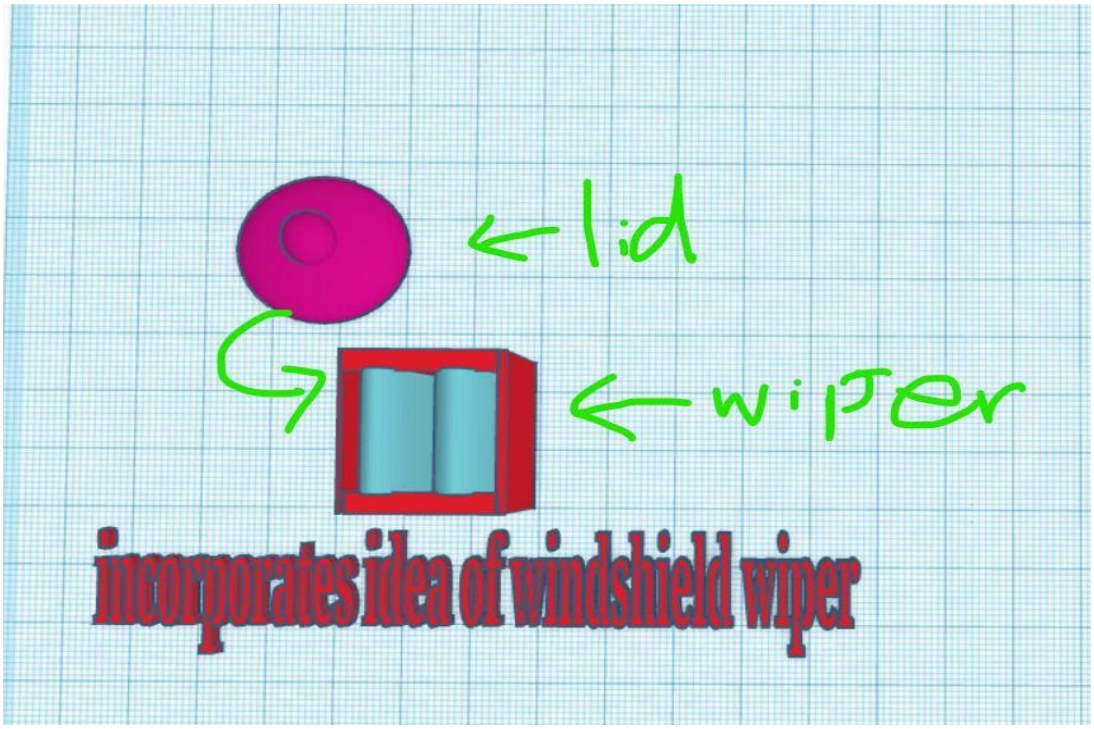
- Housewife A – “When the water spills, it's frustrating to clean up again and again, especially when I am multitasking and need to put all the ingredients in quickly.”

- Housewife B – “Most of the time I am fast enough to flip the lid and hover it over the sink, but sometimes when the water spills, I will get annoyed.”

- Housewife C – “Usually I am able to prevent the water from spilling onto the ground so it is not a hassle for me, even if I spill I just use a cloth and wipe it off, but I can understand if other people are frustrated when that happens.”

III. Proposed Solution

We initially came up with combining the idea of car windshield and the pot lid holder to wipe off the water on the lid. We did a simple drawing of it. The pot lid holder has some cloth or sponge attachment that allows the removal of moisture from hot pot lids once placed in.



We did an improvisation on our initial idea and decided to incorporate the 'wiper' function in the pot lid itself instead. Our proposed solution is to add a 'wiper', like those on car windshields, at the bottom of the pot lid that is connected to a movable knob at the top of the lid. Hence, when the water condenses, the user can turn the knob from the top and it will wipe the water droplets away so that when the user lifts the lid, there will not be any water dripping onto the countertop/floor. Therefore, the user does not need to clean up the mess from the water while still cooking and focus more on cooking.

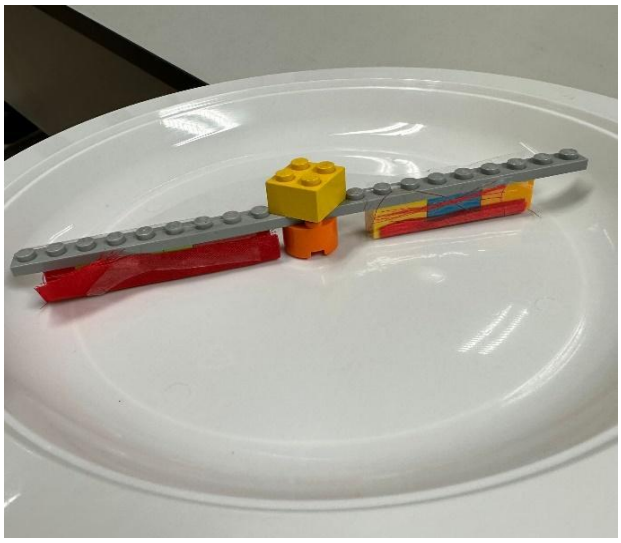
IV. Physical Prototype

Our prototype is designed to be an add-on feature to any existing pot lid to cater to the needs of people who cook.

Prototype Version 1

We modeled an existing lid we had at home and made our first prototype using plastic plate, some lego pieces with some sponge cut-out. As we turn the yellow 'knob', the wiper will rotate in a clockwise direction to wipe off the excess water from the pot lid.

version 1



Prototype Version 2

Building on our prototype version 1, we decided to try fixing the add-on feature on an actual pot lid. We unscrewed the parts of the pot handle with the help from our Operation Manager, Mr Sim. The wiper add-on is made up of an ice cream stick and sponge. A hole was drilled in the ice-cream stick so it can be attached to the pot lid with a screw. In this way, it is able to move in all direction as well. We then insert a removable sponge onto the ice cream stick to wipe off the water. We decided not to glue the sponge to the stick so the sponge can be easily washable and reusable. We tried it out but discovered that it did not rotate as smoothly as we expected it to. The extended handle looked kind of awkward too. We discussed and felt that we should find a way to do the add-on with minimal change to the pot lid handle.

version 2

Prototype Version 3

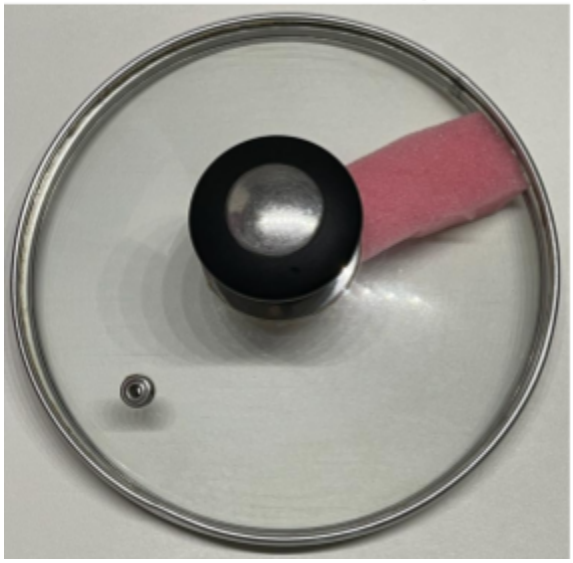
This is our final physical prototype.

We fixed back the pot lid handle as normal without the extension and fixed the add-on wiper back. This time round, we used super glue to attach the screw onto the ice cream stick to ensure smoothness in the wiping process. We tried it out several times and did a video clip of it during one of the attempts. This is the link to the video clip of use of the prototype.

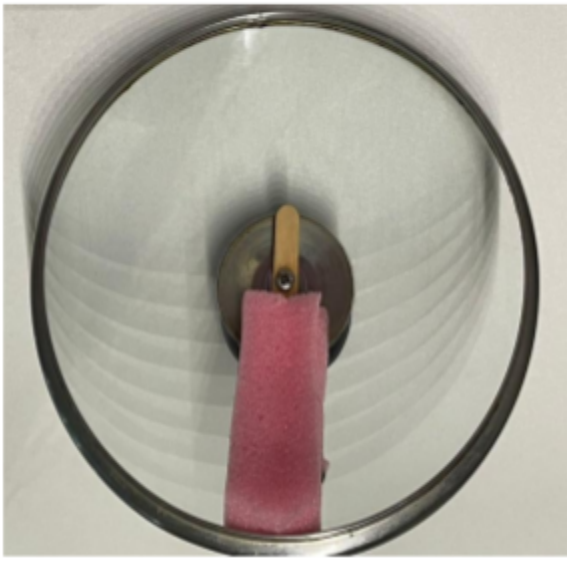
(https://drive.google.com/file/d/1YeLtr93O7OYXvkjv4H_UngrJx1a9CtQl/view?usp=sharing.)

version 3

View from the Top



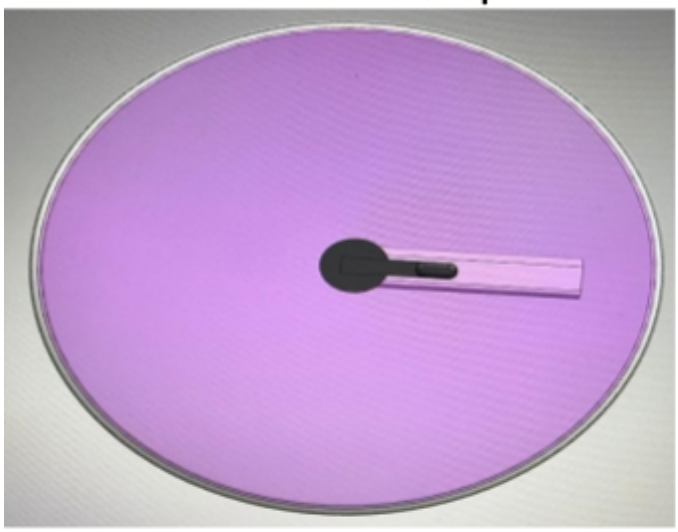
View from the Bottom



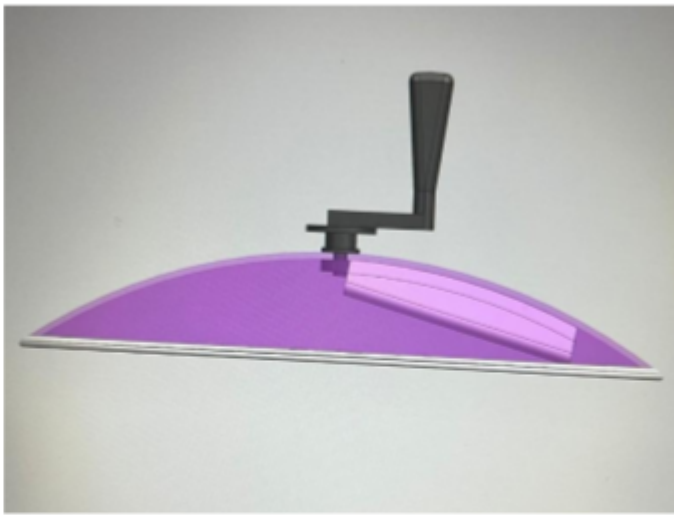
Prototype Version … (in the making)

After we were done with the final physical prototype, one of the members suggested exploring another possible lid handle design and use of other materials besides sponge. With the help of our teachers, we managed to come up with a simple drawing of it. We also did some research online and discovered that sponge cloth or microfiber high performance cloth might do a better job in wiping and absorbing moisture. They are also washable and reusable.

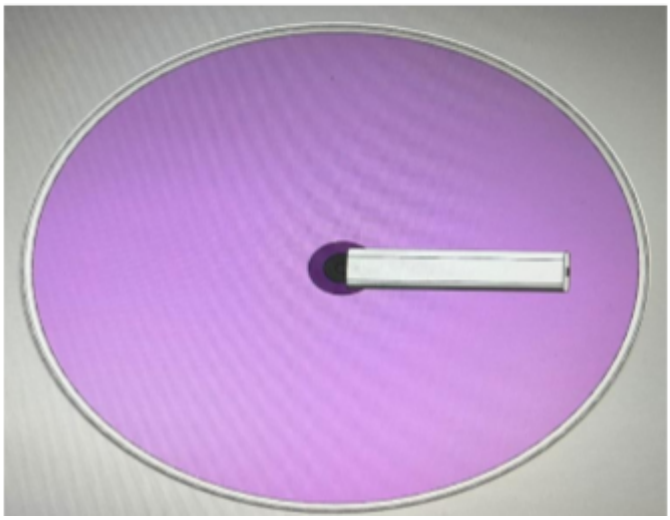
View from the Top



View from the Side



View from the Bottom



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