Abstract: The invention relates to water production and water purification systems which provide obtaining clean water, characterized by a new generation water production and purification system which comprises at least one water production device (1) providing obtaining water from the air in the outer environment and/or at least one water purification device (23) in which water taken from the water production device (1) or another water source is purified and which consists of water separation and evaporation section (24) and section for obtaining clean water from the water vapor (25); where the obtained clean water is subject to processes such as UV filtering/mineral filtering.
Published:

— with international search report (Art. 21(3))

— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))
NEW GENERATION WATER PRODUCTION AND PURIFICATION SYSTEM

Technical Field

The present invention relates to water production and purification systems.

The invention especially relates to devices by means of which water is obtained from the air or another source or the clean water is obtained by purifying the water taken from various sources, and to the water production and purification system achieved by said devices.

Description of the Prior Art

Available in all of the living beings in high ratios, water constitutes the building block of life. The human body, blood, muscles, and gross weight of the plants consist of 65%, 80-90%, 75%, and 60-85% of water, respectively.

One of the most important needs of today, the clean water is reducing day by day and the available clean water sources are not sufficient. To obtain clean water, the water is kept in the dams and supplied from the mains by means of the filtration thereof.

Every year, 333,000 km³ of water is evaporated from the oceans. The water amount evaporated from the earth's surface, on the other hand, is 63,000 km³. All of this water moves between the earth and atmosphere. However, 100,000 km³ of water returns to earth as precipitation. The rest of the moving water partly re-evaporates while reaching the earth or stays in the poles in solid state by being bonded or accumulates in hundreds meters depth of earth's crust.

Removing foreign bodies in the water by means of various methods is called water purification. Basically, water purification can be divided into two titles considering the methods used: Separation of salt and separation of other bodies.

Water is the most basic need for life. However, approximately 900 millions of people do not have an access to clean water. Every year, approximately 3.6 millions of people die due to the diseases developing as a result of the use of dirty water. Although in wealthy regions of
the world people have not experienced water shortage yet, numerous studies have indicated that clean water sources are consumed rapidly in almost every area. It seems that one of the most basic solutions against water scarcity is to purify salty water. This is because while 0.014% of water is potable, approximately 97.5% is salty in the world. In case this abundant source of the world can be utilized, the water problem can be eliminated for a long period of time.

Water purification methods have been investigated for long years and there are many techniques suitable for producing water in high volumes. However, only two techniques prevail in the market at a rate of approximately 85%. The main methods used for purifying salty water today can be ranked as follows according to the power of the plants established in the world:

- Multi-stage Flash (MSF) 44% (Evaporation with low-pressure)
- Reverse Osmosis (RO) 42%
- Electro-dialysis (ED) 6%
- Multi-effect distillation (MED) 4%
- Vapor compression (VC) 4%

In addition to these methods, basin distillation, one of the first distillation systems in history, is still among the research subjects.

Purification of sea water brings about several problems. For instance, the plants which can perform purification in high volume have a need for a large amount of energy. Thus, establishing salty water purification plants in countries which have serious energy problems is quite challenging. Moreover, the plants making use of fossil fuel greatly contribute to the greenhouse gas emission. As a result of the climate change induced by global greenhouse gas emission, on the other hand, clean water sources are threatened.

Another serious problem is experienced with the waste water emerging subsequent to purification. Waste water having a high rate of salt and mineral remains after the purified water and plants return this waste water to nature. The waste water released in low amount merges with nature without harming environment. However, in an area where purification is performed commonly, release of this waste water in the environment without taking any
precaution is not possible. The treatment or storage thereof, however, requires extra labor and investment. Thus, in order to purify salty water at an amount which will eliminate the water scarcity, the management of waste water is an important issue.

Despite all these drawbacks, purification of sea water is a significant solution against the existing water scarcity. Suitable solutions can be found for the management of waste water with adequate budgets to be transferred to research and development. Thanks to the developments in the field of renewable energy, fossil fuels for meeting the energy need can be abandoned. The best short-term solution, however, is to raise awareness of the people about saving water. In this manner, the need for putting our faith on science in order to solve the water scarcity occurring due to overpopulation, global warming, and excessive use of sources may be eliminated.

There are efforts to obtain clean potable water by purifying many sources such as muddy water, waste water, sea water, etc. However, purification costs are high. In case purification cannot be performed adequately, health problems may arise with the growth of bacteria.

As known, the air, lands, oceans and lakes are the water sources. Water in the air is in evaporated form and continuously moves between the earth and atmosphere with hydrologic cycle.

Evaporation is a natural event which can be defined such that the water passes from liquid phase to gas phase. Throughout Turkey, the total annual amount of precipitation is 501 billion m³, 274 billion of which returns to atmosphere by means of evaporation. In other words, 54.7% of the total annual precipitation is not utilized in any way. As a result of the fact that water accumulating in the dams evaporates according to the moisture content in the environment, substantial loss of water is experienced.

In the American Patent application No. US2011132842, IPC code B01D5/00B22, a method for producing potable water using a reverse osmosis system in the ships is disclosed. A solution special for use in the ships is disclosed. Osmosis system is disclosed.

In the Mexican Patent application No. MX2007001581, IPC code C02F1/00, a solution which is related to obtaining water with a hydrothermal system induced by moisture. A cooling unit which is created by means of fan by passing glycol through a radiator is used.
However, it is a high-cost solution. Due to being a complicated system, challenges with respect to the application are encountered.

In the utility model applications No. TR 2007/05089, IPC code B01J 19/16, and titled "preventing evaporation in the water basins", the followings are disclosed; The invention aims to prevent evaporation with a third substance to be put between the water and air. To this end, floating balls and plastic bubble wrap are used. The intensity of evaporation is determined according to the space occupied in the water surface by the aforementioned materials.

In the presence of the problems attempted to be disclosed, a new water production and purification system is needed for obtaining clean water.

**Description of the Objects of the Invention**

Based on the state of the art, the object of the invention is to develop a new generation water production and purification system which eliminates the drawbacks in the present applications, offers many advantages, and by means of which clean water is obtained by producing and purifying water from various sources.

Another object of the invention is to obtain water from the moisture in the air or to purify the water taken from the water sources and make use of the same as clean water.

Another object of the invention is to perform the processes of purifying water and obtaining clean water thanks to a device in which the salty water taken from a device through which the water is obtained from the moisture in the air, is separated and thus the water is purified.

A further object of the invention is to develop a system and device with a low energy need for water production and purification.

A further object of the invention is to separate the salt particles from the salty water obtained from the moisture in the air and to obtain healthy clean water by purifying the remaining water by evaporation.
A further object of the invention is to obtain clean water upon purifying the water such as muddy water, sea water, waste water, etc. which is required to be purified by evaporating. In this manner, to eliminate any substance in the water harmful to health during evaporation is aimed.

A further object of the invention is to separate the salty water accumulated on a device through which water is obtained from the moisture in the air, from the salt and to obtain cyclic clean water with the re-condensation of the remaining water by evaporating. By passing the obtained water through UV and mineral filters, to obtain healthy, clean water comprising the desired minerals is aimed.

A further object of the invention is to obtain clean water by separating, evaporating and finally condensing the water taken from unclean water sources, when water cannot be obtained from the air.

Yet another object of the invention is to obtain clean water with the water production device through which water is obtained from the air and the water purification device through which the water is purified.

In order to achieve said objects, a new generation water production and purification system has been developed which provides obtaining clean, healthy water comprising the desired minerals from the water purification device through which clean water is obtained upon purifying the water obtained from the water production device.

**Description of the Figures**
Figure 1 is the drawing which shows the interior section of the water production device in a representative application of the invention.
Figure 2 is the drawing which shows side view of the water production device in a representative application of the invention.
Figure 3 is the drawing which shows front view of the water production device in a representative application of the invention.
Figure 4 is the drawing which shows the interior section of the water purification device in a representative application of the invention.
Figure 5 is the drawing which shows side view of the water purification device in a representative application of the invention.
The present invention is a new generation water production and purification system. Clean water is obtained from the water purification device (23) through which the process of purifying the water obtained from the water production device (1) is performed. The content of the obtained clean water is adjusted by subjecting said clean water to the process of UV filtering and passing the same through mineral filters, and is presented in a healthy manner.

As seen in Figures, the air taken from the air inlet (4) on the water production device (1) by means of air suction fan (5) is passed through the air filter (3). The air passing through the air filter (3) enters into the modules for obtaining water from the air (6) and water is obtained therefrom. The water obtained from the drainage (9) by taking the water particles remaining
in the air is collected in the drift eliminator (7). Salt blocks are disposed inside the modules for obtaining water from the air (6). Salty water is obtained with the water passing through the salt blocks. The obtained salty water is collected from the drainage (9) and transferred to the water purification device (23).

The processes are controlled by the control unit (2) on the water production device (1). Maintenance service processes are provided with the service hatches (10) when required.

The water purification device (23) consists of water separation and evaporation section (24) and section for obtaining clean water from the water vapor (25). The air taken from the air inlet (4) from outer environment passes through the hot water coils (11) through which the water heated by the solar panels passes. The hot air is transferred from the compressor (12) to the evaporation panels (13) by means of the hot air line (17). Water is transferred from the water inlet (15) on the evaporation panels (13) by means of the pump (16). The water passing through the evaporation panels (13) produces water vapor (14) by releasing the solid particles therein inside. The solid particles are collected in the waste collection receptacle (19). The salt particles inside the water are collected and can be reused in the form of salt blocks in the module for obtaining water from the air (6). The processes are controlled by the control unit (2) on the water purification device (23).

Water vapor (14) is condensed while passing over the cooler (20) and clean water is obtained. Cold air is transferred onto the cooler (20) by means of the cold air line (18) coming from the compressor (12). Air is transferred to the outer environment with the air outlet (8) over the air outlet fan (21). The obtained clean water is collected in the clean water receptacle (22) and is subject to the process such as UV filtering and mineral filtering, thereby being stored as healthy potable water.

The Achieved Advantages:

- Thanks to the water purification device (23), clean water is obtained by purifying different water sources such as sea water, muddy water, waste water, etc. The water, which is to be purified, transferred onto the evaporation panels (13) takes the form of water vapor and releases the solid particles therein inside. Bacteria harmful to health cannot survive due to the high temperature and evaporation.

- The obtained water vapor (14) is passed through the coolers (20) and clean water is obtained as a result of condensation. Minerals inside the water are obtained by being
passed through the mineral filters. The healthy water produced after obtaining clean water can be used in the agricultural lands for water need of the people.

- Clean water is produced by obtaining water from areas such as river, pond, etc. without spoiling the natural balance. Natural lakes, rivers and ponds which are dried can be restored. A solution has been developed which can be utilized in any area where natural life comes to an end due to water.

- As not much energy is needed during water purification and production, an economic solution is achieved. Hot water is obtained from the solar panels and transferred to the hot water coils-(11). The cold air obtained while the compressor (12) is transferring the hot air, is transferred to the cooler (20) from the cold air line (18). As the surface areas of the evaporation panels (13) are large, maximum evaporation is obtained at minimum heat during the contact of the water with these areas.

- An economic solution which is suitable for use in various areas in need of potable water for people and clean water for agricultural lands has been developed. By utilizing only the water purification device (23), the water, which can be purified, in nature is purified and clean water is obtained.

- The water produced as a result of obtaining thereof from the air in the outer environment through the water production device (1) can be purified with different methods and transformed into clean water.

- The water production device (1) and water purification device (23) can be utilized together in any area experiencing water problem. Water problem can be solved without experiencing transportation problem.

- Hot water can be transferred to the hot water coil by obtaining thereof with different methods instead of solar panels.
CLAIMS

1. Water production and water purification systems provide obtaining clean water, characterized by the water production and water purification system comprising
   - at least one water production device (1) which provides obtaining water from the air in the outer environment and/or
   - at least one water purification device (23) in which water taken from the water production device (1) or another water source is purified and which consists of water separation and evaporation section (24) and section for obtaining clean water from the water vapor (25),
   - and UV filtering/mineral filtering where the obtained clean water is subject to processes such as UV filtering/mineral filtering.

2. The water production and purification system according to Claim 1, characterized by comprising
   - at least one air inlet (4) where the air is taken through the suction fan (5) and filtered through the air filter (3) and then transferred to the water production device (1);
   - at least one module for obtaining water from the air (6) which provides obtaining the water in the air taken from the air inlet (4);
   - and at least one drainage (9) where the water is collected while passing through the module for obtaining water from the air (6).

3. The water production and purification system according to any of the preceding claims, characterized by comprising
   - at least one air inlet (4) where the air in the outer environment is taken and passed through the air filter (3) and then transferred to the water purification device (23);
   - at least one hot water coil (11) where the air taken from the air inlet (4) is adjusted to high temperatures;
   - at least one compressor (12) which transfers the hot air obtained from the hot air coil (11) to the evaporation panels (13);
   - at least one water inlet (15) in which the water to be purified is transferred to the evaporation panels (13);
- waste collection receptacle (19) where solid particles left by the water while passing through the evaporation panels (13) are collected;
- at least one cooler (20) through which the water vapor (14) exiting from the evaporation panels (13) passes;
- and at least one clean water receptacle (22) where the water obtained from the water vapor (14) passing through the cooler (20) is collected.

4. The water production and purification system according to any of the preceding claims, characterized by comprising
   - UV filtering/mineral filtering which provides the content of the obtained clean water to be adjusted.

5. The new generation water production and purification system according to any of the preceding claims, characterized by comprising
   - hot water coil (11) to which hot water obtained from the solar panels are transferred.

6. The new generation water production and purification system according to any of the preceding claims, characterized by comprising
   - water production device (1) through which water is obtained from the moisture in the air, and at least one water purification device (23) through which the obtained salty water is purified and the thus obtained salt is put into use again.

7. The new generation water production and purification system according to any of the preceding claims, characterized by comprising
   - water purification device (23) which provides the water taken from water sources such as sea water, well water, waste water, muddy water, etc. to be purified.

8. The new generation water production and purification system according to any of the preceding claims, characterized by comprising
   - at least one control unit (2) where the processes are controlled on the water purification device (23) and the water production device (1).
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
INV. E03B3/28 C02F1/04
ADD. C02F1/14 C02F1/32 C02F1/28 C02F1/46

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
E03B C02F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Date of the actual completion of the international search: 14 April 2015
Date of mailing of the international search report: 28/04/2015

Name and mailing address of the ISA:
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