INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X
Impact factor: 6.078
(Volume 7, Issue 1)
Available online at: https://www.ijariit.com

Design and fabrication of semi-automatic dishwasher machine

Akash Gautam Gaurkhede
akavish31@gmail.com
PRMIT and R Badnera, Maharashtra

Dr. Mahendra P. Nawathe
mpnavathe@gmail.com
PRMIT and R Badnera, Maharashtra

ABSTRACT

Though lot of human activities are automated in the present competitive world. There is a lag in automated dish washer. Some machines are already designed with the help of high velocity water only; hence there is a chance of uncleanliness and not removing tough strains in dishes. In order to overcome the above problems a special machine called – Semiautomatic Dishwasher Machine" with shower and water jet introduced in this work. The project is to design and fabricate semiautomatic dishwasher that is efficient and overcome the human work. In market existing dishwasher, the spray arm is not sufficient to spray water in each part of the dish. So, keeping this in mind, we designed the circular rack and spray arm in center of the machine which will spray the water equally and effectively in each and every area of dish. The machine has less cycle time, less energy consumption, less water required for cleaning as compare to manual machine.

Keywords: *Energy Consumption, Rack, Spray Arm, Semi-Automatic*

1. INTRODUCTION

In India most of the women wash the dishes with their hand scrubbing on it which is giving strain to the muscles. Therefore, purpose of this research is to reduce human efforts in dish washing. The dish washing machine has made cleaning and drying dishes much easier and more efficient. Investigations shows the problem faced in uses of automatic dish washer and solution on the same. Large amount of electricity, time and cost is required in case of existing dish washer machine, because of this reason the uses of dish washer machine in our country are very less. Currently the chores of washing the dishes are being performed by the women which results in the labor work as it is carried out for up to several hours each week. So, by developing semiautomatic dishwashing machine we can overcome the above-mentioned problems significantly. Also, by using plastic material for casing part, the overall weight of the assembly also reduced.

A dishwasher is a mechanical device for cleaning eating-utensils and dishes. Dishwashers can be found in private homes and hotels. Unlike manual dishwashing 's, which depend largely on physical scrubbing to remove soiling, the mechanical dishwasher cleans by the brush and by spraying water, at the dishes. A mix of water and detergent is circulated by a pump. Water is pumped to one or more rotating sprays arms, which blast the dishes with the cleaning mixture. Once the wash is finished, the water is drained. After the rinse cycle finishes and the water is drained, and the dishes are left in the atmosphere for drying.

The function of the dishwasher is to provide the mechanical action necessary to distribute and direct the detergent solution and rinse waters over, under and around the dishes to loosen and remove soil.

Automatic dishwashers vary in the design of their washing systems. Some have a single water source; others may have several water sources. Water is distributed in dishwashers by spray arms or spray towers. The design of the spray arms or towers may differ in size, shape and placement in the dishwasher, or in the number, size and location of their water ports (holes through which water is forced). All of the washing systems do a good job, but those with fewer water sources require greater care in loading the dishes to prevent blocking the washing action to various parts of the machine, especially the corners.

The dishwasher has made cleaning and drying dishes much easier and more efficient. This project work has been conceived having studied the difficulty in washing the any type of plates. Our survey in the regard in several home, revealed the facts that mostly some difficulty occurs in washing the dish in Hand. The washing power contains the chemical substances and this is reacting with human hand. Now the project has mainly concentrated on this difficulty, and hence a suitable device has been designed. Such that the dish washing can be done without application of any impact force. By using semi-automatic dishwasher, we can reduce time as well as human efforts significantly. In conventional dish washing process large amount of human power as well as quantity of water is used. So, keeping that in mind, to reduce this semi-automatic dish washing machine is developed.

1.1 Main Objectives are

- To learn about the market situation and customer expectations regarding the washing machine.
- To learn some solutions for dishwasher design for home purposes.
- To study the performance of washing parameters using Hand washing manual, automatic washing machine and automatic

1.2 Advantages

- • Low maintenance and easy to operate
- • The performance of the machine is better than Automatic dish washer and manually dishes washing
- • Less time and water consuming machine
- • Cost is less than automatic dish washer
- • Design is simple and very efficient

1.3 Disadvantage

Man has to stand until the machine performs operation.

1.4 Applications

The common activity to perform is to wash dish but without time consuming and efficiently.

2. LITERATURE REVIEW

In this project literature review has been carried out on the topics related to dishwasher. They are presented below.

Shilpa N Dehedkar- "Design of basic model of Semi-Automatic Dishwasher machine". (2016): This paper uses brief idea and analysis of the Semiautomatic Dishwasher machine. It also states the mechanisms incorporated in this model for process of washing the dish. In this research the dishwashers operate with help of DC motor, Universal motor, Conveyor belt and Microcontroller for time delay.

Shaila S. Hedaoo- "Design and Fabrication of Semi-Automatic Dish and Utensil washing machine". This paper discusses the main objective of Semi-Automatic Dishwashing machine is to reduce the cost of fully automatic dishwashing machine and giving good Cleaning Performance. It requires less energy and less water consumption. Time of washing dish can be adjusted as per customer requirements

Pranali Khatake- "Design of gears in semiautomatic dishwashing machine". This paper discusses about design of gear in semiautomatic dishwashing machine. The result indicates that in India semiautomatic dishwashing machine are used than fully automatic dishwashing machine as it is chip, preferably gears are used in this semiautomatic dishwashing machine with the belt drive for better life and high efficiency.

Dhale A. D.- "Design and Development of semiautomatic dishwasher". This paper discusses about the design, construction and evaluation of dishwashing machine. The capacity of machine was 20 plates per min (i.e., 1880 plates per hour). The design dishwasher is very efficient and easy to operate.

J. G. Gochran- "Dishwashing machine". The paper gives brief idea describe about improvement of dishwashing machine. It related to improvement in machine washing a dish in which continuous stream of either soap-soda or clean water is supply to crate holding the rack or cage hot water is supplied to crate is rotate so as to bring the greater portion thereof under water.

3. METHODOLOGY

The way to work is the process of launching and developing a project. The purpose and success of a project depends on how well the strategy works to achieve the outcome. The operating procedure describes each step to accomplish the flow task sequence from the beginning until the result is achieved. All results obtained are evaluated and improved until the best possible result comes out and will be taken. This operation will be and get some serious consequences for trial and error here. Whenever the right decision can be thought and repeated to achieve the best outcome.

3.1 CAD Model of Semi-Automatic Dish washer

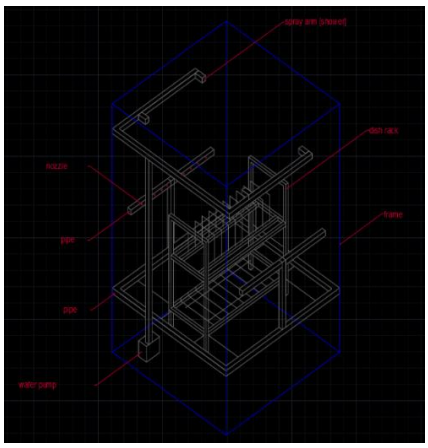

Fig. 1: Practical Model Of Semi-Automatic Dish Washer

3.2 Process flow

Uncleansed plates

⇩

Spraying pressurized water

⇩

Spraying of soap water

⇩

Spraying pressurized water

3.3 Working

The working principle of the dishwasher is to provide the mechanical action necessary to distribute and direct the detergent solution and rinse water over, under and around the dishes to loses and remove oil.

a) Add water into the dishwasher tank.
b) Then set dishes and other utensils into the rack.
c) Add detergent into the water.
d) Then start the dishwasher machine.
e) Water get pump through submersible pump.
f) Water passes through pipe, spraying arm and nozzle.
g) Water get strike on dishes and other utensils.
h) Then drain out the water from the water tank.
i) Again, add water into the tank for cleaning dishes and utensils.
j) Then finally the dishes and utensils cleaned.

4. RESULT

From the investigation and examination of programmed and self-loader dish clothes washer, unmistakably capacity of the two machines is same like washing dishes, utensils, cups, glasses, spoons and so forth. Be that as it may, their development and working are extraordinary. Following are the finish of self-loader dish washer.

a) The performance of the machine is better than Automatic dish washer and manually dish washing
b) Capacity of machine to wash maximum plates per minute.
c) Low maintenance and easy to operate.
d) Design is simple and very efficient.
e) Less time and water consuming machine.
f) Cost is less than automatic dish washer.
g) Every component of this machine is easily available in market.
h) Semi-automatic dish and utensil washing machine can be purchased by every type of customer.

From all the experimentation and comparison, it is clear that Semi-automatic dish washer is better than manual dish washing and automatic dishwashing machine. It takes less time, water and energy consumption. It is less costly than existing dish washer. And it is affordable by every class.

5. CONCLUSION

The review of semi-automatic dish washing machine was successfully carried out on various aspects like consumption of time, energy required, water required and cost analysis. The designed semi-automatic dish washing machine was easy to construct and operate. It is very efficient in operation. From the study and comparison of automatic and semiautomatic dish washing machine, it is clear that function of both machines is same like washing dishes. But their construction and working are different. Following are the conclusion of semi-automatic dish washer. Low maintenance and easy to operate. Design is simple and very efficient. Less time and water consuming machine. Cost is less than automatic dish washer. Every components of this machine are easily available in market.

6. REFERENCES

[1] Shilpa N. Dehedkar- "Design of basic model of semi-automatic dish washer machine". National Conference on Innovative Trends in Science and Engineering (NC-ITSE'16) Volume: 4 Issue: 7 2016 pp. 18-21
[2] Shaila S. Hedaoo, Dr. C.C. Handa, V.D. Dhopte- "Design and fabrication of semi-automatic dish and utensil washing machine. International Journal of Engineering Development and Research Volume 4, Issue 3 2016 pp.292-296
[3] Pranali Khatake- "Design of Gears in Semiautomatic Dish Washing Machine". International Journal for Scientific Research & Development Vol. 4, Issue 09, 2016 pp. 836-839
[4] Dhale A. D. - "Design and development of semi- automatic dishwasher". International Journal of Engineering Research and General Science Volume 3, Issue 3, May-June, 2015 pp.108-112
[5] Odesola & Afolabi- "Design, Fabrication and Performance Evaluation of a Domestic Dish Washing Machine". An International Journal of Science and Technology Bahir Dar, Ethiopia. AFRREV STECH Vol. 1 (1) Jan.-March, 2012 pp.164-173
[6] J. G. GOOHRAN, Dish washing 'machine. No. 355,139. Patented Dec. 28, 1886.
[7] J. HOUGHTON. Table-furniture cleaning machine. m. 7,865. Patented May 14, 1850.

