Design And Fabrication of Multi-Utensils Washing And Drying Machine Using Solidworks

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Abstract- *We have noticed that in daily routine after lunch/dinner, we have to clean our utensils and this job is laborious. For that in the market, a dishwashing machine is already available, but its disadvantage is first we have to remove uneaten food, it uses an ample amount of water and the machine is expensive. So to overcome this we are going to design and fabricate a cheap, required less water to wash, less laborious work to wash as well as dry the dish. This machine is easy to operate and affordable to the middle class and lower-class families. We have designed this machine in such a way that if we use this machine in the house then we can fit this machine upon any of the sinks and when we use this machine in the wedding ceremony we can put upon a tub and use this machine.*

Keywords- drying, portable, reduce,Utensils, wastage.

I. INTRODUCTION

A dishwasher is a mechanical device for cleaning eating-utensils and dishes. Dishwashers can be found in private homes and hotels. Unlike manual dishwashing, which depends largely on physical scrubbing to remove soiling, the mechanical dishwasher cleans by the brush and by spraying water, at the dishes.[2]

Dishwashers are some of the best-loved appliances in our homes. They save you time and hassle by cleaning all of your dirty dishes.

Types of dishwasher

1) Portable dishwasher.
2) Automatic dishwasher.
3) Semi-Automatic dishwasher.
4) Manual dishwasher.
5) Countertop dishwasher.

In which we are making a portable, semi-automatic type dishwasher.

II. CONCEPT AND METHODOLOGY

The concept of this project is to decrease human effort while washing utensils, decrease wastage of water while washing utensils manually, to dry the utensil which is only possible in this machine and finally make this hard work of washing utensils enjoyable.

Many machines have been designed and manufactured till date but there are some problems which are as follows;

We saw the machine first in the market and then in house and compare the problems told by them and we notice that the machine which is available in the market, it's starting price is about 35,000/- to 1,20,000 rupees. Due to this price range, people are not purchasing this machine.[1]

The second thing we notice that to use this machine we required two things to wash, powder and liquid. This cost around 200 rupees/month additional electrical cost. After all this cost we conclude that the payback period is long.[1]

The third thing we notice is we have to remove the uneaten food from the dishes and then we have to arrange the utensil orderly in the racks and we have to check that they are safe. If utensil of odd shape we can't place in rack and can't be a wash.

The efficiency of the machine is full when the machine is loaded fully; the study concluded that fully loaded dishwashers use less energy, water, and detergent than the average load.

Now after the wash is complete we have to regularly clean the filter parts, also a skilled person is needed to run this machine.

We are making a machine to solve this entire problem and could achieve what our aim is to wash and dry utensils.

We are making this machine based on trial and error to achieve 100% removal of eaten soil particles.

III. DESIGN AND IMPLEMENTATION

In the first design, we decided to rotate the brush plate with the help of water pressure and brush can be move in any direction with the help of hand, But then We faced a problem regarding the change in the force of water as per change in an apartment.

Then we decided to rotate the brush plate with a motor and will pass water with a pump, but the flexibility of the machine will not be there.

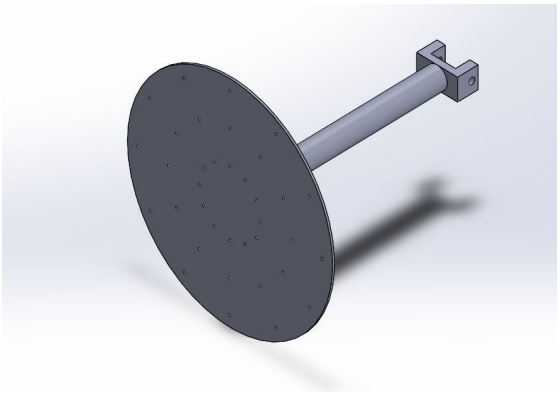

Fig.1 Concept Design no.1

Then we started to redesign by seeing other's design in the patent of the dishwasher, suddenly thought came in mind while sketching in a rough book that can we pass the shaft from the sinkhole and put the brush plate and use tap water, but the problem we faced was water drainage and shaft of motor was same so the problem of leakage may damage the motor.

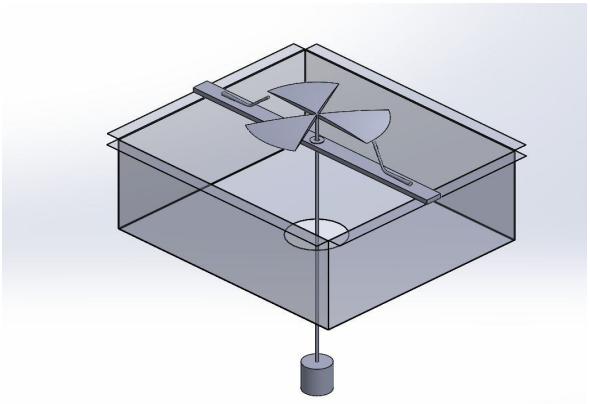

Fig.2 Concept Design no.2

We showed this design to guide and afterward, he got an idea to put the motor above the sink and we reached our final design.

While we were manufacturing there was a small change to reduce the cost of manufacturing by the change in the design of the brush, instead of manufacturing a round brush, now we have redesigned and make strips of rectangular shape.

We also had trial of this machine and found that the water was not reached at utensils, so we decided to remove the nozzles from sides and redesign and manufacture, bypassing water from the bottom of the motor to brush by making a center drilling.

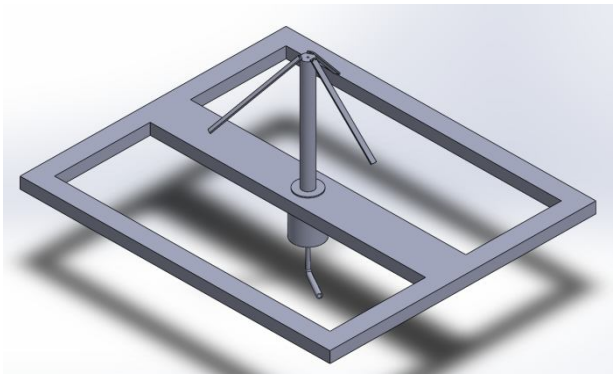

Fig.3 Concept Design Final

The specification consists of

(1) Base; (2) Shaft; (3) Rotor; (4) Big plate; (5) Brush; (6) Motor; and (7) Clamp; (8) Gears; (9) Housing.

As the machine starts motor rotates the shaft with the help of gears and shaft is welded with big round plate, then three plates are hinged joint with this plate which will rotate along with the shaft above this rotor brush is attached which will help in washing the Utensils, in the middle of the shaft pipe with water is carried to wash the utensils the rotor is flexible as it is hinged can bend 90degree as per the shape of utensils.

Technical Specifications:

1) Overall Size of Machine: 560 x 410 x 450 mm
2) Utensils Diameter Range: 75 to 400 mm (OD)
3) Utensils Height Range: 0 to 150 mm
4) Maximum weight of Job: 5Kgs
5) Application: Washing, Drying
6) Washing Time: 15 sec/utensils
7) Motor speed: 100 RPM

Fig.4 Assembly of Brush

Fig.5 Assembly of Machine 1

Fig.6 Assembly of Machine 2

IV. CONCLUSION

We have to carefully design and manufacturing of this machine as we required washing utensil with maximum efficiency

If there is any mistake in drilling/boring in shaft then, water will not be able to reach till utensils and will not be able to wash utensils.

This machine is about 5 to 10 kg due to the material we used was mild steel as we first decided to use aluminum but if any heavy utensil falls on a machine it may damage a lot and may bend the machine.

We are going to make this machine waterproof, especially motor as water is going to fall on the motor and may damage so before we use this machine we are working on making motor safe than the other parts of the machine.

We think that with the help of this machine we can help many families and we can save water as well as we can wash utensils with a small amount of water.

With the help of this machine, we can help to reduce the laborious work of washing and drying utensils and make it enjoyable.

We will save water and time to wash with fewer prices and with a simple design.

V. ACKNOWLEDGMENT

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