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A Review of Solar Water Purifier

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ABSTRACT: We plan to develop a water filtration system that will take advantage of natural energy in order to power a water purification system. Water will enter the system, where it will flow through a sediment filter and carbon filter then be processed by a UV purifier. By using sediment filtration, carbon filtration and ultraviolet radiation purification techniques, our goal is to produce water with a total concentration of less than 0.01% Coliform bacteria. In order to save on energy and cut costs, water will enter the system manually and use gravity to pull it through the system, for using a pump. We plan to use photovoltaic technology to transform sun rays into electric potential that will be stored in a battery backup system. This battery system will provide the power to the ultraviolet purification process of the system.

I. INTRODUCTION

Water purification is the process of removing undesirable chemicals, biological contaminants, suspended solids and gases from the water. Water purification may reduce the concentration of particulate matter including suspended particles, parasites, bacteria, algae, viruses and fungi as well as reduce the concentration of a range of dissolved and particulate matter.

II. EXPERIMENTAL

In this paper we have developed the solar water purifier. First we create the water purifier then the solar panel connected to the battery setup. The battery system gives the power to run the water purification system. The solar panel produce the electrical energy, this electrical energy stored in the battery.

III. RESULT

As per our goal off this project, we design a dependable way to purify water for locations those are off grid and don't have constant sources of clean water. This design is also full fill the requirement of low budget product considering the most of the places don't provide potable water to their citizens. Water purification through solar power is one of the best inventions to save energy and to have uncontaminated water. An electric purifier system requires more power and costs a lot more too.

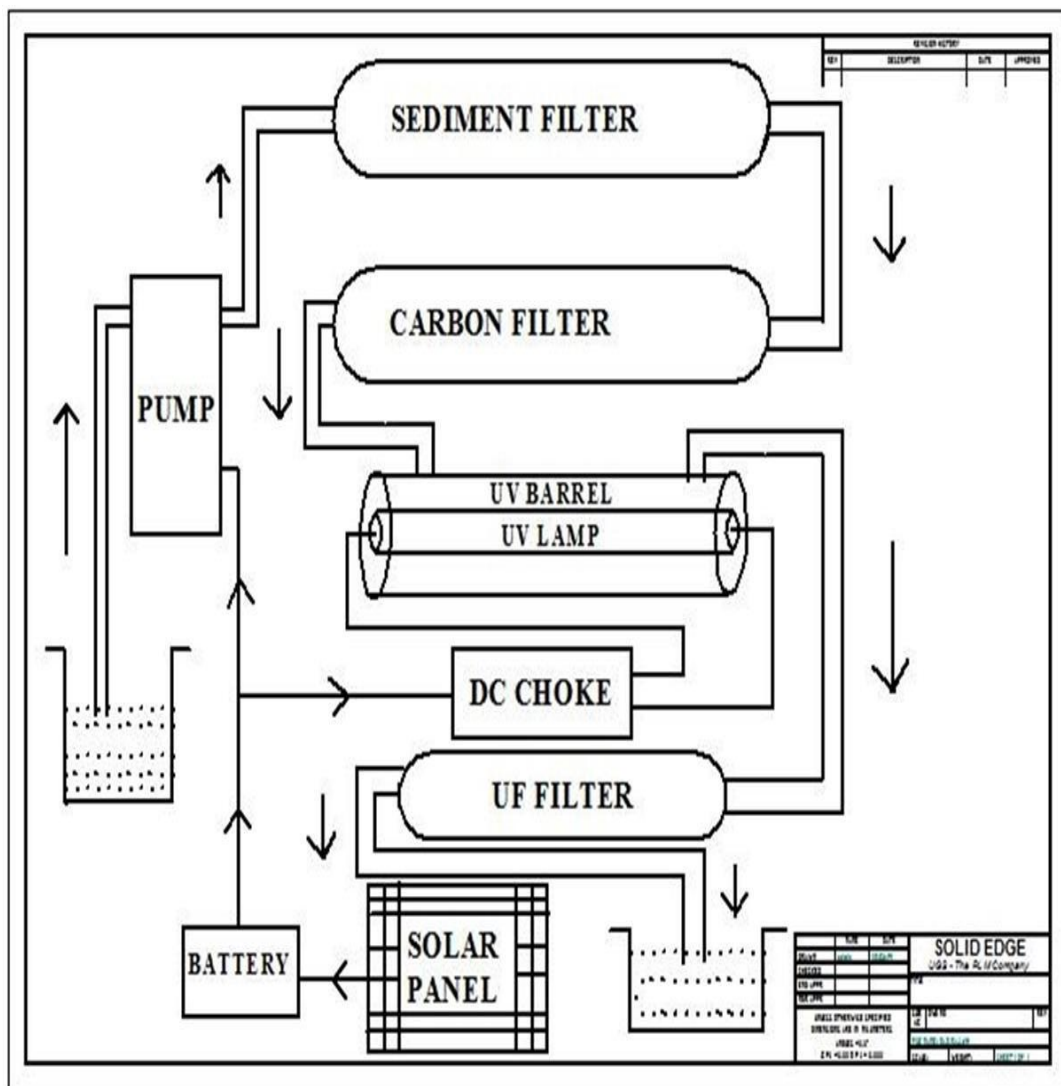
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IV. PROJECT LAYOUT



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V. PRINCIPLES OF SOLAR WATER PURIFIER

Water purification is the process of removing undesirable chemicals, biological contaminants, suspended solids, and gases from water. The goal is to produce water fit for specific purposes. Most water is purified and disinfected for human consumption (drinking water), but water purification may also be carried out for a variety of other purposes, including medical, pharmacological, chemical, and industrial applications. The methods used include physical processes such as filtration, sedimentation, and distillation; biological processes such as slow sand filters or biologically active carbon; chemical processes such as flocculation and chlorination; and the use of electromagnetic radiation such as ultraviolet light. Water purification may reduce the concentration of particulate matter including suspended particles, parasites, bacteria, algae, viruses, and fungi as well as reduce the concentration of a range of dissolved and particulate matter. The standards for drinking water quality are typically set by governments or by international standards. These standards usually include minimum and maximum concentrations of contaminants, depending on the intended use of the water. Water purification through solar power is one of the best inventions to save energy and to have uncontaminated water.

CLASSIFICATION

- ❖ Water purification system
- ❖ Battery
- ❖ Solar panel

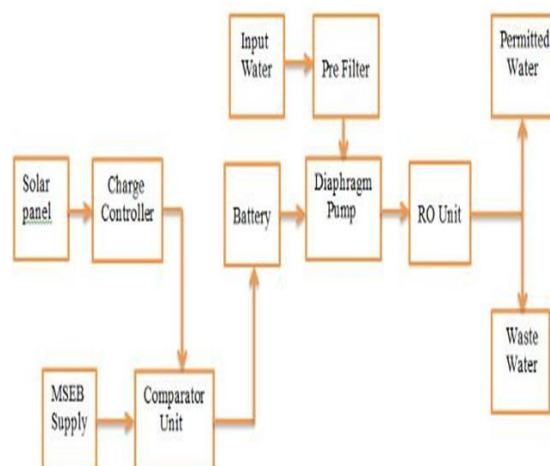
APPLICATION

- ❖ Swimming pools
- ❖ Fish farms
- ❖ Medical

JOURNAL PAPER

A journal is a publication that is printed periodically. It is a collection of reviewed papers. Also, journal papers are usually more elaborative than the conference papers.

Mr.S.k.Shaikh at el (March 2017)



As per our goal off this project, we design a dependable way to purify water for locations those are off grid and don't

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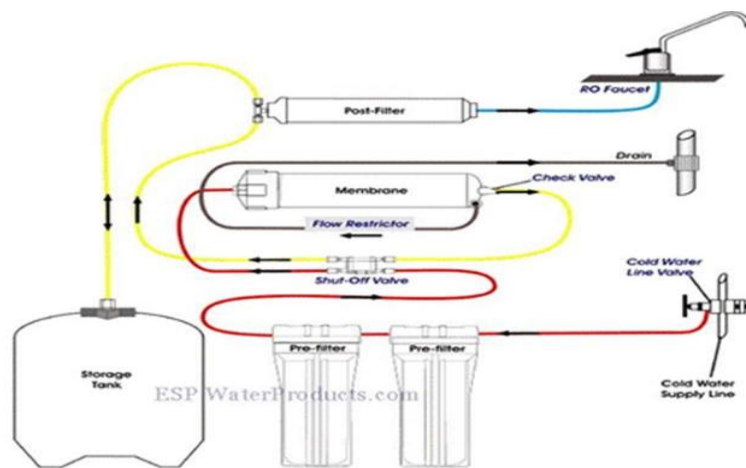
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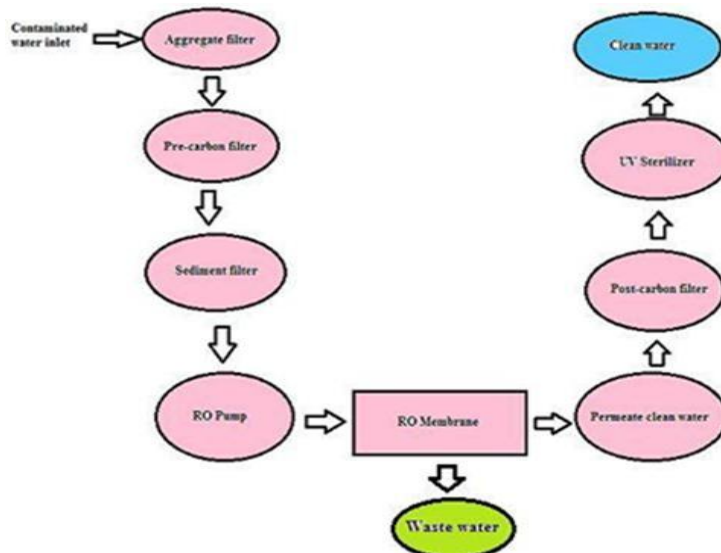
have constant sources of clean water. This design is also full fill the requirement of low budget product considering the most of the places don't provide potable water to their citizens. Water purification through solar power is one of the best inventions to save energy and to have uncontaminated water. An electric purifier system requires more power and costs a lot more too.

Dr.S.Prakash (December 2018)



As solar energy is being used for the purification of water, which is cheap and abundant, it can be used everywhere where electricity is not available. Here, the microcontroller which is used also prevents the water from overflowing. Moreover, reverse osmosis is a good disinfectant process. This project has only capital cost and almost no running cost. Hence, It will prove to be useful in the near future.

Pooja at el (October 2016)



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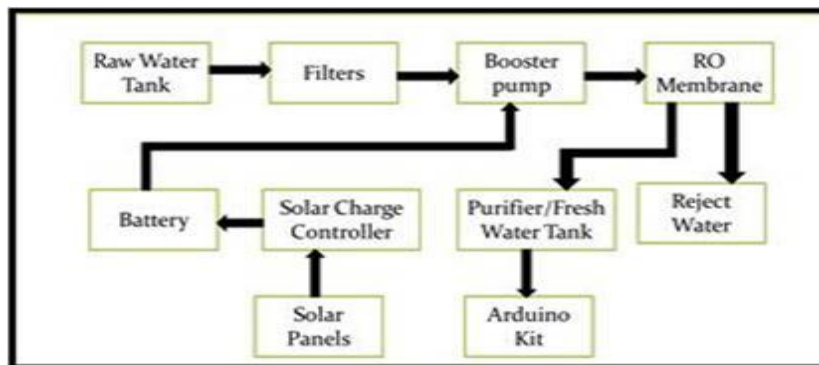
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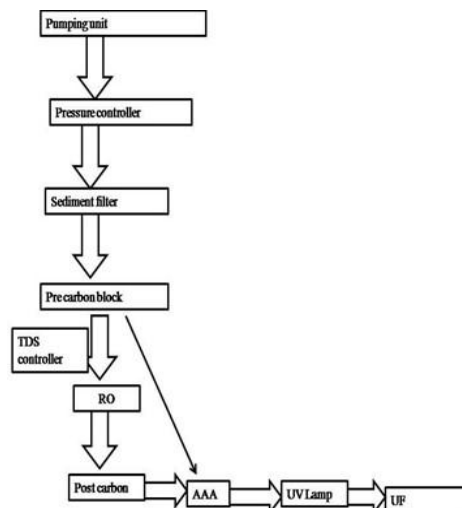
This paper has analyzed the need the of smart water purification in today’s environment where tap water in not fit for drinking in most parts of the world. This device will reduce the botheration to the user about timing for maintenance and service of purifier. As it has TDS sensor interfaced with GSM module, it will alert the retailer as well as user about the service and cleaning of purifier automatically. Thus the people who usually check the quality of the water just by tasting it can leave all this responsibility on smart water purifier. Because it is usually seen in the case of purifiers that even being good in taste, the purified water become unsafe for drinking due to its increased value of TDS. Thus it will eradicate such big problem.

Wadekar Abhijit Narayan at el (March 2018)



Safe drinking water is the basic need of human beings. Microbial contamination of drinking water is a major health hazard, to overcome these we can use RO purifier for the clean and fresh water but the main problem in some village areas is that there is no availability of electricity for adequate time, because of which we cannot operate RO water purifier plant. Hence it will be end over with smart approach to get pure drinking water with the optimum use of renewable energy sources with ourproject.

A.M.Sogarwal at el (March 2019)



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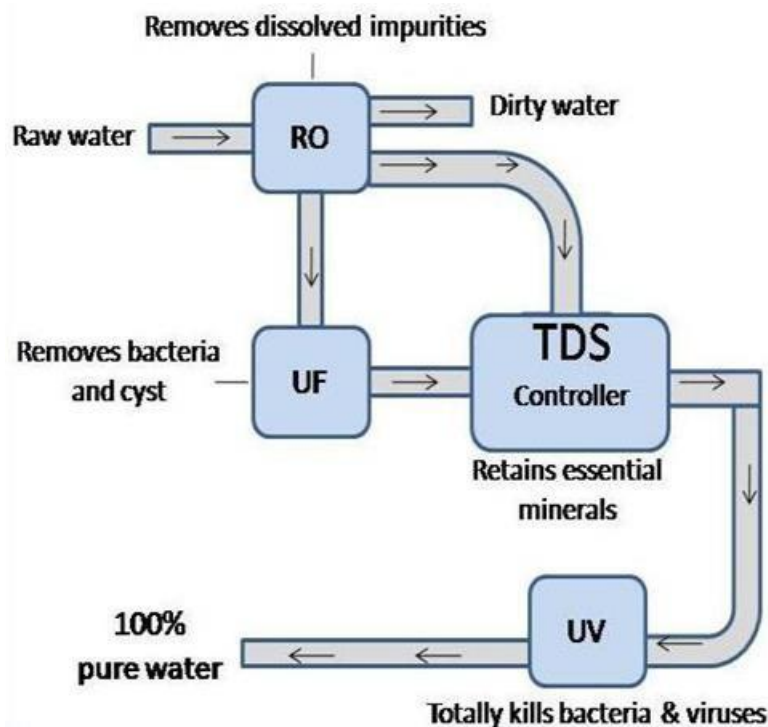
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In this water purifier we combine the RO (Reverse Osmosis) UV (ultraviolet) and UF (Ultra filtration) with TDS controller and AAA (alkaline antioxidant antibacterial). The water purifier is design on the basis of the efficiency increasing, cost of purifier, and maximum places it can be used for different type of water. The water purifier provided mineral cartridge in which the mineral is added and quality of water is increase. The TDS controller is provided to control the TDS of water and to decide the purification outline. It is economical and very efficient for purification of water with minimum wastage of water. Keywords: Purifier, RO (Reverse Osmosis), UV (ultraviolet), UF (Ultra filtration), AAA (alkaline antioxidant antibacterial)

Ashish Thakre et al (March 2017)



The water coming from the outlet of purifier was pure in comparison with the water coming from the tap (in inlet). The impurities remained in one side of the semipermeable membrane and we get pure water from the other side. As such there is no minimum TDS limit defined for any form of water. The lesser the TDS reading, the better the quality of water. Minimum TDS level based on some studies should be close to 30 ppm which keeps the mineral levels in check. The Bureau of Indian Standards (BIS) states the upper limit of TDS in drinking water at 500 ppm. Crucially the standard also states that in case no alternative source of drinking water is present, so

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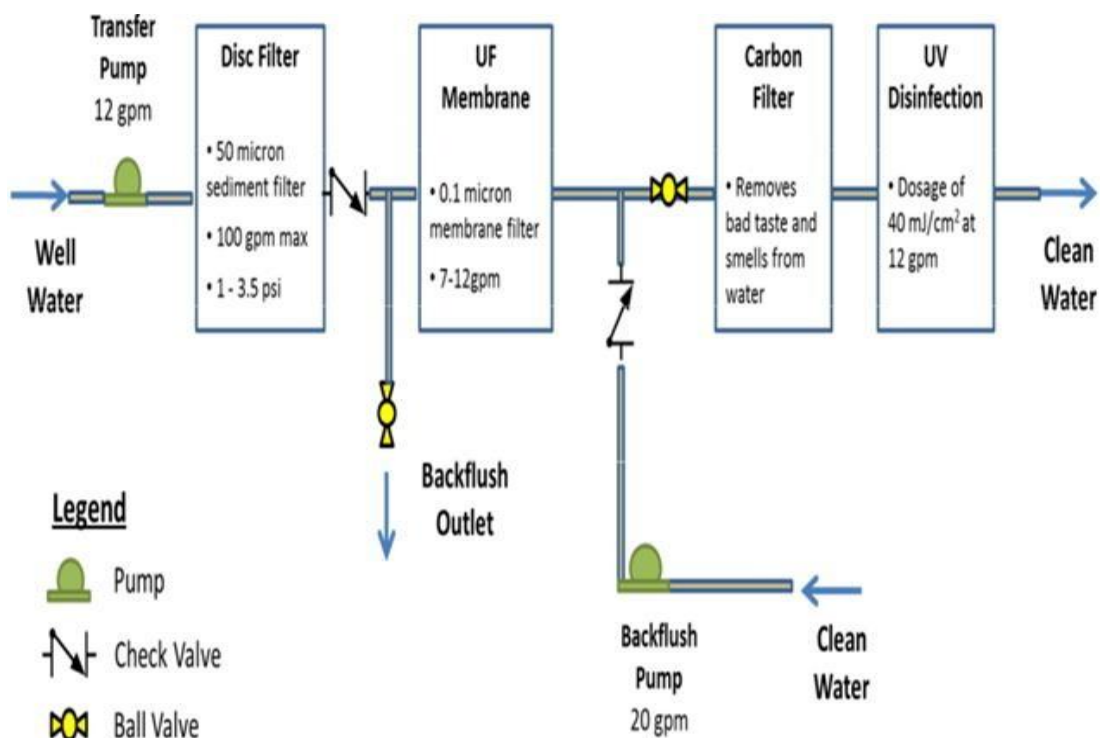
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this upper limit can be relaxed to 2,000 ppm. So technically maximum TDS obtained by RO filter should not exceed 500 ppm and for health purposes, it should be below 75 ppm. Also normally available domestic RO filters won't be able to handle water of more than 2500 ppm effectively.

Yung, Wong et al (May 2014)



Project Haiti has evolved from just donating a piece of technical equipment to a community with a need for clean water to a project where that technology is a center piece for social change. The technology not only fulfills a basic need, but also provides the opportunity for improved livelihoods and community growth. Although there have been many lessons learned along the way, the Project Haiti team is able to reflect and improve the project year after year to positively impact every community that they have and will partner with. The multifaceted community development model is constantly being improved but is a framework for successful, sustainable water projects for communities in developing countries.

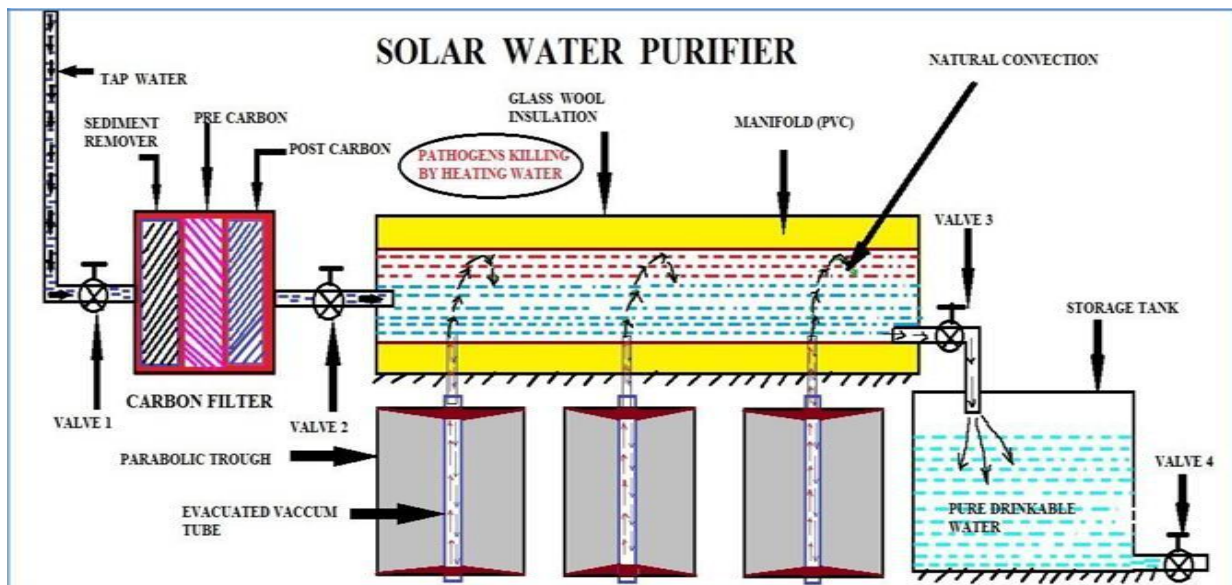
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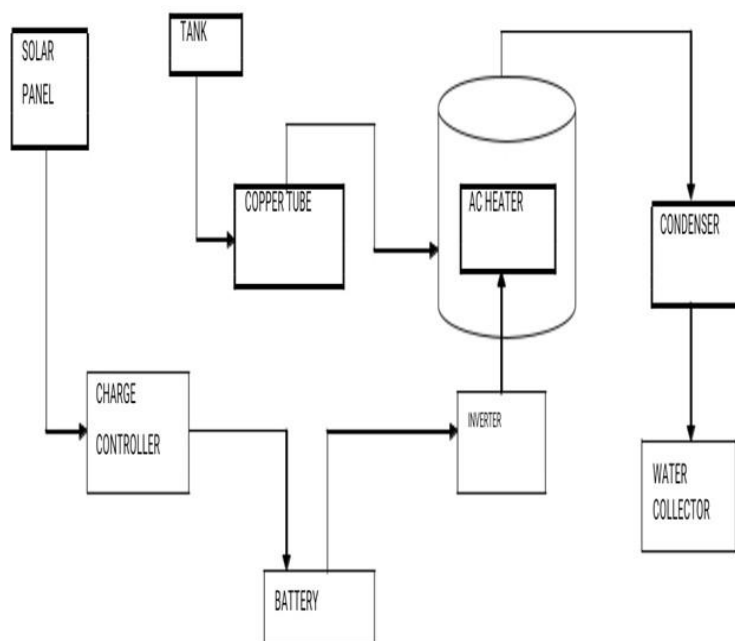
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Deepak Devasagayam et al (October 2014)



The design is meant to provide 25 liters of water per day and will be best usable during the summer seasons in india. The estimated cost of our project is around Rs15850/-. All the components required for fabrication are available in the market.

Dr.Smt. et al (August 2018)



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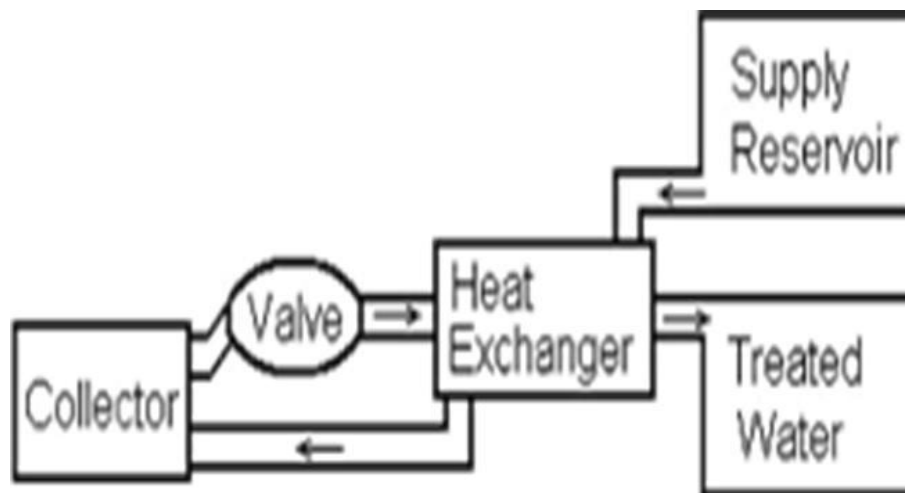
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The normal water gets purified with a low amount of cost and the values are completely checked in a different ways to know the properties there in the purified water and these are compared with the bore water, drinking water and distilled water. The properties of this purified water lies in the range of conventional distilled water. The total experiment is fabricated with in a low cost, so it is easy to put in pure peoples house also. it is economical in financially, efficient in working, eco-friendly.

William S. Duff (December 2004)



This paper presents three solar water pasteurization systems. The system presented in Section 4 is the first density driven system to include evacuated tube heat pipes and a heat exchanger. The density driven system has an advantage over thermostatic valve system terms in that it does not have a valve to maintain. With no moving parts to fail the system should be very reliable. The system also has an advantage over systems that use flow-through collectors. It is often difficult to clean the internal plumbing of flow-through solar collectors. The use of heat pipes allows for easy maintenance. The collector tube can be removed from the system for cleaning. Also, any damaged heat pipe collectors can easily be removed and replaced.

VI. CONCLUSION

As solar energy is being used for the purification of water, which is cheap and abundant, it can be used everywhere where electricity is not available. Here, the microcontroller which is used also prevents the water from overflowing. Moreover, uv +uf water purifier is a good disinfectant process. This project has only capital cost and almost no running cost. Hence, It will prove to be useful in the near future.

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