

TITLE OF INVENTION

PROCESS AND STRUCTURE FOR SUPERACCELERATING NATURE,
PRODUCING A CONTINUOUS SUPPLY OF FRESH WATER FROM SALT
WATER
BY USING SOLAR, WIND, AND WAVE ENERGY.

TECHNICAL FIELD

The invention relates to a water desalinization process and device.

BACKGROUND ART

The process of desalting water to create fresh water is not a new idea, it has been used for centuries by civilizations around the world. By boiling salt water and collecting the steam, the simplest of men could have fresh water from the oceans. Although the process has become much more refined, virtually all desalinization techniques require enormous amounts of energy, enormous amounts of labor in maintenance, and they all create, as a by-product, enormous amounts of concentrated brine pollutants that must be disposed of. With all of the requirements of energy and maintenance along with the problem of pollutants it has become costly to produce fresh water from seawater. Reverse osmosis has been an approach that utilizes a membrane that allows water to pass through with very little salinity. Even though membrane technology continues to improve, it will always require energy, maintenance, and waste disposal.

There is a long-felt need for a water desalinization device that uses only passive energy sources including solar, wind, and wave energy to deliver a continuous source of fresh water without any measurable waste product.

DISCLOSURE OF INVENTION

It is an object of this invention to produce fresh water using only passive energy sources including solar, wind, and wave energy. Another object of the invention is to harness and use passive energy sources to "Super Accelerate" the desalinization process. A further object of the invention is to generate continuous

fresh water without using any source of generated energy, without the cost of labor or maintenance, and without any measurable waste product. It is another object of the invention to produce a steady source of fresh water with little additional cost beyond the construction of the device itself. Yet another object of the invention is to be built of concrete or similar material that will allow the structure of this invention to last for a long time.

These and other features, aspects, and advantages of the present invention will become better understood with regard to the following description, appended claims, and accompanying drawings.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is cross sectional view of the invention.

FIG. 2 is a top view of the blackened surface, wind walls and bottom shaft portion opening.

FIG. 3 is a perspective view of the blackened surface, wind walls, bottom shaft portion opening, and bottom shaft portion.

FIG. 4 depicts wind walls reflecting energy to the blackened surface.

FIG. 5 depicts the Venturi effect channeling heated air and water vapor into the bottom shaft portion opening.

FIG. 6 depicts the heat transfer duct and the heat exchange to the heat transfer duct through the chamber upper zone, and the generally horizontal, stacked hollow cylinders.

FIG. 7 depicts the generally horizontal stacked hollow cylinders with water droplets from condensation removing heat from air as it passes through the cascading droplets.

BEST MODE FOR CARRYING OUT THE INVENTION

The invention is a water desalinization device. The invention is designed to deliver a continuous supply of fresh water through desalinization of seawater.

Referring now to **FIG. 1**, the invention **1** comprises a housing **2**, preferably made of concrete, that has an upper zone **3** and a lower zone **4**. Within the housing **2** are a series of interconnected chambers **5** with a first chamber **6** and a last chamber **7** in the series **5**. The chambers are also preferably made of concrete.

A generally vertical wind shaft **10**, preferably made of concrete, is shaped to create a Venturi effect **11** between the upper shaft portion **12** and the bottom shaft portion **13**. The upper shaft portion **12** opens **14** into the first chamber **6** of the series **5** and the bottom shaft portion **13** opens **15** adjacent to the blackened surface **16**. Each of the chambers of the series has an upper zone **17** and a lower zone **18**, as well as a plurality of sides **19**, a ceiling **20**, and a bottom **21**.

The sides **19** are formed with ribbed walls by the slip-form method, thus allowing the forms to be slipped up while the concrete mixture is poured down, thus allowing the chambers to be built quite large and tall, yet with increased strength. The water droplets that condensate on the sides **19** flow more easily through the folds in the sides and drip **23** to the lower zone **18** of the chamber.

The ceilings **20** of the chambers are textured, preferably in an egg-crate-like surface, in order to provide surfaces with increased surface area for water to condensate on and drip **23** to the lower zone **18** of the chamber. Each of the chambers has at least one upper temperature zone and at least one lower temperature zone, each of which may be of a different temperature from the other upper and lower temperature zones of the other chambers. The bottom of each chamber **21**, located within the lower zone **18**, is a water collection basin **26** to collect the water drips **23**.

A blackened surface **16** is connected to the bottom shaft portion **13** and lies partially submerged **30** on the shore of a body of water **31**. The blackened surface **16**, preferably generally made of concrete and shore-like, through the absorption of solar energy, heats air and evaporates water as it is washed up onto the blackened surface by the wave action **32** of the water body **31**.

A water drainage throughway **33** at the lower zone **18** and bottom **21** of the chamber has a termination end **34** with an exit port **35** and is designed to drain desalinized water from the basin **26** and out the exit port **35** using gravity. At least

one water reservoir **36**, which may also be made of concrete, is connected to the water drainage throughway exit port **35** and is designed to retain water, also by using gravity.

The heat transfer duct **40** has an influx portion **41** and an efflux portion **44** that undergoes a Venturi effect **45** as air leaves the structure. The influx portion **41** begins and opens **46** near the body of water **31** and serves as an air intake. The efflux portion **44** terminates and opens **47** at the air exhaust port **48** and expels warm air into the air exhaust port.

Referring now to **FIGS. 2 - 5**, **FIG. 2** depicts the blackened surface **16** that is connected to the bottom shaft portion **13** and the bottom shaft portion opening **15**. The blackened surface **16**, preferably generally made of concrete or a combination of concrete and vinyl additives and shaped shore-like, is designed to be in contact with an external body of water **31**, as waves **32** provide a constant supply of water to be evaporated and continuously clean the surface of salt residue.

Referring now to **FIG. 3**, depicted are the Venturi shaped concave wind walls **50**, blackened surface **16**, and the bottom shaft portion opening **15**. The blackened surface **16** is designed to evaporate water generally into the bottom shaft portion opening **15**. The concave wind walls **50**, preferably white and made of concrete, are adjacent to the blackened surface **16**, as seen in **FIG. 4**. The heat transfer duct influx **41** supply also can be seen here. The concave wind walls **50** are designed to be reflective surfaces to direct solar energy **51** to the blackened surface **16** to assist in water evaporation **52**.

As seen in **FIG. 5**, the concave wind walls **50** also channel air and water vapor **52** towards the bottom shaft portion opening **15**. The Venturi effect of the wind walls on the air movement increases the velocity and air pressure as slow moving air and water vapor moves towards the narrow end of the Venturi **53** from the bottom shaft portion opening **15** at the bottom shaft portion **13** thus becoming accelerated.

Referring now to **FIGS. 6 and 7**, **FIG. 6** depicts heat rising **60** to the upper zone **17** of the chambers where it is absorbed by the heat transfer duct **40**. This allows the cooler, water-laden air to condense on the egg-crate-like textured ceiling and drip down the folds in the walls, forming droplets **23** that fall to the basin **26** below. The horizontal hollow cylinders **61** are pitched slightly downward **62** in the direction of the airflow **63**. The generally horizontally stacked hollow cylinders **61** direct air and water vapor **63** from one chamber to the next in the series **5** and allow water to drip **23**

and drain to the basins 26 of the chambers. Condensation droplets 64 are shown flowing from the lower end 65 of the horizontal hollow cylinders 61.

Referring now to FIG. 7, the generally horizontally stacked hollow cylinders 61 downward pitch 62 allows water vapor to condensate and drip 64 through the directed air and water vapor 63 from the lower stacked hollow cylinders. This partial end view of horizontally stacked hollow cylinders 61 shows the cascade of water droplets 64 that removes heat, therefore cooling the warm air as it moves 63 through the cascade 64, allowing for increased condensation in the next chamber.

The invention housing 2, preferably made of concrete, may reach heights of hundreds of feet (possibly over sixty meters in height); the size and ratios of the invention components are site-dependent. The height should prohibit contamination of the chambers 5 by non-evaporated water, including salt water. The blackened surface 16 may be composed of blended concrete, including vinyl additives, for wear resistance.

As water from the body of water 31 washes up on the blackened surface 16, the evaporation rate is increased due to the solar energy being absorbed by the blackened surface 16 and the increased surface temperature of the blackened surface. Rising air through the Venturi shaft draws a breeze through the bottom shaft portion opening 15 from over the body of water 31. This draft pushes rising hot air and evaporated water to the narrow end of the Venturi of the concave wind walls 50. The curved ends of the concave wind walls 50 maximize the collection of air flows from any given direction from above the surface of the body of water 31 and to redirect said air flows into the concave wind wall Venturi 53.

The collected hot air and evaporated water are forced up the vertical Venturi wind shaft 10, causing an increase in air velocity and pressure. As hot air and evaporated water exits the vertical Venturi shaft 14 and enters the chambers there is a sudden decrease in air pressure. As the air flow slows and hot air rises to the upper zone of the chambers 17, the hot air surrounds the heat transfer duct 40 and heat is absorbed by the heat transfer duct 40.

The water in the air begins to condense on the textured concrete ceiling 20 and/or ribbed sides 19 of the chambers. As water droplets fall 23, they are collected in a basin 26 at the bottom 21 of the chambers. The collected water flows by way of the water drainage throughway 33 from chamber to chamber and exits the housing at

the water drainage exit port **35** where water is channeled to at least one water reservoir **36**.

As air pressure increases in the first chamber **6** it forces the water-laden air through the series of generally horizontal stacked hollow cylinders **61** connecting the first chamber **6** to the next chamber (and likewise subsequent chambers in the same manner) where the air will repeat the condensation cycle that occurred in the first chamber. As air passes through the stacked horizontal hollow cylinders **61**, condensation collects along the inside walls of the cylinders. The cylinders are slightly pitched **62** towards the direction of the airflow **63** allowing all condensation to flow down and out of the cylinders into the next chamber. This creates a cascade effect of water flowing **64** from the ends of all the stacked, horizontal hollow cylinders **61**.

As warm air passes slowly **63** through this cascade of droplets **64**, it continues to cool, allowing for increased condensation rates in this next chamber. After the air has passed through the last, preferably third, chamber **7**, it is drawn upward through the vertical Venturi exhaust shaft, and then at an angle over the tops of the chambers where it collects radiant heat from the preceding chambers, and then through at least one Venturi portion, and finally out the air exhaust port **48**. Cool air from the surface of water body **31**, preferably an ocean in a hot part of the world, enters the heat transfer duct **40** and provides cool temperatures that absorb the heat radiation into the heat transfer duct **40**. This heat that is absorbed into the heat transfer duct **40** then radiates upwards through the duct and is released at the efflux portion drawing cooler air in behind it.

The previously described versions of the present invention have many advantages, including use of passive energy to generate fresh water with no measurable waste product. Thus, the problems that may be associated with previous attempts at desalinization are solved. It is important to note, however, that the invention does not require that all these advantages need be incorporated into every embodiment of the invention.

Although the present invention has been described in considerable detail with reference to certain preferred embodiments thereof, other embodiments or versions are possible. Therefore, the spirit and scope of the appended claims should not be limited to the description of the preferred embodiments contained herein.

CLAIMS

I claim:

1. A process for desalinizing water, said process comprising: providing a blackened surface in contact with a body of water so as to heat air and evaporate said water from said blackened surface; channeling said heated air and water vapor upward through a vertical Venturi wind shaft creating an adiabatic pressure variance so as to release said water vapor into a first chamber of a series of interconnected chambers; allowing said water vapor to condensate within said chambers; draining said desalinized water from said chambers; expelling said heated air from said chambers; and, retaining said desalinized water.
2. The process according to claim 1 wherein said desalinized water is retained in at least one reservoir.
3. A desalinization device to be used on the shore of a body of water, comprising:
 - a. a housing, said housing with considerable height relative to said shore of said body of water;
 - b. a series of interconnected chambers within said housing; said series of chambers having at least one first chamber and at least one last chamber in said series, with each of said chambers having at least one upper temperature zone and at least one lower temperature zone, each of which may be of a different temperature from the other upper and lower temperature zones of the other chambers;
 - c. a generally vertical wind shaft connected to said housing, said shaft designed to create a Venturi effect, and said shaft having an upper shaft portion and a bottom shaft portion, said upper shaft portion opening into said first chamber and said bottom shaft portion having an opening;

- d. each said chamber having an upper zone and a lower zone, and each said chamber having a plurality of sides, a ceiling, and a bottom, said bottom located within said lower zone and designed to serve as a water collection basin;
 - e. a blackened surface connected to said bottom shaft portion and said bottom shaft portion opening, said blackened surface designed to be in contact with an external body of water and said blackened surface further designed to absorb solar energy and to evaporate said water from said external body of water and to heat air, causing it to rise creating air movement into said bottom shaft portion opening;
 - f. a water drainage throughway at said bottom and lower zone of said chamber, said water drainage throughway having a termination end, and said water drainage throughway designed so that gravity drains said water from said basin;
 - g. an air exhaust port connected to said last chamber of said chamber series, said air exhaust port designed to expel air that has passed through said chambers out of said last chamber and said housing and further designed to create at least one Venturi effect, as air leaves the structure roughly to match the velocity of air entering the structure; and,
 - h. at least one water reservoir, said water reservoir connected to said water drainage throughway termination end and designed to retain water, at least temporarily.
4. The desalinization device of claim 3, wherein said interconnections of said series of chambers comprise generally horizontally stacked hollow cylinders, said generally horizontally stacked hollow cylinders designed to direct air and water vapor, said cylinders designed to be pitched at an angle to allow said water to drip and drain to said basins of said chambers.
5. The desalinization device of claim 4, wherein said horizontally stacked hollow cylinders are further designed to allow said water vapor that condensates to drip through said directed air and water vapor in order to cool said directed air and water vapor by removing heat from the air as it passes through the cascading droplets.

6. The desalinization device of claim 3, wherein said chamber sides and ceiling comprise a textured surface, said textured surface designed to provide increased surface area on which water condensates.
7. The desalinization device of claim 3 further comprising a heat transfer duct with an influx located above the surface of said body of water positioned to intake air without heating it prior to influx and the efflux located near the air exhaust port and a body that runs through the structure collecting radiant heat.
8. The desalinization device of claim 3 further comprising concave wind walls adjacent to said blackened surface, said wind walls designed to be reflective surfaces to direct energy to said blackened surface and further designed to channel said water vapor into said bottom shaft portion opening.
9. The desalinization device of claim 8 further comprising concave wind walls with curved ends to maximize the collection of air flows from any given direction from above the surface of said body of water and to redirect said air flows into the wind wall Venturi and to said vertical wind shaft connected to said housing.
10. The desalinization device of claim 3 wherein said housing, said chamber, said shaft, said wind walls, and said blackened surface are comprised of concrete.
11. The desalinization device of claim 10 wherein said shaft, said wind walls, and said blackened surface are comprised of concrete with vinyl additives.
12. The desalinization device of claim 3 wherein said water drainage throughway further comprises an exit port.
13. A desalinization device, comprising:
 - a. a housing, said housing with an upper zone and a lower zone;
 - b. a series of interconnected chambers within said housing; said series of chambers having at least one first chamber and at least one last chamber in said series;

- c. a generally vertical wind shaft connected to said housing, said shaft designed to create a Venturi effect, and said shaft having an upper shaft portion and a bottom shaft portion, said upper shaft portion opening into said first chamber and said bottom shaft portion having an opening larger than the opening at the top of the vertical Venturi shaft;
- d. each said chamber having an upper zone and a lower zone, and each said chamber having a plurality of sides, a ceiling, and a bottom, said ceiling being textured, said texture designed to provide surfaces for water to condensate on, and said sides being ribbed designed to allow the droplets of water to run down the sides, and said bottom located within said lower zone and designed to serve as a water collection basin;
- e. a blackened surface connected to said bottom shaft portion and said bottom shaft portion opening, said blackened surface designed to be in contact with an external body of water and said blackened surface further designed to absorb solar energy and to evaporate said water from said external body of water and to heat air, causing it to rise creating air movement into said bottom shaft portion opening;
- f. a water drainage throughway at said bottom and lower zone of said chamber, said water drainage throughway having a termination end, said termination end having an exit port, and said water drainage throughway designed so that gravity drains said water from said basin and delivers said water to said exit port;
- g. a vertical Venturi exhaust shaft connected to said last chamber of said chamber series, said vertical Venturi exhaust shaft designed to direct and expel air that has passed through said chambers out of said last chamber and said housing and further designed to create at least one Venturi effect forcing air upward and over the tops of said chambers to collect radiant heat, and expel it through an air exhaust port located at the top of said structure;
- h. at least one water reservoir, said water reservoir connected to said water drainage port and designed to retain water;

i. generally horizontally stacked hollow cylinders, said generally horizontally stacked hollow cylinders designed to direct air and water vapor, said cylinders designed to be pitched at an angle to allow said water to drip and drain to said basins of said chambers and further designed to allow said water vapor that condensates to drip through said directed air and water vapor in order to cool said directed air and water vapor by removing heat from the air as it passes through the cascading droplets;

j. concave wind walls adjacent to said blackened surface, said wind walls designed to be reflective surfaces to direct energy to said blackened surface and further designed to channel said water vapor into said bottom shaft portion opening; and,

k. said concave wind walls having curved ends to maximize the collection of air flows from any given direction from above the surface of said body of water and to redirect said air flows into the wind wall Venturi and to said vertical wind shaft connected to said housing.

14. The desalinization device of claim 13 further comprising a heat transfer duct with an influx located above the surface of said body of water positioned to intake air without heating it prior to influx and the efflux located near the air exhaust port and a body that runs through the structure collecting radiant heat.

15. The desalinization device of claim 13 wherein said housing, said chamber, said shaft, said wind walls and said blackened surface are comprised of concrete.

16. The desalinization device of claim 13 wherein said shaft, said wind walls, and said blackened surface are comprised of concrete with vinyl additives.