

PEDAL POWER PUMP AND PURIFICATION

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ABSTRACT

This paper describes the design and construction of the pedal-operated power pump and purification are done especially for the discharge and purification of the water. The proposed pump is a rotary pump operated by the pedal power through rear wheel. In this the water enters axially through the vane eye and exits radially. In this paper, necessary dimensions are calculated for the design. Purification is the process of purifying of any substance and thus involves filtration. Purification the water by cycling is useful in purifying the water by means of a cycle operated with reverse osmosis process. It includes the cycle pedal being rotated and inlet being connected to the membrane of the Reverse Osmosis setup. It is used to increase the discharge level of the water involved in purification. Hence the amount of water used can be purified and used by these means of purification with a lots of water borne diseases. This method is used in providing the purified water that can be available for all people in a very low cost. An Most of the earth is covered by Water but it needs to be purified before we consumed it. In Generally water purification needs electricity or fuel along with large systems making purified water more costly. But there are a lot of different purification methods which needs no electricity with minimum cost. One of the purification method is pedal operated water purification. In this purification process mainly basic Bernoulli principle is used which say that an increase in the velocity of a fluid occurs simultaneously with decrease in pressure or a decrease in the fluid potential energy. Different people worked on this type of water purification system and came up with some unique designs.

Keyword – centrifugal pump, discharge, rotating shaft, inlet, and outlet Dynamo five stage of Purification , Battery .

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INTRODUCTION

Pedal operated water pumping is done by pedal power on mechanical energy without electricity and purification through water filters and pump powered by the discharge of electricity through dynamo connected at the rear wheel. It is used to lift and supply the water in rural or urban area where there is no electricity or load shedding and also to stay fit. When the pedal is done bicycle wheel rotates, so finally it rotates a rotary pump connected at the rear wheel which supply the water from source, and electricity is generated through the rotation of dynamo connected at the rear wheel which will supply power to the purification pump to filter the water. In pedal operated water pump a rotary water pump which is run by rotating the pedal of a cycle. The system comprises a bicycle adjust with supporting stand which in contact with the rotor of pump and dynamo through this process of paddling is used to lift water from pipe into the form for cultivation. The Earth is covered mostly by water. Water is main element on earth and is very essential to sustain life, and a satisfactory and safe supply must be available to all. But nowadays, the water is getting contaminated due to industrialization which produce large amount of wastes which contains toxic chemicals and pollutants which leads to many water related diseases. supporting stand which in contact with the centrifugal of pump and dynamo through this process of paddling is used to lift water from pipe into the form for cultivation. Liquid can only flow under its own power from one elevation to a lower elevation or, from a high pressure

system to a lower pressure system. The flow of liquid is also affected by friction, pipe size, liquid viscosity and the bends and fittings in the piping To overcome flow problems, to move liquids .Reverse Osmosis is needed to remove Fluoride, sodium, total dissolved salts, or chemicals like arsenic, radium and nitrates .The water purification system can be operated by means of many ways like electrical energy, solar energy, thermal energy, gravitational potential energy .we use electrical energy

OBJECTIVES

1. A small scale water filtration system could be brought into remote areas and emergency conditions like flood, famine, earthquakes, and tsunami to provide the means of purifying contaminated water.
2. In other hand there are no proper water facilities and electricity in villages and these people are drinking hard water which is dangerous to health
3. Filtering local sources of water would eliminate the need to import large quantities from elsewhere, saving relief funds for alternate uses.
4. To make the system portable and user friendly.
5. The purpose of this project is to design a small scale water purification kit which requires minimal maintenance and is cost.

LETEREATURE REVIEW

PEDAL POWERED WATER PURIFICATION -

K. I. Vishnu Vandana ,

T. Venkata Sai Kaartheek ,

S. Prudhvi Teja ,

M. Manikanta ,

Y.V.S Mani Sampath ,

We have conducted a experiment on pedal power water purification and style was focused on process of conception, invention, visualization calculation etc. he also made a force analysis to see performance criteria. The physical parameter of design decided by the acceptable calculation and therefore the practical consideration with some reasonable assumption. it's discovered that the planning is straightforward , cheap, efficient and affordable as might be seen from the readily available materials used. It also use the Bernoulli's principle for the flow calculation with the assistance of peristaltic pump. Yuichi katsuraet .al 2011 [4]president of Nippon basic company was the primary company to offer Portable Water Purifying System "Cycloclean" powered by pedaling bicycle to form 5 liter(max.) of unpolluted water during a minute at a technology fair in Tokyo. It need man power to show a motorcycle chain driving motor to pump water through series of filter (without the utilization of electricity). Clean water are often utilized for domestic purpose. Peramanan et. al 2014 [5] has studied the fabrication of Human Power Reverse Osmosis Water Purification Process. The device use pedal to harms human motion to convert it into usable power to run a reverse osmosis filtration system.

Pedal Operated Water Pump :

ChandrasekarAswath.

ManimohanDhayananth.

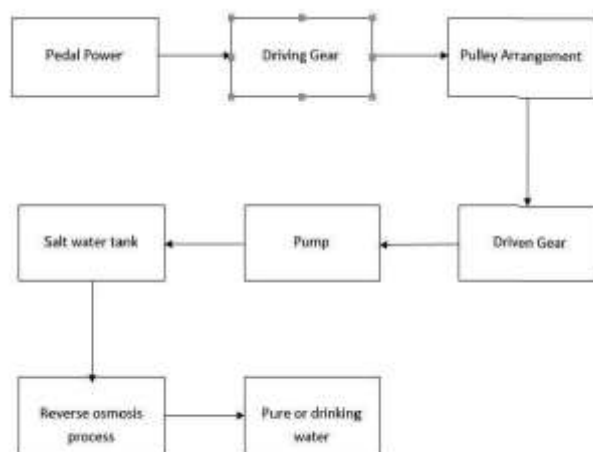
Moorthy Karthikeyan .

MuthaiyanRavikumar .

etc all., discussed that the human power is beneficial for production or generation of electricity to satisfy the need of electricity in lifestyle by use of dynamo and solar array for its use in stationary and mobile condition . it's also possible to directly power production by DC powered equipment like low power pump without employing a battery. Appliances like a DC television, light or radio can also be used. Installing residential solar panels for home can bring big financial benefits, especially within the sort of permanently reduced energy bills.

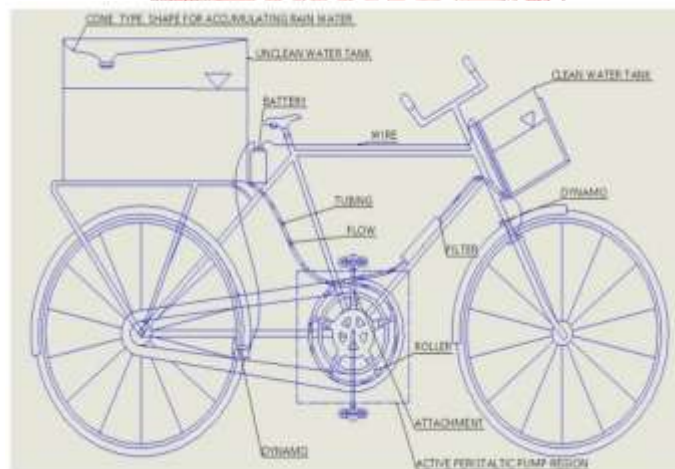
METHODOLOGY

The first step of creating power operated and pump is that the preparation of the stand scrap low-carbon steel pipes are made into sufficient pieces and are welded together to urge the stand. The stand is then connected with the rear wheel of the bicycle .By considering the wheel and rotar the stand is connected by using the nut and bolts ,the suction and delivery pipes are then connected to the suction and delivery ports respectively .The flow of water is measured using tachometer..The Flow of water is measured by using the measuring tank and stopwatch. .In this purification process mainly the essential Bernoulli's principle is employed which states that a rise within the speed of a fluid occurs simultaneously with a decrease in pressure or a decrease within the fluid's P.E. ..The main setup of the whole design is split into three different stages went to purify the water. The stages are Generator, Boiler and Condenser. Initially the water which is contaminated is purified by allowing the water into pump with the assistance of chain drive..In this arrangement generally chain drive is employed to transmit energy from driver shaft to driven shaft. Chain drives efficiency is more as compared to belt drives. Chain drives can maintain the speed ratio constant and may be suits for little and enormous distances from 3mts to eight mts .Chain drives can produce less load on shaft in order that we will do effective pedaling with low overall maintenance. in order that we prefer chain drive as a transmission to 12volt DC Pump also as generator.The contaminated water is drawn to Boiler with the assistance of pump. The generator is employed to develop the energy to electric power in order that the contaminated water is heated within the boiler. The boiler is actually a closed vessel inside which water is stored because the generator gives the input the boiler heats the pollutant water. After heating the water within the boiler, it turns in to vapour then it goes to condenser. The condenser is employed to chill down and condense the water which comes from the boiler. Then the clean water which is condensed is stored during a container.



PRINCIPAL

Pump may be a device which rises or transfers water at the expense of power input, it during a machine and style to elevate, deliver and move water or a tool that transfers mechanical energy into the potential and kinematic energy of a water. Rotary pumps are positive displacement pumps that utilize rotation rather than reciprocating motion in their pumping action. Pedaling will start the rotor and therefore the water discharge from the source to the tank. Later the pumped water is transferred to the next tank and stored there. From there the water is pumped forward to the filters for the filtration through the RO water filter. The project involves fabrication of a pedal-operated water pumping and purification unit. The energy obtained by pedaling the pedaling system is transferred to the drive train using the chain and sprocket drive. The chain and sprocket drive used is of required speed ratio so because the pedaling action of a person makes the specified energy also as speed to drive the pump. The pump is connected to the impure cistern. Because the user pedals the impure water from the tank is pumped to the purification unit. The purification unit purifies the impure water and provides to the outlet. Thus this project can function a way to pump the water from the tank using pedal power also as purify the water from the tank. Additionally to the present, a part of the drive is employed to get electricity. The project consists of a little generator which is attached to the pedaling unit employing a speed reduction drive. Because the pedaling action takes place, the generator also rotates, thereby generating electricity. The generated electricity is stored during a battery which may be utilized in case of power cutoffs.



FLOW CHART:

ANALYSIS:

Capacity to purify: Minimum 10 Gallons per Day

- Water usage: Maximum need of capacity
- Pedalling time: Maximum 15 minutes each for purifying water
- Total operation time: Maximum 20 minutes, which depend upon pressure and input water quality
- Lifetime of structure: membrane should be changed thrice a month
- Capital cost: Rs.5000/- (welder, membrane, tds machine)

THEORY

Now each day Water becoming more polluted causing many diseases due to pollution and contaminated sources . The water from water purifiers use commonly also can't be bound to be the clean water .Thus so as to save lots of our upcoming generations we've to use resources during a natural ways. Thus Purification System of Water purification cycling is beneficial for humans without polluting the environment. this sort of innovative systems are now getting used so as to unravel water issues .The method of purification system are often operated by means of cycle connected to Rotary pump then sent into the second stage of purification . The rotary pump is use in elimination of the wastes. The filter purifies the water and its get collect separately into another tank . The inlet and outet getting used within the process are involved in transferring the water resources to the from the tank and thus discharging the impurities. Thus the method are often made available for all person.

DISCUSSION

1. The pedal operated power pumping and purification designed and construct ,so that a long time operation is possible with high efficiency..It is simple and rigid in construction compact and portable.
2. Manufacturing cost is lesser than the modern water pumping machine and filtration.
2. Advance filtration is done with the basic methods without using external electric source.
3. The power saved and good exercise for all people.
4. It uses manual power hence no fuel is required.
5. Operation is economically and less maintenance cost.
6. The operation is not much noisy.
7. It is Low cost and helpful in rural areas.
8. It will not need any types of electricity.
- 9.Comfortable to use.

RESULT

It is very useful in rural areas.

It is very much useful in summer seasons.

Usage of electricity is not needed.



Fresh water can be obtained. .

CONCLUSION

Pedal powered water pumping and purification can face this problems as this technique only works on pedal powered there's no need of electricity to pump nor to purify the polluted water. Pedal operated water purification reduces the upper energy costs. Pedal operated water purification is design as a transportable one which may be use for irrigation in various places. The experiment was done and performance of the pedal powered water purification had administered during this research paper we've proposed that the pedal powered water purification will provides a suitable amount of discharge and head of the purified water. The pedal operated purified water system system is an invention that uses the straightforward technique and puts all of them together to assist villages in developing countries to possess daily access to safe beverage all by harnessing the energy of pedal power. The project has mainly aimed that each one the people would get safe beverage by means of simplest process, without electricity and each people of the developing country will deserve it for the explanation for drinking. The project administered by us made an impressing task within the field of water purification method.. Considering other water purification systems, a person's powered reverse osmosis system isn't only feasible, but quite economical and effective means for providing potable water. within the coming days a prototype are going to be constructed which consists of a pressure pump, the filter and a stand. Each component are going to be thoroughly tested so as to supply the simplest product possible at the foremost reasonable price.

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