

# Pedal Operated Washing Machine

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**Abstract:** Pedal power is the transfer of energy from a human source through the use of a foot pedal and chain drive system. This technology is most commonly used for transportation and has been used to propel bicycles for over a hundred years. Less commonly pedal power is used to power agricultural and hand tools and even to generate electricity. Some applications include pedal powered laptops, pedal powered grinders and pedal powered water wells. This project concentrates on pedal powered washing machine. The basic Principle of this machine is Sprocket and Chain system; the concept of this Mechanism is that the pedalling is converted into rotary motion and offers us higher transmission efficiency.

**Key Words:** — Pedal Power, Washing Machine, Chain Drive Technology.

## I. INTRODUCTION

Pedal power washing machine is the transfer of energy from a human source through the use of a foot pedal and Gear system. This technology is most commonly used for transportation and has been used to propel bicycles for over a hundred years. Some third world development projects currently transform used bicycles into pedal powered tools for sustainable development.

An individual can generate four times more power (1/4 HP) by pedalling than by hand- cranking. At the rate of ¼ HP, continuous pedalling can be served for only short periods, approximately 10 minutes. However, pedalling at half this power (1/8 HP) can be sustained for close to 60 minutes but power capability can depend upon age. As a consequence of the brainstorming exercise, it was apparent that the primary function of pedal power one specific product was particularly useful the bicycle.

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## II. WASHING MACHINES THEORY

Pedal power washing machine is the transfer of energy from a human source through the use of a foot pedal and Gear system. This technology is most commonly used for transportation and has been used to propel bicycles for over a hundred years. Some third world development projects currently transform used bicycles into pedal powered tools for sustainable development.

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### 2.1 Objective

- The main objective is to provide a product with an alternative way to wash clothes when there is no electricity.
- To avoid the damage that is caused by chemicals in detergents which may cause skin diseases.
- Easy to build and maintain and also should have less investments as it should be used by laundry shops in India as they are urge in need of such machines.

- Another aim is to keep health conscious as nowadays there is madness of cycling, so instead of wasting the energy in cycling one will use this energy to do some productive work.
- Study on washing machines on the basis of design & construction, performance, economy and applications.
- Design & construction of a working unit of low-cost washing machine made up of easily and readily available scrap parts in daily life. It generates power through human pedalling and with the drive mechanism, to perform all the functions such as Washing, Rinsing, and Drying.
- Cost analysis of a unit of pedal powered washing machine

### III. METHODOLOGY

A pedal - operated washer machine which uses the available materials to wash clothes with low water quantity, with low purchased and maintenance cost which is simple and easy to be used are established to wash clothes without time consuming, with power saving. Even though it overcame washing with hands, the washed clothes need to be dried with the help of the sun.

### IV. SIMULATION AND ANALYSIS SIMULATION

As we know that in the era of automatic operated washing machine and highly advanced techniques why one should buy pedal operated washing machine, so here is the reason.

Table.1. Comparison between POWM and Automatic Machine

Parameters	Pedal Operated Washing Machine	Fully Automatic Washing Machine
Cost	10,500/-	20,490/-
Energy usage per wash of 2 kg clothes	0 Watt	300-500 watts (Depending upon model)
Energy usage per year of 2 kg clothes	0 Watt	36,400 to 52,000 Watts
Physical Exercise	Yes, by pedalling	No
Burning of Calories due to cycling per hour	350 Calories	0 Calories

#### 4.1 Fabrication Work:

The fabrication work is carried out by sequence of operations and requires some days to manufacture. Various operations are performed in the workshop in order to manufacture the project and all our team members are at work and learning to make the project to another level.

Following are the process of operations that can be done to manufacture the components:

#### 4.2 Frame:

Square pipes of 2×2 inches are used to fabricate the frame as it is integral part of it and all the components can be assembled over it, it should be as tough as possible to sustain the shocks and vibrations. Following should be the process of fabrication:

- Cutting of square pipes using cutting machine in required dimensions
- Cutting the burrs that are formed
- Welding the same using Arc Welding and checking straightness using spirit level
- Final checking of Frame if any misalignment is there or not.

It will take around 5-6 days to manufacture frame according to our fabrication plan.

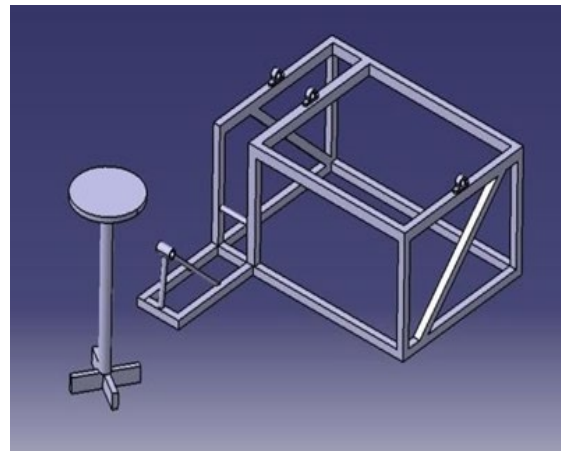


Fig.1. Frame

#### 4.3 Drum:

Two drums one the outer which is bigger than inner drum. Outer drum is having a solid steel plate having thickness of 2mm while the inner drum is a punched hsheet having 1.75mm thickness is used.

Both the drums are manufactured in the same way which is as follows:

- Drum is first straight thoroughly
- Then it is wound around a cylinder in round shape
- and joint using welding to make it a leak proof weld
- Final finishing and testing are done on the drum and checking the leakage if any.

It will take around 3-4 days to manufacture the drum as it is critical part

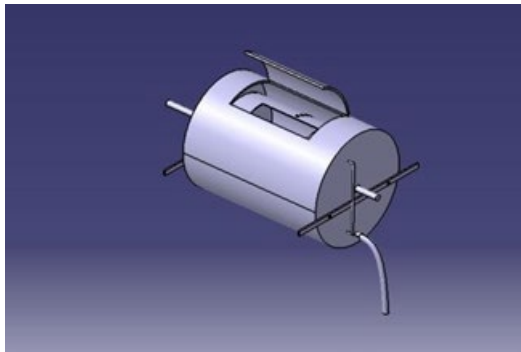


Fig.2. Inner and Outer Drum

#### 4.4 Chain Drive:

A bicycle pedal is the part of a bicycle that the rider pushes with their foot to propel the bicycle. It provides the connection between the cyclist's foot or shoe and the crank allowing the leg to turn the bottom bracket spindle and propel the bicycle's wheels. Pedals usually consist of a spindle that threads into the end of the crank and a body, on which the foot rests or is attached, that is free to rotate on bearings with respect to the spindle

Following is the process of manufacturing:

- Shaft is connected to drum concentrically
- Bearing support is given to shaft and driven sprocket is mounted on the shaft
- Driving sprocket is mounted on the frame and pedal is mounted after the same Alignment is checked between the components and chain is assembled in between them and straightness is checked of the chain drive to avoid any damage to system

It will take around 3-4 days to assemble the components and their alignments.

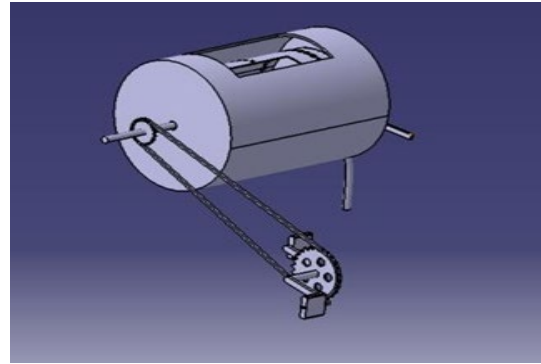


Fig.3. Chain Drive Arrangement

#### 4.5 Seat:

A seat is place to sit, often referring to the area one sits upon as opposed to other elements like armrests. Seat is a arrangement in any bicycle on which a person can sit comfortably. In seating arrangement, the design factor is always considered according to their use in any vehicle.



Fig.4. Assembly of POWM after Rendering

## V. CONCLUSION

When any detailed design has been done, it is easily understood that no product/design get at its best of 100% efficient in its operation. There should always be opportunities for continual development and improvement. As shown, despite the fact that the selected concept proved to obtain satisfactory results, it could be still be improved to obtain a higher effectiveness of efficiency in the discharge of the intended duty.

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