iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 10 **Issue:** V **Month of publication:** May 2022

DOI: https://doi.org/10.22214/ijraset.2022.42909

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 10 Issue V May 2022- Available at www.ijraset.com

Design and Fabrication of Pedal Power Washing Machine

Dr. Atul. C. Waghmare[7], Sahil Sadmal[2], Hardik Jain[1], Chetan Sakarde[3], Yogesh Kosare[5], Prakash Meshram[6], Rajat Khandekar[4]
[1, 2, 3, 4, 5, 6]*K.D.K. College Of Engineering, Nagpur*

Abstract: Pedal Powered Clothes Washer is a low cost machine made up of easily and readily available scrap parts in daily life. It is a machine which generates power through human pedaling and with the drive mechanism, converts the pedaling motion into required rotary motion of the washing drum. Its innovation lies in its simple design, use of inexpensive parts, very low repairing and maintenance cost, affordability to each member of the society and it does not affect the environment. Our team intends 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. The Pedal Powered Clothes Washer is a completely new concept, which in its one laundry cycle does washing, rinsing and drying of clothes similar to that of an automatic washing machine available in the market.

I. PEDAL POWER WASHING MACHINE

Peddling washing machine is a very great innovation in its own. Peddling washing machine is specially made for the purpose of its utilization to wash the cloth by means of applying pedal. Today due to non renewable energy crie its basic need to utilize the energy from other way or save the energy.

This project includes the construction and utilization of the peddling washing machine which can with any amount of requirement. The following pages in the report includes about the constructions of peddling washing machine, its raw material, it's working, benefits of the peddling washing machine with respect to actual electronics washing machine save the time, water, electricity and not very expensive. Its main expect is exercises with applying the pedal to wash the cloth.

Cloth washing is one of the essential parts of the life but it is considered undesirable because of the involvement of efforts, time, energy and cost. Now a days a wide variety of washing machines are available in the market and there is a tough competence among the manufacturers. The cost of washing machine varying from Rs.10,000 to 1,50,000 depending upon features and capabilities.

II. WORKING PRINCIPLE

A washing machine has become a vital household item that most people simply cannot do without these days. For one, it is designed to make washing clothes a lot easier. If you have already tried washing your clothes by hand, then you'll certainly understand what it means not to have this appliance with you.

A washing machine is a pretty straightforward piece of contraption which can be run by practically anybody. It is designed to remove dirt and stains from your clothes and make them suitable for wearing again. The machine moves the clothes about in soap suds and spins them around to separate water later on.

One thing that you should understand about how washing machines work is that these contraptions are actually made of two drums instead of one. The inner drum works to let water in and out to spin your clothes and clean them and has a lot of small holes on it for that purpose. The bigger drum, that you really don't see works to hold water while the inner one works on spinning your clothes around.

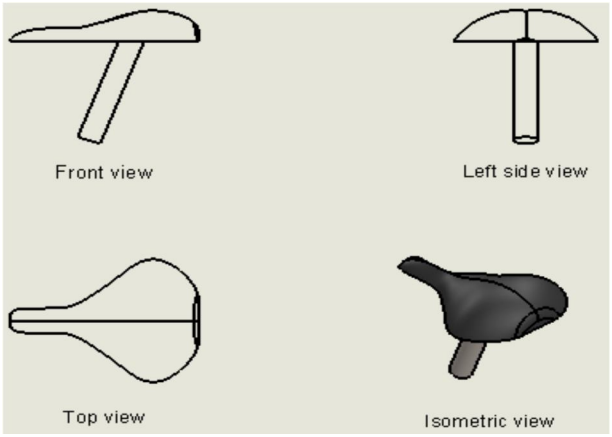
III. COMPONENTS USED

The Pedal Power Washing Machine is one kind of a technological revolution where the prototype model of it shows a closer look to its design where the model consist of

1) Seat
2) Pedal
3) Sprocket with pedal link
4) Chain
5) Bike frame
6) Drum as a washing chamber

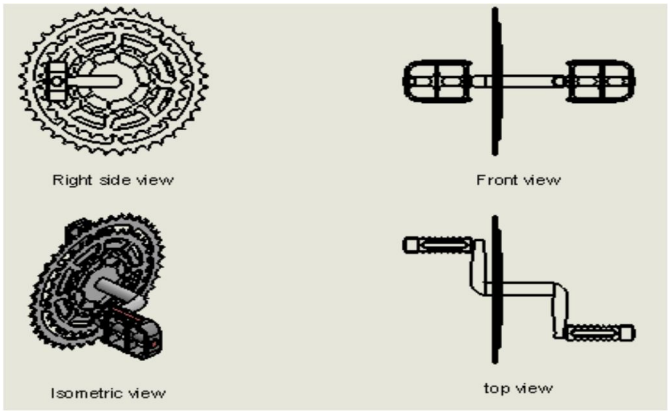
A. Seat

A seat is placed to sit; seat is an arrangement in any bicycle on which a person can sit comfortably. In the seating arrangement, the design factor is always considering according to their use. The seat may be made of plastic, rubber



B. Sprocket with Pedal Link

Sprockets and pedal links are connected to transmit rotary motion to the shaft connected on the inner drum with the help of a chain. Three different sprockets are according to the task purpose. The large, medium and small sprocket is meant for drying, rinsing and washing respectively



C. Chain

When creating your own human-operated bicycle, a chain drive will likely be your chosen power transfer system, as it is an inexpensive, easily-to-install and extremely effective drive mechanism. Bicycle chains are equitably simple, requiring unique one cheap tool to remove and attach links. Two types of bicycle chains are available: single speed chain and multi-speed chain. The single-speed chain is primarily used on children's bikes, coaster footbrake, and weighty cargo bikes. The multi-speed chain is used on standard speed bikes and mountain bikes that require the use of a front and rear derailleur to change gears. The chain drive can transmit motion to several shifts by one chain only and the production cost of chains is relatively high.

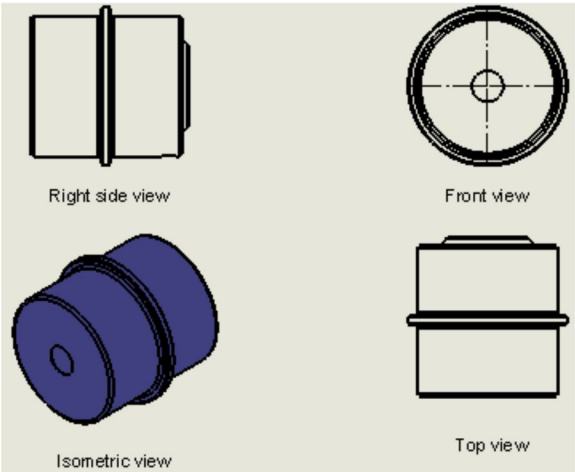
D. Bike Frame

The bike frame is the key component of a bicycle, on which its fits other apparatuses. The up-to-date and most public frame design for a standing bicycle is built on the secured bicycle. Frames are essential to be strong, inflexible and bright, which they do by combining unlike materials and shapes and it makes the frame of aluminum since aluminum is not very dense so it can be formed into lightweight structure. The bicycle has a different number of simple machines like wheels, brakes, gears and pedals that help the bike to move. When the rider pedals the wheel (s) rotates as shown in Figure 6. The bicycle has a "tool" that enables moving the support and control the bike in balance. That tool is the steerer, split to be careful. The bicycle junction is always at an angle. It is never (fully, 90 degrees) vertical. The junction angle is not for fashionable purposes but has a significant role. It permits movement of the pivot and equilibrium care. When bars are curved to the right, the front controls contact point is also stirred to the right. This moves the pivot to that side as well.

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 10 Issue V May 2022- Available at www.ijraset.com

E. Drum as a Washing Chamber

It is just a chamber in which water is filled with detergent further clothes are put inside to be washed, rinsed and dried. In this type of machine, there are two drums are used: inner & outer. The inner drum consists of clothes and it is less in diameter as compared to the outer drum. The inner drum is flanked throughout its body. It rotates with the help of compound gear and chain arrangement at the desired speed with respect to the purpose as shown in Figure 8. Outer drum is used to store water used for washing and rinsing the Clothes



IV. DESIGN OF THE PROJECT

1) The velocity ratio of a chain drive is given by

V.R=N1/N2=T1/T2

Where ,

N1=Speed of rotation of smaller sprocket in rpm

N2=Speed of rotation of larger sprocket in rpm

T1= No. of teeth on the smaller sprocket

T2= No. of teeth on larger sprocket

We have , T1=17

T2=44

N2=50(Approx).

2) The velocity ratio of a chain drive is given by

V.R=N1/N2=T1/T2

Where ,

N1=Speed of rotation of smaller sprocket in rpm

N2=Speed of rotation of larger sprocket in rpm

T1= No. of teeth on the smaller sprocket

T2= No. of teeth on larger sprocket

We have , T1=17

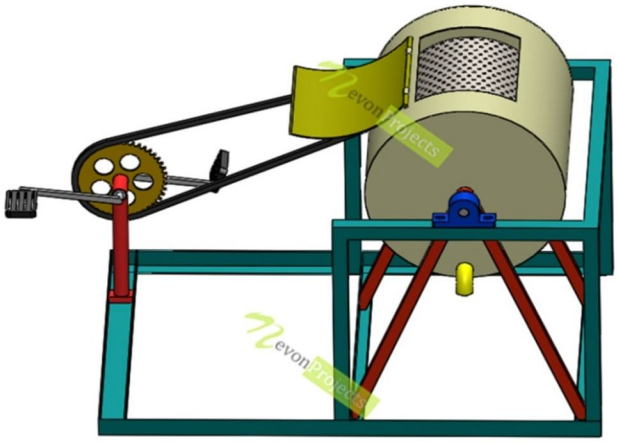
T2=44

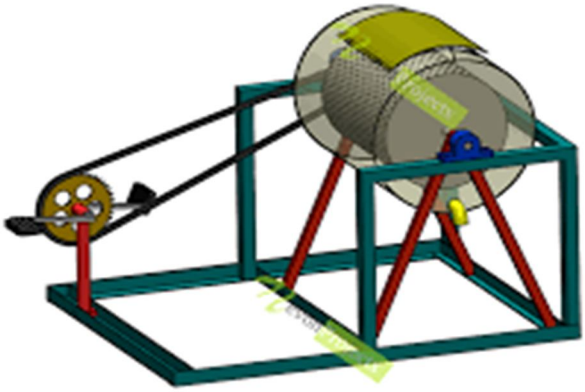
N2=50(Approx).

- Length of change = K.p
- where,K=No of chain lines
- p=pitch of chain
- K= T1+T2/2 +2X/P +(T1+T2/2*Pi)2* P/X (PITCH=12, X=533.4mm)
- K=121.5,
- K=122 (approx.)

Length of chain=122*12= 1464mm =1.464 m

V. PROPOSED DESIGN





VI. WORKSHOP WORKING

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 10 Issue V May 2022- Available at www.ijraset.com

VII. 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 a 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.

VIII. DISADVANTAGES

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 analyze your economic possibilities.
The washing machine occupies too much space. If you generally change spaces or live in small apartments, having a washing machine will be a disadvantage for you to move around and for the machine too

IX. APPLICATION

1) It is very useful into the local rural areas.
2) Saving in detergent and the water
3) Scale free tub
4) Reduced traces of detergent on clothes
5) Better wash quality
6) Softer clothes
7) Easy to operate and the less effect of chemical on the women hand.
8) Exercise is also done with the applying the pedal.

X. ACKNOWLEDGEMENT

We would like to thank our guide Dr. Atul .C. Waghmare who gave this opportunity to work on this project , we learn a lot from this project about Design and fabrication of electromagnetic breaking system.

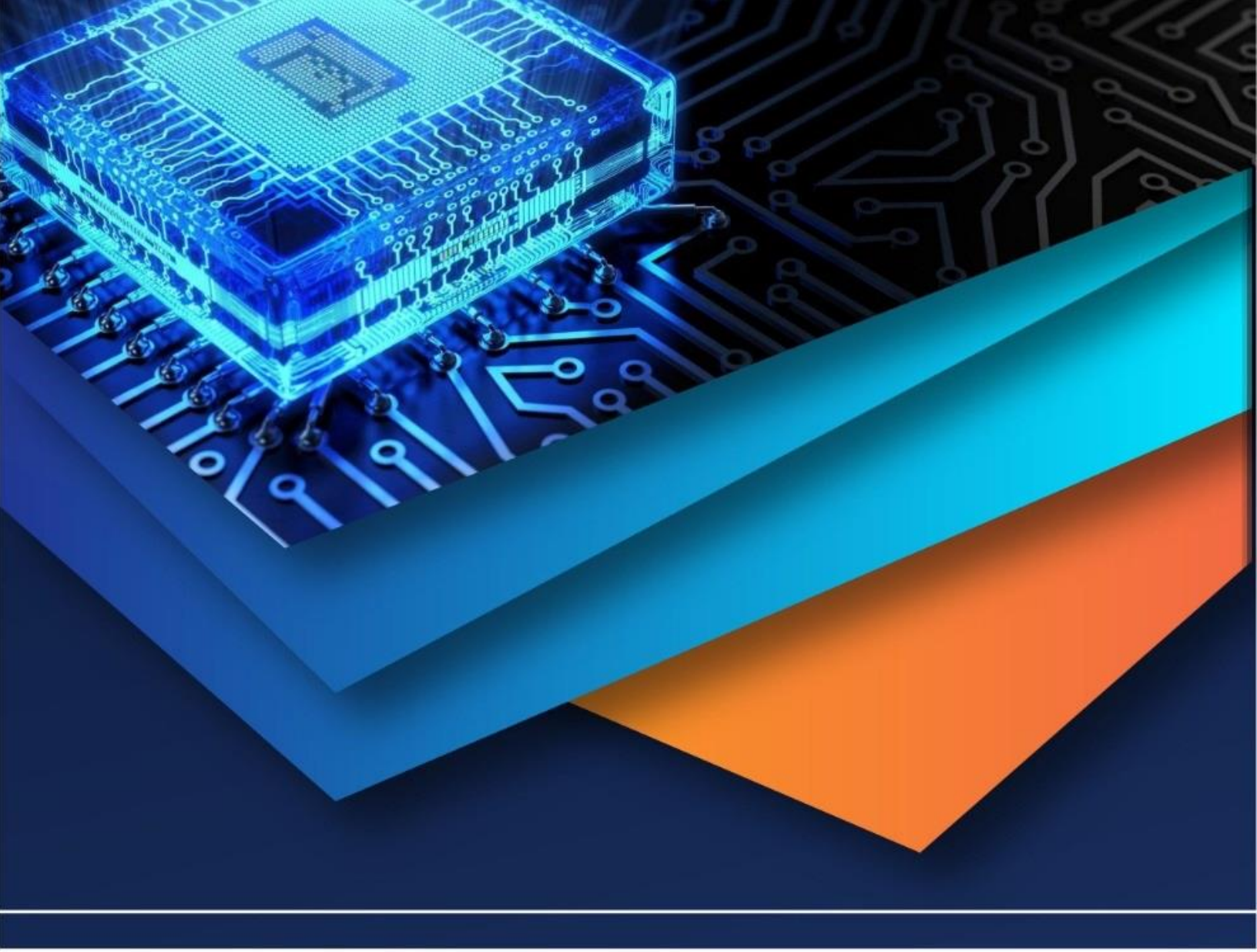
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 10 Issue V May 2022- Available at www.ijraset.com

XI. CONCLUSION

From the above project, it can be 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 a 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.

REFERENCES

[1] S.M.Moghe & K.S.Zakiuddin (2013) "Design and Development of Turmeric Polishing Machine Energized by Human Power Flywheel Motor."-A past review, Proceedings of the 1st International and 16Th National Conference on Machines and Mechanisms IIT Roorkee, India, Dec 18-20 2013
[2] Bicilavadora: The Pedal-Powered Washing Machine - IDEAS 2005 Proposal.
[3] Bruzzone, M. & Wieler, A. (2010) "Reflecting on an Intercultural Design-Build Project in the Kathmandu Valley" Final Draft, February 5, 2010.
[4] http://en.wikipedia.org/washing mc/pedal-powered-washing-machine.htm
[5] http://en.wikipedia.org/wiki/Washing machine.
[6] http://www.ideafinder.com/history/inventions/washmachine.htm
[7] http://home.howstuffworks.com/washer1.htm
[8] http://www.apparelsearch.com/definitions/miscellaneous/washing_machine.htm



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY