International Journal of Culture and Modernity
ISSN 2697-2131, **Volume 33 | oct-2023**
https://ijcm.academicjournal.io

Methods and Devices for Converting Brine into Fresh Drinking Water Using Alternative Energy Sources

Shomurodov Anvar Ahadovich
Base doctoral student of the Bukhara Institute of Natural Resources Management of the NRU «TIIAME», anvar.axatovich90@mail.ru

Sharipova Dilnora Burkhonovna
Assistant of the Bukhara Institute of Natural Resources Management of the NRU «TIIAME», dilnora.sharipova91@mail.ru

ANNOTATION

This article covers the results of the construction and verification of data and devices on consumable freshwater extraction technology and economically efficient solar water chiller devices from marine and underground salt waters, which are unsuitable for consumption due to the sharp increase in the consumption water needs of the population of the growing world.

KEYWORDS: Solar impeller, solar device, solar radiation, transparent surface, condensation, conical, U.W.C, Watercop, clay- barrier, Mehsana.

The main issue facing the energy workers of our country is the fuel and energy problem, which is mainly aimed at satisfying the growing need for fuel and energy of the national economy and the population; by studying, planning, and creating a rational fuel-energy balance, as well as finding ways to use natural energy sources and creating new ones.

The main forms of energy at the present time are the energy of combustible fossils and the mechanical energy of water. Renewable energy sources - solar energy, wind energy, rising and falling water in the earth's crust, and geothermal water energy are not being used in large-scale production.

The creation and construction of devices that work on the basis of solar radiation energy and the formation of various physical processes under the influence of solar radiation are attracting the attention of mankind day by day. Currently, in the practice of the world and our country, heliotechnical devices, with their technical and economic indicators, do not lag behind the traditional types of fuels, and in some cases, even surpass them.

The cost of energy or fuel resulting from the use of solar devices depends on the radiation and climate conditions of the place where the devices are used. However, due to the decrease in organic fuel reserves and the finding of optimal technical solutions due to the efficient use of solar energy, the use of solar devices is increasing day by day.

For any successful solar still design, water temperature, steam temperature, amount of water added, and the difference between the inner glass layer and the water temperature are all important. Model results and experimental results were compared under Mehsana climate conditions. The water temperature and the amount of water added were consistent with the experimental results. Figure 1 shows the schematic diagram of the hemispherical solar collector, and Figure 2 shows the design of the factory-designed hemispherical solar

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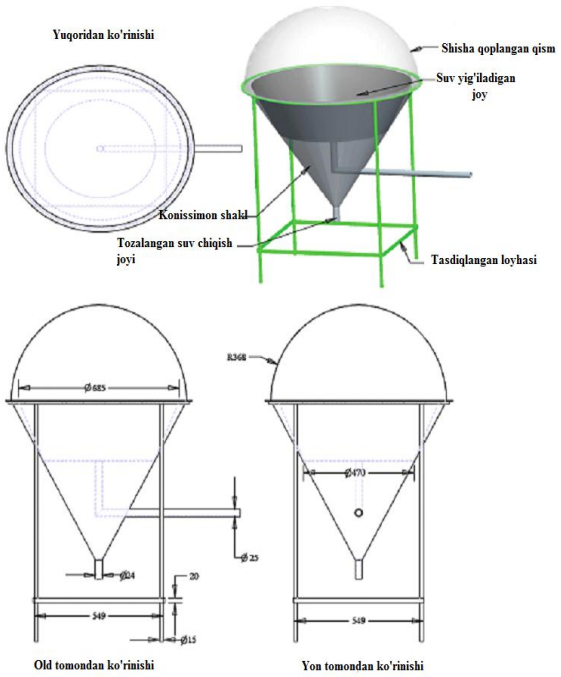
collector. The hemispherical base is circular in shape and surrounded by a black absorber plate, to which a saltwater drain is connected. The hemisphere is covered with acrylic, and the purified water is collected in the conical part. Its black absorber plate is made of soft plate with a useful surface area of *0,55* m^2 and a thickness of 5 mm.



Drawing 1. Schematic diagram of a hemispherical solar collector.

Checking the use of wind speed in the nozzle. Wind speed is an important parameter that is efficient and effective in a solar wind turbine. Increasing the wind speed in the hood with an additional fan is highly effective. With this, we increase the evaporation rate and the efficiency of the device. The wind speed was *1,14, 2,06, 2,92 and 4,01* m/s during the four-time inspection.

The next sprinkler is a pool-type sprinkler with a single slope and is covered with 0.8mm-thick steel. In the chimney, the slope 33^0 to the horizon is covered with 4 mm-thick glass

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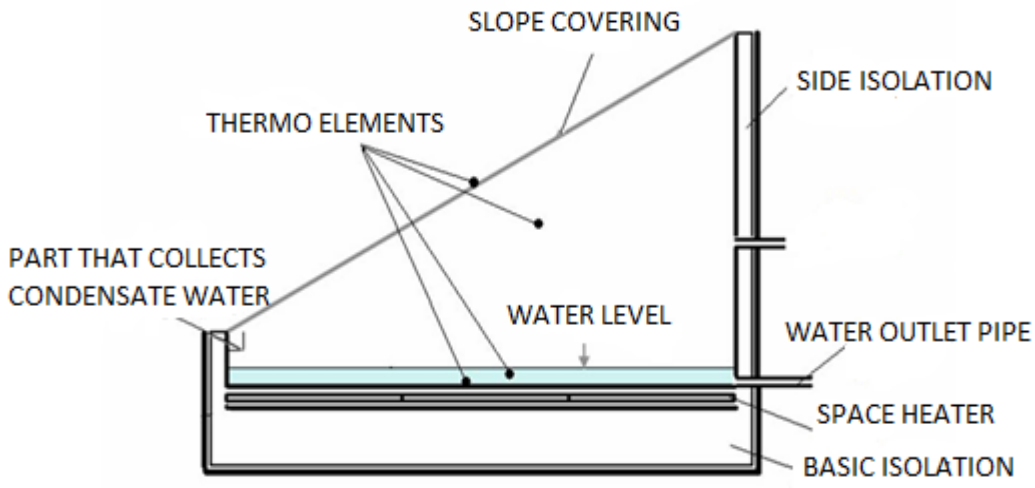

Figure 3. Schematic view of the device

The water pump shown in Figure 4 is a solar pump with a wet attraction surface designed by A.N. Tekuchev. The sun's rays fall on the black cloth that has absorbed sea water, heat it up, evaporate it, touch the inner part of the transparent plasma surface, and condense it into a fresh water receiver. The container at the bottom of the sprayer will leak. The FIK of this device was around 50%. In the United States, this device was used on a large operational scale by the Navy and rescue ships.

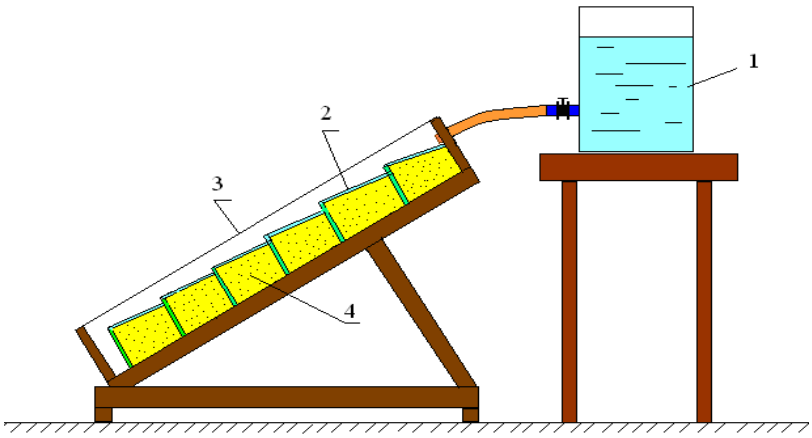

Figure 4. A.N.Tekuchev designed a solar water heater with a wet absorbing surface: 1. Salt water tank; 2-ceramic plate; 3- glass (transparent surface); 4th isolation wall; 5-nova.

Solar water purifiers have found their place and are widely used in places where there is a large supply of sea salt water and a need for clean water. In world practice, the construction of "solar water dispensers" with an air-blower is widely used to provide water to the crews of crashed planes and ships in the open ocean and seas.

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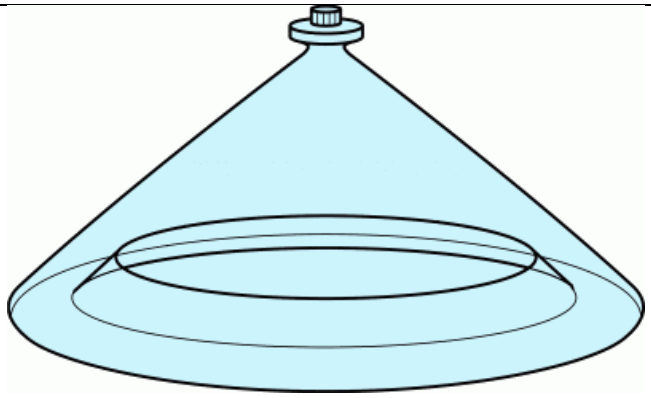

Figure 5. A cone-shaped container

This device is designed to extract drinking water from salt water using sunlight. Globally, 60% of distilled drinking water is extracted by heat-assisted water evaporation and condensation. This method is based on the fact that naturally occurring salty ocean water evaporates and falls on the earth in the form of rain and snow. A cone-shaped sprinkler works on the same principle. It consists of a simple, conical, transparent plastic container. Condensed water flows down the walls of the cone tank into the clean water collector bath and is collected. In order to increase the efficiency of the process, the cone part is hermetically sealed so that water vapor does not escape and temperature exchange does not occur. To get fresh water, it is enough to slowly tilt the cone to one side, release the plug from the reservoir, and pour the water into the container.

The conical solar water sprinkler should be placed on the wet ground on the surface of the salt water. Naturally, the surface of the water should be free of calm waves; otherwise, salt and fresh water will mix together inside the cone. In order to get an effective result from the conical solar water dispenser, it is advisable to have its bottom darkened.

Such water purifiers are widely produced on an industrial scale; It is recommended to install this cone-shaped device with a diameter of 80 cm, at an angle of 78 degrees, and to use it at an azimuth width of 33.3 degrees to extract 1-1.5 liters of clean water per day. The device U.W.C. 40% of such cones can work comfortably even at night due to the difference in ambient temperatures inside and outside the container. The solar purifier also cleans polluted water (swamp water, pond water) and makes it suitable for drinking. It should not be forgotten that if the water is mixed with chemical elements, the cone cannot make such water usable.

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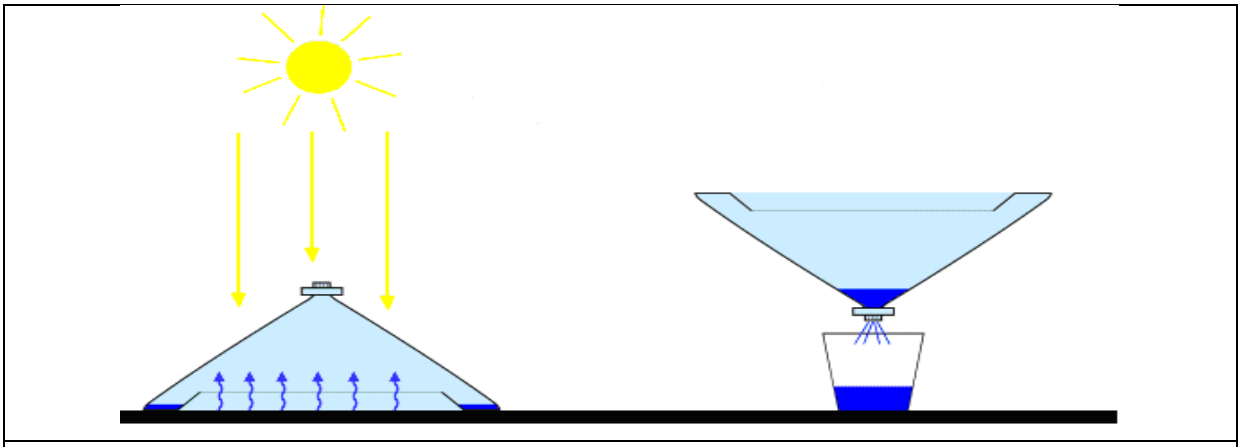

Figure 6. Conical solar water sprinkler.

Small-scale solar water purification devices will be necessary for us in the near future; it takes a lot of money to deliver clean drinking water to a disaster zone.

Figure 7: Amount of water extracted from a conical solar water dispenser.

The device takes the form of a cone-shaped container that uses ordinary sunlight to make seawater or other salty water clean and drinkable. It is easy to use and does not take up much space. It has a simple construction and produces 1.5 liters of fresh water in one day.

The U.W.C of such a device system is 40%; it is based on the process of evaporation of water by the sun's rays and the condensation of steam into droplets due to temperature differences.

Its main dimensions are 80 cm in diameter, and it can release 1–1.5 liters of clean water per day. Watercop (R) is a simple and compact design that allows the steam to turn into droplets on a cone-shaped transparent glass (or plastic organic glass) and slide down to the bottom of the container. Those who have worked: "The advantage of small private individual devices over centralized large-scale industrial water treatment plants is that if the large plant stops working, the whole region will be without water.

Another solar water dispenser was developed by Italian designers and successfully tested in water-scarce areas. This unit has a solid clay base, with a heavy clay base) embedded in the bottom of the airtight container. The pot is made of metal, and its upper part is painted black, with an open side, like the mouth of a coffee maker. The solar water heater is mainly installed in the south. The optimal angle of its light fall is selected depending on the height of the sun relative to the horizon and the flow of condensed water drops. It is known that black absorbs more sunlight. An airtight metal container has a hole in the center, from which a connecting

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tube is inserted into a ceramic container. It is worth noting that the manufacture and production of such a device can be started in any region with a developed pottery industry (M: Gijduvan).

The principle of operation Salty or contaminated water is placed in an airtight metal container; the metal container heats up from the sun's rays, the water in it turns into steam, the steam passes through the pipe to the collecting tank, passes through the expanding nozzles (which are installed at the end of the pipe), and condenses. The efficiency of the device increases due to the fact that the collection tank is located under the massive base (in its shadow). In this case, the process of forming distilled water is accelerated due to the large temperature difference between the boiling water vapor and the cold walls of the collecting vessel.

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