Application Type/No.:	**Utility Model 2/2017/050237**	**Filing Date**	**: 15 August 2017**
Applicant	**: Southern Luzon State University**		
Title	**: Off grid household desalinator**		
Division	**: Utility Models**		
Patent Examiner	**: Cirilo J. Castro**		

THE DIRECTOR OF PATENTS
Intellectual Property Office of the Philippines
Intellectual Property Center, World Finance Plaza
No. 28 Upper McKinley Rd.,McKinley Hill Town Center,
Fort Bonifacio, Taguig City

27 September 2018

VOLUNTARY AMENDMENTS BASED ON SUBSEQUENT FORMALITY EXAMINATION DATED AUGUST 30, 2018

Sir:

In response to the Subsequent Formality Examination Report of August 30,2018, please amend the above-identified application as follows:

Voluntary amendments to the CLAIMS (to correct defects cited in Item1.1) per attached amended description, claims and abstract

Amendments to the SPECIFICATION ((to correct defects cited in Item1.2) per attached amended description, claims and abstract

Attached also are the clean sheets of the above items as amended.

Respectfully submitted,

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OFF-GRID HOUSEHOLD DESALINATOR

TECHNICAL FIELD OF THE UTILITY MODEL

The present utility model generally relates to devices for sea water desalination but more particularly to household desalination units using solar energy.

BACKGROUND OF THE UTILITY MODEL

Potable water availability has always been a problem in small island municipalities. This becomes even more apparent during extreme weather conditions such as drought were water shortage is amplified. Drinking water shortage is also widely experienced during immediate post disaster scenarios.

Solar desalination of sea water has been widely explored as a solution to fresh water availability. The following are representative of the field relating to the present utility model:

CN 2420273 Y The utility model reasonably combines a plurality of filtering towers, and the water outlet section of each filter tower is provided with a self-absorption booster pump, so the utility model has the advantages of fast processing speed to sea water, good desalinating, purifying and sterilizing effect and low operation cost and is especially suitable for industrializing and serializing production.

U.S. Patent No. 8,419,904, describes a system for solar water purification including a sun-tracking reflecting mirror unit and a two-axis Fresnel concentrator mirror unit to collect sunlight reflected from the sun-tracking reflecting mirror unit and focus the sunlight.

PCT Application Publication No. 2016/048417 discloses systems and methods to collect solar energy to heat non-potable water in super insulated structure.

At present, devices and systems available are either expensive to acquire and even more expensive to operate and maintain. They lack the simplicity, mobility and features to maximize and concentrate the energy of solar radiation. To this end, the present utility model provides

technical solutions that will enable the off grid production of potable water from sea water with solar energy as heat source and using materials that are inexpensive and readily available.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 presents the perspective view of the portable off grid household desalinator

Figure 2 presents the left-side view of the present utility model

Figure 3 presents the top view of the present utility model

Figure 4 presents the right-side view of the present utility model

Figure 5 presents the front view of the present utility model

DETAILED DESCRIPTION

Referring now to the detailed drawing of the portable off grid household desalinator and especially Figure 1 comprising; a water filtration unit (1,2,3,4,5); a heat concentrator-collector unit (12,13,14,15,17,18); and a collection tube unit (6,7,8,9,10,11,16) which interconnect the water filtration unit (1,2,3,4,5) and heat concentrator-collector unit (12,13,14,15,17,18). Wherein said water filtration unit (1,2,3,4,5) having a three layered frame (1); a desalinated tank (5) secured to first layer of said frame (1); a filtered saline water feed tank (4) provided to said second layer of said frame (1); a raw tank (2) secured to the third layer of said frame (1); a sediment filter (3) interconnect said raw tank (2) and saline water feed tank (4). Referring now to Figure 2 and 3 where shown the said heat concentrator-collector unit (12,13,14,15,17,18) having a support structure (12); a reflectorized parabolic trough concentrator (13) secured to said support structure (12); a pair of pillow block (15) secured to the top portion of said support structure (12); a pair of horizontal support members (17) welded to the edge portion of said reflectorized parabolic concentrator (13); a support rod (18) and one of said support member (17) are welded to the top portion of said frame (1); a steel bracket (8) secured outwardly from said support structure (12); an adjustable longitudinal bar perpendicularly secured to said support structure (12) to hold said parabolic concentrator(13) to a desired angle. Referring now to Figure 1,4,5, wherein said collection tube unit (6,7,8,9,10,11,16) shown to have a first acrylic collector tube (9); a second acrylic collector tube connected to said first acrylic collector tube (9); a third acrylic collector tube (11)

connected to said second acrylic collector tube (10); an inlet line (16) connected to said third acrylic collector tube (11) and the other end of said inlet line inserted to said filtered saline water feed tank (4), a control valve (6) secured to said inlet line (16) proximate to said saline water tank (4); an outlet tube (7) connected to said first acrylic collector tube (9) and the other end of said outlet tube (7) secured to said desalinated water tank (5); said acrylic collector tubes(9,10,11) are made of transparent acrylic; said acrylic collector tubes(9, 10, 11) are secured to said steel bracket (8); and wherein said reflectorized parabolic concentrator (13) and said acrylic collector tubes are disposed to the sunlight as source of heat energy.

Using the present utility model, potable water can be obtained from seawater in off grid conditions by positioning the portable off grid household desalinator outdoor, in an open space where there are no obstructions that hinders the amount of insolation that could be gathered. Adjust the concentrator on an angle, where it could gather abundant amount of sunlight, The feed water (usually saline or brackish water) is delivered to raw tank, then passes through a 100 microns sediment filter that removes impurities and then fed on the inlet line with the valve open, after that, it then passes through a series of absorber. This result to much faster evaporation rates and desalination process since the water continuously flow while it desalinates. This change in material composition and manner of desalinating could also eliminate the foul smell and blackish color that develops when water is in a stagnant state.

CLAIM

1. A portable off grid household desalinator (Figure 1) comprising; a water filtration unit (1,2,3,4,5); a heat concentrator-collector unit (12,13,14,15,17,18); and a collection tube unit (6,7,8,9,10,11,16) which interconnect the water filtration unit (1,2,3,4,5) and heat concentrator-collector unit (12,13,14,15,17,18);

said water filtration unit (1,2,3,4,5) having a three layered frame (1); a desalinated tank (5) secured to first layer of said frame (1); a filtered saline water feed tank (4) provided to said second layer of said frame (1); a raw tank (2) secured to the third layer of said frame (1); a sediment filter (3) interconnect said raw tank (2) and saline water feed tank (4);

said heat concentrator-collector unit (12,13,14,15,17,18) having a support structure (12); a reflectorized parabolic trough concentrator (13) secured to said support structure (12); a pair of pillow block (15) secured to the top portion of said support structure (12); a pair of horizontal support members (17) welded to the edge portion of said reflectorized parabolic concentrator (13); a support rod (18) and one of said support member (17) are welded to the top portion of said frame (1); a steel bracket (8) secured outwardly from said support structure (12); an adjustable longitudinal bar perpendicularly secured to said support structure (12) to hold said parabolic concentrator(13) to a desired angle.

said collection tube unit (6,7,8,9,10,11,16) having a first acrylic collector tube (9); a second acrylic collector tube connected to said first acrylic collector tube (9); a third acrylic collector tube (11) connected to said second acrylic collector tube (10); an inlet line (16) connected to said third acrylic collector tube (11) and the other end of said inlet line inserted to said filtered saline water feed tank (4), a control valve (6) secured to said inlet line (16) proximate to said saline water tank (4); an outlet tube (7) connected to said first acrylic collector tube (9) and the other end of said outlet tube (7) secured to said desalinated water tank (5); said acrylic collector tubes(9,10,11) are made of transparent acrylic; said acrylic collector tubes(9, 10, 11) are secured to said steel bracket (8); and wherein said reflectorized parabolic concentrator (13) and said acrylic collector tubes are disposed to the sunlight as source of heat energy.

OFF-GRID HOUSEHOLD DESALINATOR

ABSTRACT

The present utility model relates to devices for sea water desalination using solar energy. More specifically, a portable off grid household desalinator comprising: a water holding and filtration unit, a collection tube unit and a heat concentrator-collector unit.

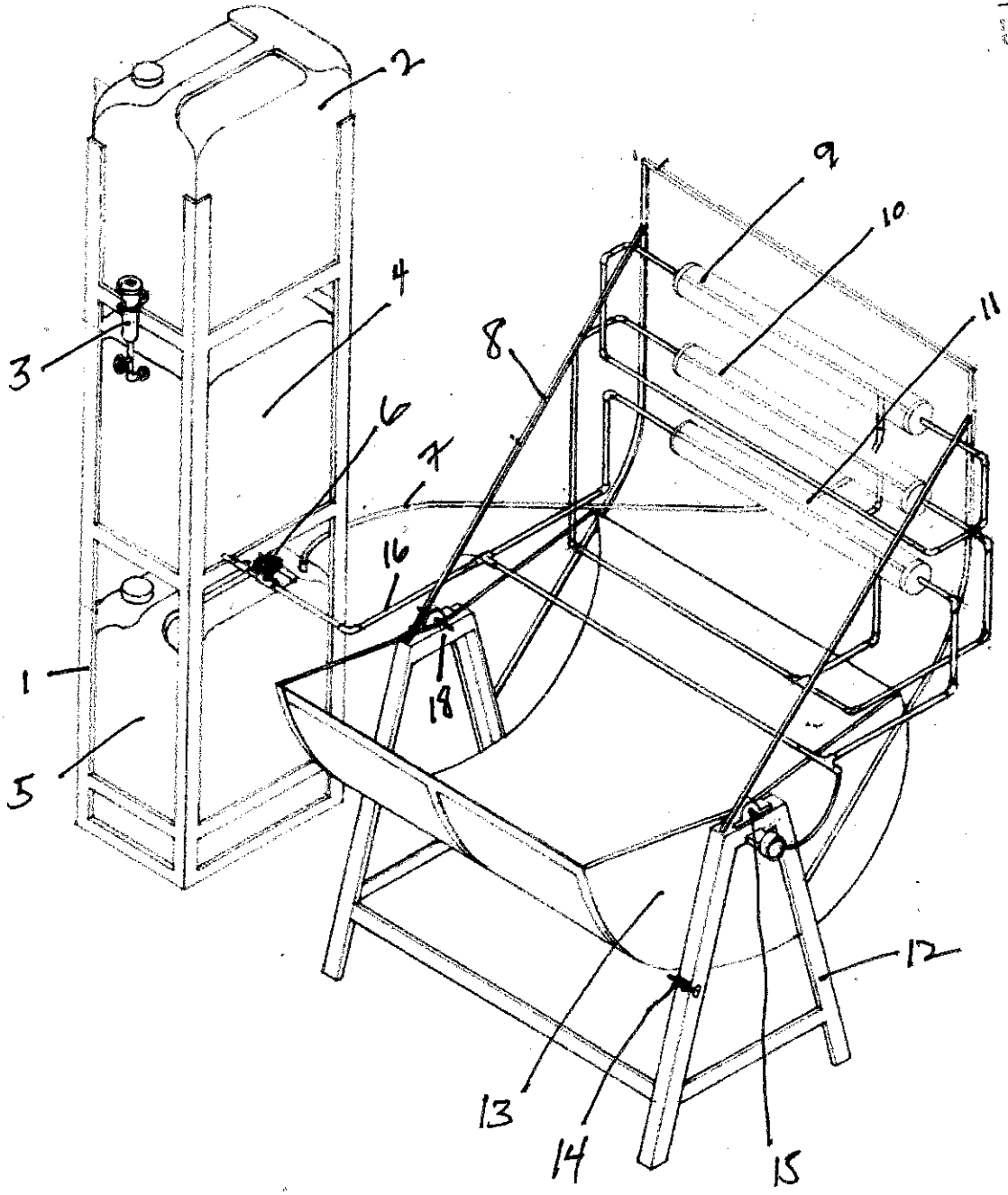

FIGURE 1

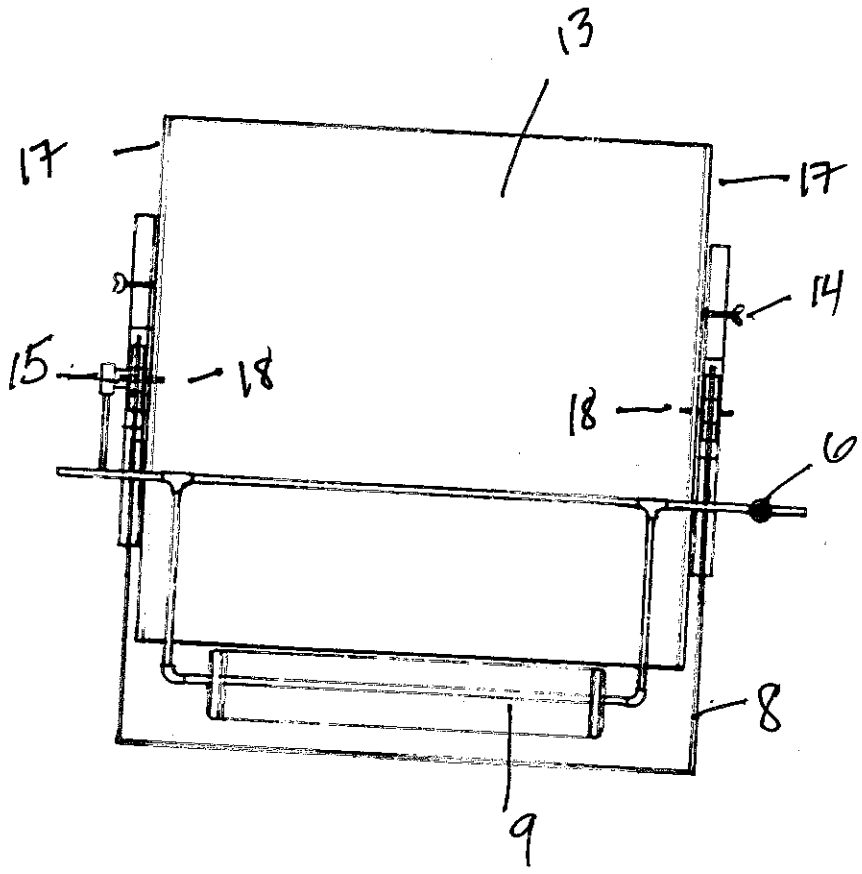

FIGURE 3

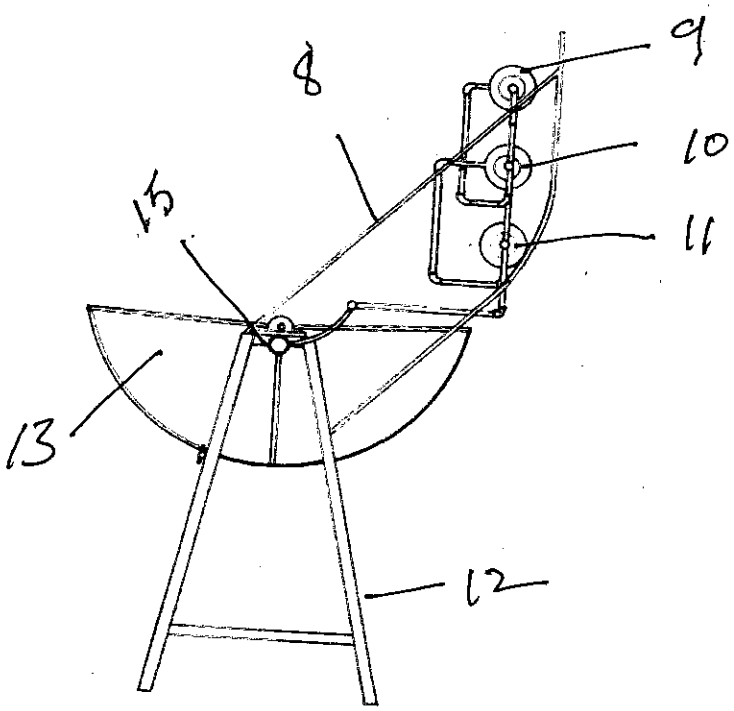

FIGURE 4

Republic of the Philippines

INTELLECTUAL PROPERTY
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REGISTRATION NO. 2-2017 050237

Having complied with the provisions law and regulations, this Office registers this

UTILITY MODEL

the specification and claim/s of which as hereunto annexed and made part hereof.

This **REGISTRATION** grants unto the applicant/s or assign/s the exclusive right throughout the Philippines to make, use, sell or import the utility model, for a term of **SEVEN (7) YEARS** from the date of filing, unless sooner terminated or cancelled as provided for by law and the regulations.

IN WITNESS WHEREOF, I have hereunto affixed my hand and the seal of the Intellectual Property Office at Taguig City, Philippines.

ATTY. LOLIBETH R. MEDRANO
Director of Patents