JUGAAD AT HOME - PEDDLING WASHING MACHINE

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***Abstract*: The COVID-19 pandemic has led to a dramatic loss of human life worldwide and presented an unprecedented challenge to everyone. Life was at a standstill but Indian people found ways to be creative. During such difficult times Jugaad; a flexible approach to problem-solving that uses limited resources in an innovative way, helped people a lot. The main objective of this paper is to show the importance of jugaad and how a home-made peddling washing machine can be useful. Many people have built a peddling washing machine in labs for research purposes but in this paper, the washing machine was built using items that can be easily found at any home. This type of washing machine can help save electricity and power and is also a great asset as it is environmentally friendly.**

***Keywords*: Peddling washing machine, jugaad, innovation, environmental friendly.**

Introduction:

Albert Einstein once said "Any intelligent fool can make things bigger, more complex, and more violent. It takes a touch of genius – and a lot of courage – to move in the opposite direction."

JUGAAD (**जुगाड़**) which refers to a non-conventional, frugal innovation, often termed a "hack". It could also refer to an innovative fix or a simple work-around, a solution that bends the rules, or a resource that can be used in such a way. It is also often used to signify creativity: to make existing things work, or to create new things with merger resources.[2] Jugaad is increasingly accepted as a management technique and is recognized all over the world as an acceptable form of frugal engineering at its peak. Companies in Southeast Asia are adopting jugaad as a practice to reduce research and development costs. Jugaad also applies to any kind of creative and out-of-the-box thinking or life hacks that maximize resources for a company and its stakeholders. [1]

"Necessity is the mother of invention."

In India: **जुगाड़ पहले से तैयार है. आप काम बताओ.** (The jugaad is already ready. You just need to say it)

It is a truth universally acknowledged that nobody can beat Indians at jugaad. From innovations to keep locusts away to inventions that make social distancing possible in the age of coronavirus, there is no dearth of creativity in our country. With schools and colleges shut amid the pandemic, one chemistry teacher found a way to make sure her students were following what she taught during virtual classes. Moumita B fashioned a tripod out of a clothes hanger and a plastic chair to film the lesson as she wrote on the chalkboard - a hack that won her much praise and appreciation.[3]

Fig 1: fashioned a tripod out of a clothes hanger and a plastic chair

Some other great examples for INDIAN JUGAAD are:

Fig 2: A shed made out of a pump used to keep bikes

Fig 3: A bike attached to rickshaw seat

Background – Peddling washing machine

As said earlier "necessity is the mother of invention" and Remya Jose from Kizhattoor Panchayat, India is a perfect example for the ingenuity that is born from hardship.Jose was just 14 years old, her mom fell ill and she and her sister had to take over helping with household chores. She wanted to make her job of hand-washing the family's clothes in the nearby river a little easier, and she knew that her family could not afford an electric washing machine.

She began to research how electric washing machines work. She did not want to burden her father with the cost of electricity, so she invented a human-powered washing machine. Her father helped her find the parts and a local auto shop helped her build it and at just fourteen years old, Jose invented a pedal-powered washing-machine.

The machine has an aluminum chamber with a wire cylinder in which you place the laundry to soak in hot soapy water. The cylinder is connected to a bike chain and pedals, and the user pedals to spin the clothes. The soapy water is drained through a faucet, and then the machine is refilled with clean water for the final rinse. This simple machine is an excellent solution for families in villages like Jose's who cannot afford electric washing machines.

The machine is gentler on the clothes than traditional electric machines. You can still easily wash your clothes during a power outage, and you save electricity. You even get some exercise while doing your laundry!

At eighteen years old, Jose was given the National Award from Indian president Abdul Kalam, and she applied for a patent for her machine. She is now in her 20s and is employed as a Serial Innovator at the National Foundation in India. Her focus is on creating machines that will help people in villages such as her beloved hometown of Kizhattur Panchayat.[4]

Fig 4: Remya Jose from Kizhattur Panchayat, a National award winner.

LITERATURE REVIEW:

- Hari Babu and Dr. Subba Rao [5] did research on "PERFORMANCE OF A PEDDLING WASHING MACHINE". Their problem statements were that it must also be more comfortable to use than manual methods and culturally Acceptable in India. They decided on the final design and made the peddling washing machine. They concluded that the "peddling washing machine" is a very simple yet very powerful design of washing cloth which if brought into application in the rural areas of the developing countries can aid a lot of plight and the suffering of the poor peoples who find it very difficult to wash cloth by means of hand. Thus, it is used as an application keeping in mind the social welfare of the peoples of the rural areas. Also, it is safe in working condition and hence it does not require any safety guards during operation. The cost of maintenance is a low and it has a long life.
- Tawanda Mushiri and Tererai J. Mugova [6] did research on "DESIGN AND FABRICATION OF A PEDAL POWERED WASHING MACHINE". The paper was intended to directly address the problems faced by people in the rural areas when washing clothes by designing and fabricating a pedal powered washing machine. The machine can also be used in urban areas to save electricity and also to exercise. The machine does not require electricity or an engine but uses human power. The transfer of human energy through the use of a foot pedal and crank mechanism is what is known as Pedal power. This is the mechanism that has been used to propel bicycles. The paper designs and fabricates the pedal powered washing machine. Experiments are conducted in order to determine the optimum operating conditions.
- Shreyans S.Chordia, Prajwal S.Kalyankar and Siddharth R.Paschapur [7] did research on "Development of Non-Electric Washing Machine". The main objective of their work was to develop low initial cost and operating cost machines and in the areas where electricity is not available is achieved.
- Adetokunbo Adenowo and Abayomi Isiaka Yussuff [8] did research on "Automatic Washing Machine with Direct Current Power Backup". The design and construction of a simple but efficient automatic washing machine with direct current power backup is presented in this paper. The machine is capable of washing, rinsing and dry-spinning clothes. The intelligence of the machine was based on the PIC16f628 microcontroller. This provides the sequence of instructions that controls the machine from start to finish according to the washing mode selected. The machine is robust in design; with local utilization of materials. 3 kg load of clothes at an average power consumption of 1.91 watt per minute washing cycle was achieved. Furthermore, at power failure, the battery backup was automatically initiated to complete the washing operation.
- E.O. Popoola and K.G Aridegbe [9] did research on "Design and Fabrication of a Physiotherapy Manually Driven Washing Machine". In this paper they attempt to develop a concept to make a cloth washing mechanism which can meet the requirements of the above mentioned 70% population of the nation. Working principle of this concept is no more different from available similar types of machine with a different driving mechanism of the machine. The objective of bringing down the initial cost and operating cost of washing machines is almost achieved in present work within the limitation of work as mentioned.
- Adarsh Ranjan, Kushagra Sharan, Sudeep Mazumdar [10] did research on "Pedal Powered Washing Machine (PPWM)". They intended to directly address the problems faced in washing clothes, and thus have developed a new design for easy effort in washing, rinsing and drying clothes.And they concluded that So the product which is a pedal driven machine, it satisfies the need of rural people by giving them an alternative way of washing clothes which is quick, cost effective and eco-friendly. The product design has zero operating cost, cost-effective, and it can be used with minimal effort.

ADVANTAGES AND DISADVANTAGES: [5]

ADVANTAGES:

1. Uses less water, power, and soap

2. Cleans as well as commercial washer with similar capacity
3. Spin dries so no wringing needed
4. Comfortable to use
5. Enables women to do more rewarding things
6. Technology for women
7. Community investment that also benefits the poor
8. Sustainable with local production and maintenance
9. Replicable anywhere with bicycles
10. Save the water.
11. It is non-polluting, as well as not using any types of electricity.
12. Also, we get the advantage of exercises with washing the cloth by means of applying the pedal.

DISADVANTAGES:

An invention like this does not have any specific disadvantages.

The only one it has is the washing machine needs detergent, and water. This means an increase of consumption and expenses in your house. If you are about to buy a washing machine, you should bear these items in mind as future expenses and analyse your economic possibilities.

DISCUSSION AND RESULTS:

As this is a report on jugaad, it was only logical to make a peddling washing machine at home. Our inspiration was this picture.

Fig 5: Inspiration for the project.

Components of the washing machine:

- An outer big plastic storage container.
- An inner smaller plastic storage container.
- A pipe
- 2 Pedals
- A small tap

WORKING PRINCIPLE:

For making this model, we used the resources that could be easily found at any house. We took two storage containers, one a bit larger in diameter than the other. The smaller one is inside the larger one and has a small gate-like structure so that we can insert clothes into it. The smaller one acts as the drum of the washing machine, and the larger one acts as the outer part of the washing machine, which is also used to balance the whole system. We used a pipe to pass through both containers and assist the inner container in rotating. The drums also have a tap attached to them so that the used water can be easily removed. At last, we have attached 2 pedals to the pipe on either side so that a person could pedal it like a cycle and it would wash the clothes.

Most of the components being proposed for physical demonstration of the concepts are taken from different parts of different similar types of articles like washing machine, bicycle, and more.So no load related calculations are shown for their design. It is assumed that all of these components will work satisfactorily in the physical demonstration of this concept .

CONCLUSION:

Jugaad innovation sounds easy but it really takes brave intentions to actually do jugaad as Albert Einstein said. Peddling washing machines is an excellent example of a jugaad innovation which not only proves as a useful resource in India and abroad but also proves to be an excellent engineering innovation.

So, the product, which is a pedal driven machine, needs no electricity, it satisfies the needs of rural people by giving them an alternative way of washing clothes which is quick, cost-effective and eco-friendly. The product designed has zero operating cost, is cost-effective, and it can be used with minimal effort.

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