

20 Ltr. Jar Washing Machine

Aniket Shewale¹, Sachin Khalkar², Shriram Yadav³, Akshay Rakshe⁴, Mayur Chavan⁵

^{1,3,4,5}Student, Department of Bachelor of Technology in Mechanical Engineering, Jaywant College of Engineering & Polytechnic, Killemachindra Gad

²Assistnat Professor, Department of Bachelor of Technology in Mechanical Engineering, Jaywant College of Engineering & Polytechnic, Killemachindra Gad

Abstract - Recent studies says that the people are getting more and more health conscious due to increased no. Of various diseases. This project is all about helping to maintain such high purity standards in Industrial area while keeping hygiene factor in a mind.

The goal of this research project is to create a safely constructed and stainless steel framed water pump type machine for washing Jar's without human efforts. As we are presenting a prototype of a working model in the industrial area, We've successfully managed to add all possible innovative features to the machine.

A 20 Ltr. Jar Washing Machine is one of the needy innovative that possess a huge potential to run Indian market & This paper exactly describes our efforts with this concept for sure.

Key Words: Jar Washing Machine, Peoples health, Hygiene, Healthy drinking etc

1. INTRODUCTION

Bottle washing is a job that permits not a single mistake in terms of hygiene and product safety. And at the same time, it demands economical utilization of water as a valuable resource.

So, the whole project is made using SS (stainless steel) frame. There is a water pump placed under the bottle stand which is used to force the water from the lower level (tank) to the rinse rod. When the button is pressed the pump gets on and the water forcefully flows inside the bottle through the rinse rod. And then water is then collected or thrown out by the pipe connection underneath the bottle.

1.1 Objective

In several food industries, bottles and cases are used when packaging the final products. Bottles and cases are in direct contact with the food and water therefore they must be sufficiently cleaned before being used. The cleaning process removes possible food and water residues, dirt and odors from the packaging containers and ultimately helps peoples life easily healthy and stable.

1.2 Need and Scope of project

Because of huge budget issue, In every industry the water bottle washing machine are not available & Yet till now as their isn't anyone who have designed such small scale design or machine so there an huge opportunity to develop a 20 Lit Jar washing machine which can become a monumental movement for industries like Food industries, Health care Business etc.

2. WORKING & TECHNICAL DETAILS

Firstly the power supply to the electric motor, motor rotated with desired speed. Then this motor, the gear is attached to reduce the speed of the electric motor by using these gears. This gear is attach to a vertical shaft, those shaft are directly connected to the special brush. These brush is rotated at desired that speed we can required.

These jars are manually feeding in to the machine then the brush can rotated at outer, inner, bottom as well as top surface of the jar. So this jar can easily clean. The water supplies though the vertical shaft, those the special brush is mounted on it. So brush can clean the jar

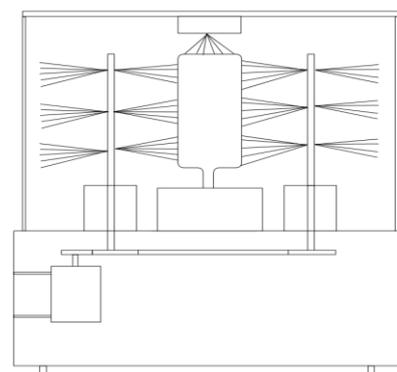


Fig -1: Experimental Set Up

2.1 Design Parameters

A) **Motor:** The motor is single phase 12 volt DC motors, meaning that the speed is infinitely variable from 0-300 rpm. The motor is mounted on the machine frame and is connected to guider shaft and also linear blades through connecting links.

B) **Inner Brush Shape:** inner brush shape most in bottle washing machine is circular but in case of our project we design a Spiral type. Because the Stating site of 20 lit. jar is small so no of brushes ate required less as well as smooth operation required.

C) **Chain Drive:**In case of jar washing the most important jar can automatically rotate. So we first belt drive selected but chance of slip are very high so change that and replace by the chain drive because chain drive is positive drive.

D) **Drive and Driven Sprocket:** Drive and driven sprocket made up of SS material which has properties like light in weight, sufficient strength etc. on which conveyor Chain is moving due to motor motion.

E) **Centrifugal Pump with Nozzle:** We can both materials is directly purchase from the market. Because the pump are only water suppler and with the help of nozzle water a directly on jar.

F) **Bearing:** We select ball bearing on which radial load is act. The shaft and drive and driven pulleys are held in ball bearing mounted in bearing housing and rotates freely in it.

E) **Frame:** It is made up of mild steel material (M.S.). The entire assembly is mounted on frame which is inner and outer brush, bearings, chain drives, Pump and Nozzle.

Sr. No.	Manufacturing Process	Instrument Used
1	Marking	Measuring Tape
2	Cutting	Hand Grander
3	Drilling	Drilling Machine
4	Welding	ARC Weld M/C

Table -1: Process & Instruments Used

2.1 Types of Jar and Bottle Washing machine

In market different type of jar and bottle washing machine are available but price of that machines are not suitable to medium and small scale industries to invest in them because cost and space are more required.

There are different types of water jar or bottle washing machines are as follows:

1. Rotary Bottle or Jar Washing Machine
2. Automatic Linear Bottle Washing Machine
3. Automatic Vertical Air Jet Cleaning Machine

Benefits of Jar Washing Machine

- Two or Three Bottle can be cleaned at a time.
- Easy Handling & Requires less Manual effort.
- Time Saving and High Production System.
- Replacement of parts is handful.
- Useful in areas of Mineral Water Plant Industries, Cool Drinks Industries, Factory, etc.

3. COST ESTIMATION

Cost estimation may be defined as the process of forecasting the expenses that must be incurred to manufacture a product. These expenses take into a consideration all expenditure involved in a design and manufacturing with all related services facilities such as pattern making, tool, making as well as a portion of the general administrative and selling costs.

1. Material Cost
2. Machining Cost

1. Material Cost

Material cost estimation gives the total amount required to collect the raw material which has to be processed or fabricated to desired size and functioning of the components.

Sr. No.	Raw Material	Zenith Steel cost (Rs)
1	Square Pipe	780
2	Nozzle	450
3	Solid Shaft 20 mm Diameter	180
4	Bearing 3 Nos.	1800
5	Internal & External Brush	7000
6	Electric Motor	800
7	Chain	80
8	Sprocket 3 Nos.	430
9	Nut & Bolts	135
10	20 Liter Jar	120
11	Plastic Pipe	280
12	Centrifugal Pump	2500
Total		14,555 /-

Fig. 2 Total Material Cost is 14,555/- only

2. Machining Cost

Machining cost estimation gives the total amount required to assembling the the parts and designing aspects to achieve desired size and functioning.

Operation	Cost
Cutting	400
Welding	700
Drilling Machining	280
Assembly	400
Total Cost	1780

Fig.3 Total Machining cost is 1780/- only

Total cost = Raw Material cost + Machining Cost + other expenses

$$= 14555 + 1780 + 2500$$

$$= 18835 \text{ /-}$$

This total cost can be reduced if this machine made in mass production because the machining cost would be very less and material cost would be less if bought in bulk

4. CONCLUSIONS

Our project is 20 Liter jar washing machine, anyone can't manufacture a this large size washing machine, this is innovative project so we are design and develop an actual working model.

From this project we are concluding that, we can reduce the time as well as cost of the jar washing can reduce. As the space required for the other machine can reduces. This project which can help the small scale industry those are not offered a large size jar washing machine.

4.1 Possibilities

We will try to design a washing machine for 50 Liter Milk-Can. & along with that we are also design a small bottle washing machine at lowest price as well as compact in size.

ACKNOWLEDGEMENT

The authors are thankful to the department of Mechanical Engineering in Jaywant College of Engineering and Polytechnic for providing laboratory facility for this research work and special thanks to our honourable chancellor professor S. A. Khalkar & Our Department faculty for their constant support and encouragement to carry this research work.

REFERENCES

- [1] Mr. Rizwanul Neyon , Nirjhar Das Sharma, Mr. Priom Chakraborty "Designing Of A Bottle Washing Machine In Virtual Environment Using The Enhanced Mechatronics System Design Methodology ", 122 ASEE Annual conference, ASFEE, 2015.
- [2] Ankur G. Gajjar, Alpesh I. Patel, Raviprakash G. Singh "Design and Development of Bottle Washer Machine for Small Scale Beverage Industry", International Conference on Advances in Computer Engineering and Applications (ICACEA), IMS Engineering College, Ghaziabad, India 2015..
- [3] http://wiki.zeroemissions.at/index.php?title=Cleaning_of_bottles_and_cases_in_food_industry
- [4] AnastasiiaFedotova "Automatic Washing System", Bachelor's degree (UAS), Savonia University Of Applied Sciences, 2016.
- [5] Ujam, A. J, Ejeogo, G and Onyeneho, K. C. "Development and Application of Geneva Mechanism Bottle Washing", American Journal of Engineering Research (AJER) e-ISSN: 2320-0847 p-ISSN : 2320-0936 Volume-4, Issue-11, pp-63-73.
- [6] https://www.labour.gov.hk/eng/public/os/C/GN_on_washing_pump_eng.pdf
- [7] A conference paper published by Thanikachalam Jayara about Evaluation on Properties of Industrial pumping Using Natural hygiene and health Composite (https://www.researchgate.net/publication/326299156_Evaluation_on_Properties_of_Industrial_Pumping_Hybrid_Composite)