

DESIGN AND MANUFACTURING OF LOW-PRICED PEDAL OPERATED HAND WASHER

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Abstract

Keywords:

Covid-19, hand washing machine, infectious diseases, sanitizers and pedestal operated.

In accordance with the guidelines of World Health Organization (WHO) to guard from Covid-19 the hand wash and /or sanitization is mandatory for every person irrespective of their health condition. However, sanitizing their hands when and where is needed protects not only Corona virus but contagious likewise bacteria, viruses, fungi or parasites. Unfortunately, there is no vaccine or medicine for COVID-19 so far. Many scientists world wide working with indefatigably energy to find out specified solution. Therefore, until to get a solution it is recommended to practice hygienic lifestyle including frequent hand washing with soap and sanitizing hands (80% ethanol-based). In general observation, conventionally operated water taps need to be replaced with remote or pedal operated system to open/close the tap. In this paper a new pedal operated hand sanitizing and washing machine has been designed and manufacturing at cheaper cost. Further focused on minimal wastage of soap, sanitizer and water. A interlocking mechanism has been introduced protect from stealing. Finally, the mechine is successfully operated several days on diversed people and outcome has been discussed.

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1. Introduction

The COVID-19 virus spreads between people in close proximity through saliva droplets or nasal discharge when an infected person sneezes or coughs. Several pneumonia cases of unknown aetiology have been reported on 8th December 2019, in Wuhan, Hubei province, China(reference). Most of the patients were found to live or work at around the local Huanan wholesale seafood market, where live animals were sold. On 7th January 2020, the Chinese Center for Disease Control and Prevention (CDC) has identified a novel coronavirus from the sample of throat swab of a patient. The official name of the 2019 novel coronavirus was then announced by WHO as coronavirus disease (COVID-19). Within a month, this coronavirus quickly spread throughout China during the Chinese New Year, a time when there is a high level of mobility among Chinese people.[1] [2]

On 13 March, the first coronavirus case was reported in the country and the victim later identified was a Japanese citizen. The process of contact tracing is currently taking place, according to Lia Tadesse, the Health Minister of Ethiopia.² On 18 July, the WHO stated that Ethiopia was one of ten African countries accounting for 88 percent of all reported COVID-19 cases in the African Region. During the month there were 11,684 new cases, raising the total number of confirmed cases to 17,530. The death toll rose to 274. The number of recovered patients increased by 4,520 to 6,950. There were 10,306 active cases at the end of the month.[3] [5]

COVID-19 (Coronavirus disease) is an infectious disease which is caused by a newly discovered coronavirus.⁴ The common symptoms of Covid-19 include fever, dry cough, and difficulty in breathing but muscle pain, sputum production, diarrhea, and sore throat are less common.⁵ While the majority of cases result in mild symptoms, some progress to pneumonia and multi-organ failure. Elderly people, and those with underlying medical problems like diabetes, cardiovascular disease, cancer and chronic respiratory disease are more susceptible to develop serious illness.[4]

The COVID-19 virus primarily spreads between people in close proximity through saliva droplets or nasal discharge when an infected person sneezes or coughs. Hence, it is important to practice respiratory etiquette (for ex. by coughing into a flexed elbow).[4] However, the transmission may also occur through sneezingsmaller droplets that can stay suspended in the air for longer periods of time in enclosed spaces, as typical for airborne diseases.[6] Less commonly, people may become infected by touching a contaminated surface and then touching their face.[7]

At this time, no specific vaccines or treatment available for the cure of Covid-19. Therefore, preventive measures are recommended including frequent handwashing with soap, maintaining physical distance (at least 1m) from others (especially from those with symptoms), quarantine for minimum 14 days (especially for those with symptoms), covering coughs with a mask, and keeping unwashed hands away from the face. The use of cloth face coverings such as a scarf or a bandana has been recommended by health officials in public settings to minimize the risk of transmissions, with some authorities requiring their use.[8][9]

As a solution to prevent the Covid-19, the present work deals with the design and development of a pedal-operated hand washing system. Focus is mainly on providing effective hand washing with liquid soap and water, minimizing the wastage of liquid soap and water, maintain social distancing while hand washing, minimize the cost of fabrication, the enclosed mechanism to prevent theft, etc.

2. Development of the system

The hand washing system is most significant in the present novel cause. In this work, the system designed for two foot-operated hand washing with liquid dispenser. The action of the pedal is downward direction. The pedal frame is made by 30mmx30mm square tube for a channel shape and fastened to the primary system by bolt and nut. The pedal is 40mm wide flat with 5mm thickness and 400mm length. A circular tube is welded at the bottom end of the pedal, and the axle is passed through the tube. The axle welded to the frame. The pedal assembly is similar for actuating the water and liquid dispenser.

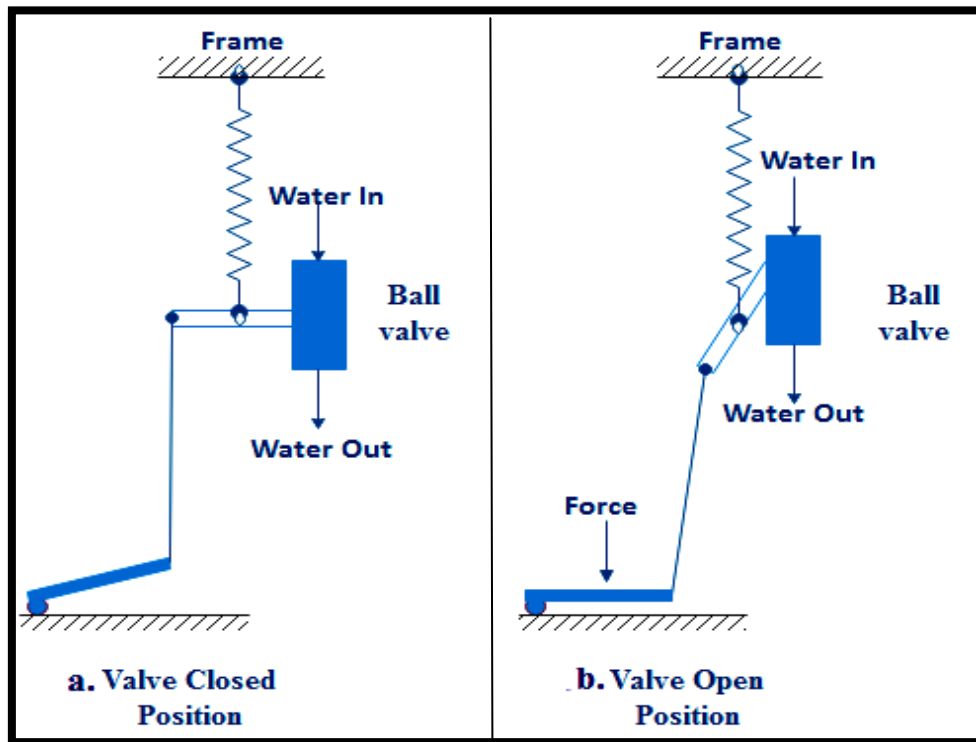


Figure.1 Water tap actuation

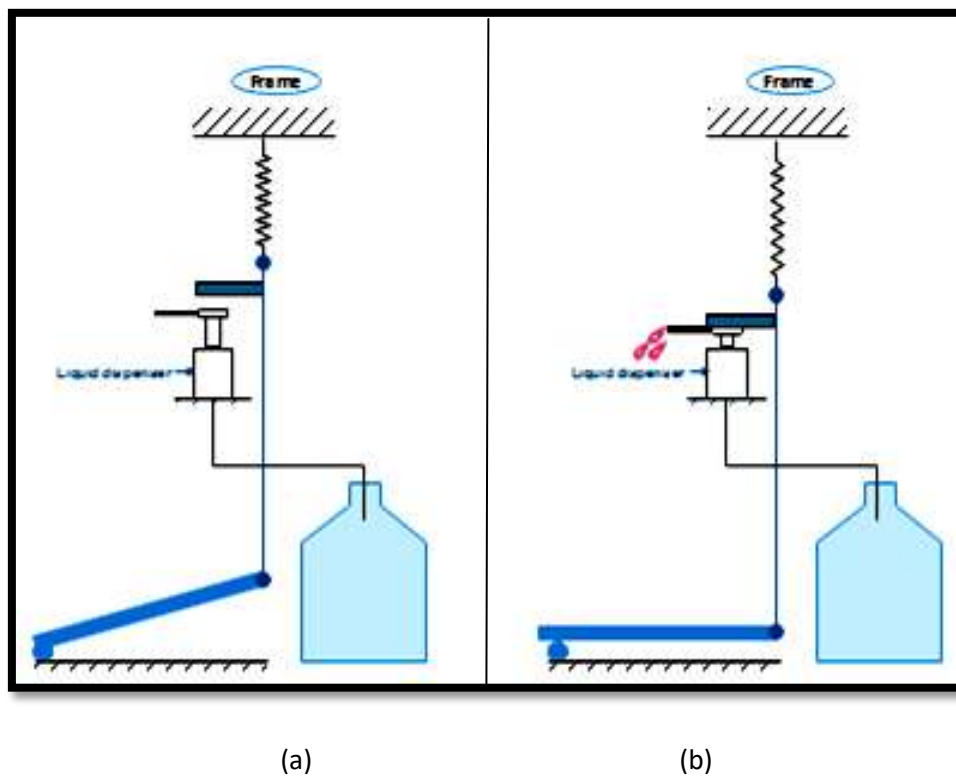


Figure.2. Liquid dispenser Actuation

The main frame and angular are made up of mild steel and iron respectively. its angulars stand iron with a specific dimension, as shown in fig.3.

Dimensional Table:1

S.No	Part Description	Size	Units	Material
1	Thickness	4	mm	Iron
2	Stand Height (main frame)	1200	mm	Mild Steel
3	Top Platform (Area)	450	mm ²	Iron
4	Bottom tank	12	litres	virgin polyethylene
5	No of Pedals	4	numbers	Iron
6	Refill pipe	1/2	inch	Plastic
7	Pedal wide	40	mm	Iron
8	Pedal thickness	5	mm	Iron
9	Pedal length	400	mm	Iron



*Figure 3 . Squared hollow section 30*30 mm*

3. Fabrication of the Main Frame

The dimensions are optimized in selection with 4mm thickness of channels. The stand height is 1200 mm, and the top platform is 450 square mm. A water tank placed on the top

platform. On the bottom platform, hand washing liquid tank with a capacity of 20 Litres seated, and from a tank, the liquid dispersed by a liquid dispenser. There are four pedals fixed at the bottom, in which two are for the water tap actuation, and the other two are for the liquid dispenser actuation as illustrated in the fig.1 the water tap actuates with two positions one is valve close position and valve open positions. In the main water line, “ $\frac{1}{2}$ T” is used to split the line and to supply the water to both water actuation system. The $\frac{1}{2}$ ” ball valve connected on the split water line from the tank. Helical spring is connected in between handle of the ball valve and top of the frame, for the retraction. Also, a flat link is fastened to the pedal and ball valve handle by a bolt. Initially, the valve is in the closed position shown in fig.1.a, when the foot-force exerts on the pedal, it moves downward direction open the valve handle to the downward causes the water outflow as illustrates fig.1.b.

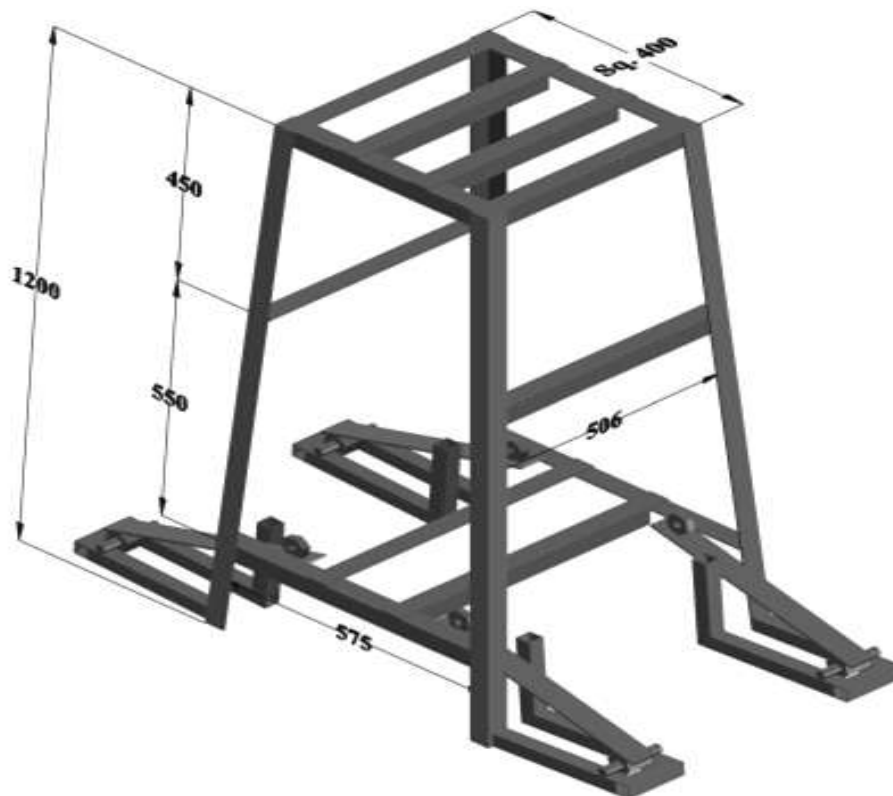


Figure.4. Hand washing system stand with the pedal assembly



(a)



(b)



(c)

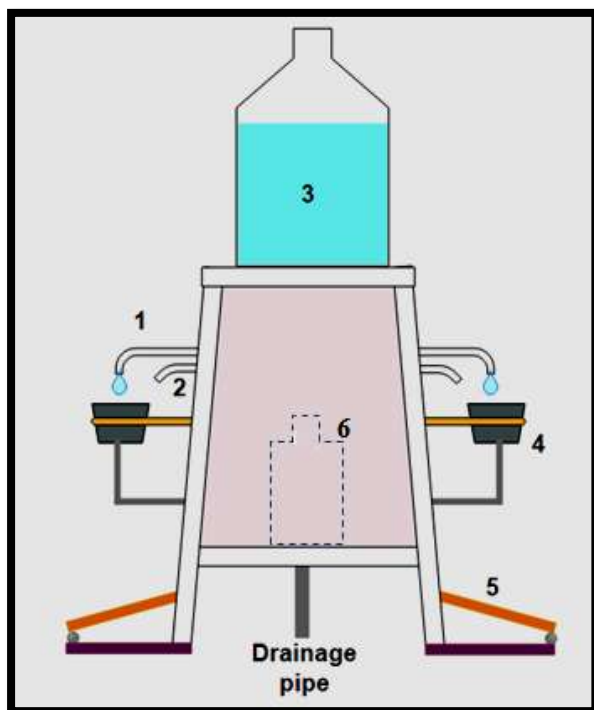


(d)



(e)

Figure.4 (a) and (b) Hand washing system, (c) is Liquid dispenser actuation, (d) Water line and (e) Water tap actuator.



1. Water pipe,
2. Liquid dispenser hose,
3. Water tank,
4. Washbasin,
5. Pedal-assembly for water and liquid dispenser and
6. Liquid hand wash container.

Fig.5 Schematic diagram of the Hand Washing System,

At the bottom of the platform, the liquid hand wash container placed on the base platform. A 1/2 inch pipe used to refill the hand wash liquid on the container. It consists of two liquid dispensers on the system. The flexible hose is used to connect the liquid dispenser, container and the system as illustrated in the fig.2. A round link connects the pedal and the spring and the other end of the spring joined the frame. Further, at the end of the link, a small metal strap welded to actuate the dispenser. When the force exerts on the pedal, link moves downward, and it presses the liquid dispenser which dispenses the liquid. Finally, when the force on pedal force is free it backs to its original position.

5. Conclusion

A hand wash and sanitize system has been designed and manufactured to washout the infectious virus likewise COVID-19 etc. It has been tested in several ways on all the people like educated, uneducated, children, women and senior citizens. This project was made successfully to bring the awareness among the people of country side about hygienic practices. However, hygiene practices not enough to avoid spread off virus and social distancing a highest priority. It is obvious to break the novel cause chain linkage of spread of virus as well. The machine is manufacturing at a minimal cost that can be afford by a common man. The hand washing systems have been placed in hospitals, bus station, bank, market, schools and universities.

6. Acknowledgement

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7. References

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