SOLAR OPERATED AUTOMATIC PORTABLE ELECTRIC WASHING MACHINE

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Abstract **-**This machine provides a simple portable wash machine designed for cleaning of small components. This machine describes a cleaning problem, developing a cleaning process, integrating the process to production needs, selecting and sizing appropriate cleaning equipment. This report stands with a sole purpose to develop a small, efficient energy and time saving wash machine large and inefficient for small sized components Washing Machine. Along with this the project promotes Reuse and Recycle policy of the company as all the components comprising with it. The design based method reduces instability and cost effective.

I. INTRODUCTION -

Washing machine is a machine that quickly washes clothes, linens and other item. Before the invention of the washing machine, people spent hours doing their laundry by hand. Some people soaked their clothes in stream and then beat them on rocks to get out of dirt. The rapid advancement in technology has been given rise to the washing machine which is widely used in present day`s society. Portable washing machine is a very light weight machine operated with dc motor which is connected to battery which is charged by the solar cell so portable DC washing machine uses nonconventional energy source. The manufacturing of washing machines has lately been an important issue for the appliance industry. Current environmental awareness demands the improvement of washer efficiency. To this end, the use of closed-loop control instead of traditional open-loop approaches is being adopted. In addition, although horizontal-axis washers have a higher manufacturing cost, they are becoming more popular because it has been estimated that they consume less energy, water and detergent compared to the vertical-axis ones.

The reduction of washer mass is of crucial importance not only for environmental, but also for financial reasons. Unfortunately, washing machines remain big and heavy, weighing usually over fifty kilograms. This is due to the unbalanced rotation of the laundry mass during spinning. The rotating clothes are not evenly dispersed in the drum, resulting in significant centrifugal imbalance forces, which tend to destabilize the washer. This problem, which has been traditionally solved by adding a large concrete mass to the system, can have three modes: Translational slip, rotational slip and tip. Depending on the spinning speed, the mass of the laundry and system geometry, each of these modes can become the most important destabilizing agent. Naturally, all these techniques improve the washer's dynamic behavior, but are insufficient unless the machine's mass is over fifty kilograms.

However, such a machine cannot be portable. An interesting approach to stabilization has been proposed by Zuoxin, who introduced the idea of passive balancing by adding a ring containing liquid at the drum. The idea takes advantage of the centrifugal forces and of the washer's suspension to counteract the imbalance. This solution compensates for vibration caused by imbalance but introduces problems associated with system resonances. Finally, Lemaire introduced an out-of-balance detection system, but did not propose any method of counteracting these forces.

This project analyzes the problem of rotational slip and shows how it is related to translational slip and the design of a washing machine. It is proved that the critical speed for impending translational slip is higher than that of rotational slip. A design-based method is suggested, which increases the vertical force and contributes to the machines stability allowing the reduction of the washer's mass. Finally, an active method is proposed, which employs sensors, a micro-controller and stepping motors to minimize vibrations. It is also shown that an improved estimation of the drum angular position and velocity results in greatly reduced residual vibration In the present era when on one hand both husbands and wives have to work to maintain certain living standards and on other hand price rise, domestic

electrical appliances play useful role. The appliances soothing the house wives varies and also bring about some savings in the domestic expenses. Washing machine of late, are becoming increasingly popular especially in urban areas. Further, because of the availability of power in remote areas also, the demand of washing machine is likely to go up. A few years ago domestic washing machines were popular only in metropolitan cities only whereas now even in town area also the demand for washing machine is growing up rapidly

II. LITERATURE REVIEW

Senthil Kumar, M.J and Sadeesh Kumar, K and Nagarajan, N.R4 (2013) in their study entitled, "A Study on Consumer's Attitudes towards Washing Machine", which explains that in the modern technological world many innovations and new apparatus are invented by the man for reducing the work burden of the layman. Especially a lot of home appliances are introduced to save the valuable time of the working women. Because in the hurry bury world both husband and wife are working. So the modern women are not having sufficient time to do domestic work like washing their dresses. In this situation washing machine becomes an integral part of their home. The washing machine is not only to reduce their physical work but also it gives quality washing. In a competitive world many well reputed companies manufacture various brands of washing machine with varying features to cater to the diverse needs of consumer. The consumers are not in a position to identify the good brand of a washing machine because of its technical features. Consumer's opinion about the washing machine is paramount importance, so a study of this kind helps the customer to know the features available with the various brands. [1]

A washing machine is a machine that is used to wash laundry, such as sheets and clothing. Usually this term is applied to machines that use water as compared to dry cleaning which uses cleaning fluids or ultrasonic cleaners. Washing clothes manually is strenuous, laborious and time consuming. Washing machines were developed to address these challenges. The first washing machines were operated by hand and made from wood, while later machines were made of metal and made it possible to burn a fire below the washtub, keeping the water warm throughout the washing process which helps supply the required thermal energy. [2]

Due to globalization, competition for the market has increased. This has resulted in many times of washing machines being invented. Recent designs have been getting noiseless, more and more effective, economical, less weight and their designs adapt to where you want to use them. At first, clothes were washed using hot water and soap, and the fine fabrics were kept soft. Technology began to appear in 1780 with the invention of the washing machine by Robinson Lancashire. The machine also dripped clothes. In 1855 another washing machine to wash and dry clothes was invented in Crimea's hospitals. 1880 saw the first washing machines being built. They were steam-driven. They water was heated with coal and gas. In 1888 In cola Tesla joined electronics with washing by creating a compact electric engine. [3]

In 1901, Alva Fisher invented the first washing machine by adding an electric engine which impelled a cylinder to the already existing machines. An automatic mechanism inverted the spinning sense from time to time so that the clothes did not compress, which frequently used to happen. Rollers were then added to drip clothes. This is the date when the first washing machine was born. Washing machines started selling highly in Western countries after the Second World War, in 1945. Prices for washing machines were now much cheaper than before. [4]

III. DESIGN LAYOUTS AND ITS COMPONENTS

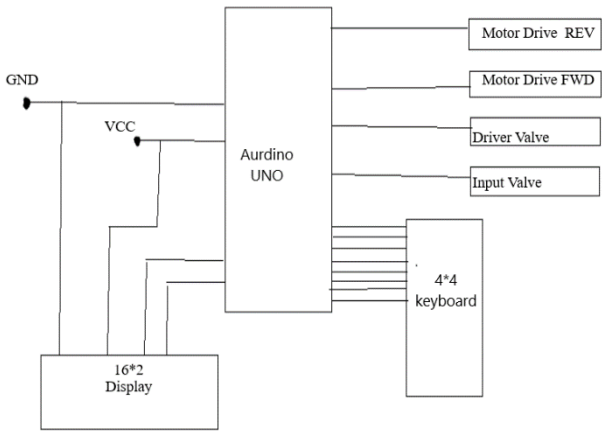


Fig 1. Bock Diagram

FIG 2. SOLAR PANEL

A solar panel is a device that collects photons from sun light which are very small packets of electromagnetic radiation and convert them into electrical energy which can be used to power electrical loads shows a general solar panel. A solar electric system is potentially less expensive and can provide power for a long time if properly maintained. Energy from solar system is clean and is a renewable source of energy. The 10W 12Volts 36-cell

Fig.4 -Bucket

Solar Panel (41 x 40 CM) for DIY Projects is ready to use without requiring a frame or special modifications. We have chosen to sell these Polycrystalline solar cells because they are Laser cut to proper size and encapsulated in special sun and weather resistant materials which gives them unique characteristics.

DC Motor -

FIG 3. PMDC MOTOR

DC motor consists of one set of coils, called armature winding, inside another set of coils or a set of permanent magnets, called the stator. If electrical energy is supplied to a conductor lying perpendicular to a magnetic field, the interaction of current flowing in the conductor and the magnetic field will produce mechanical force. Two conditions are necessary to produce a force on the conductor. The conductor must be carrying current, and must be within a magnetic field. When these two conditions exist, a force will be applied to the conductor, which will attempt to move the conductor in a direction perpendicular to the magnetic field. This is the basic theory by which all DC motors operate. The force exerted upon the conductor can be expressed as follows.

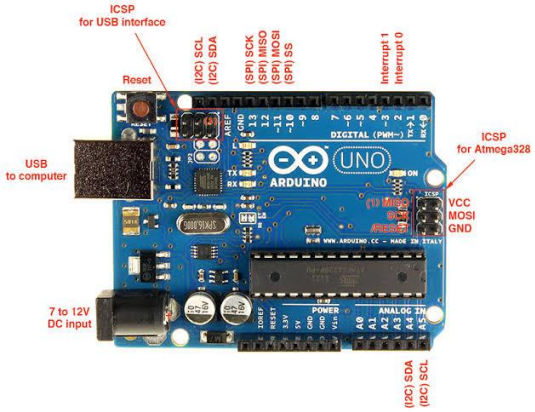
$$F = B\ i\ l \text{ Newton}$$

Where,
B= Density of the magnetic field,
l = Length of conductor,
i = Value of current flowing in the conductor.

BUCKET –

Valve –

Arduino –



IV. CONCLUSION-

The washing machine has greatly influenced people's life styles by providing easy means of washing clothes and drying them out to a considerable extent. It not only saves time and amount of water used but also helps the user to wash and dry clothes with a lot of ease due to its fully automatic nature. Most of the raw

materials used in the manufacturing process of the portable DC washing machine have unacceptable social and environmental impacts in their life cycle. Due to the many drawbacks in various stages of washing machine manufacture, alternative options of washing need to be looked at portable dc washing machine which is solar operated.

A service can be provided where dirty laundry will be located on a weekly basis, washed, dried, ironed and then returned to users amidst some feasibility problems. It is believed that by providing such a central service, material use and water and energy consumption patterns could be minimized to a great extent by using the potable dc washing machine. Hence we can say that the portable dc washing machine has wider scope in the future.

V. REFERENCES –

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