Nov. 11, 1952 J. E. JOYNER 2,617,759

SALT WATER EVAPORATOR

Filed May 3, 1949 2 SHEETS—SHEET 1

Fig. 1.

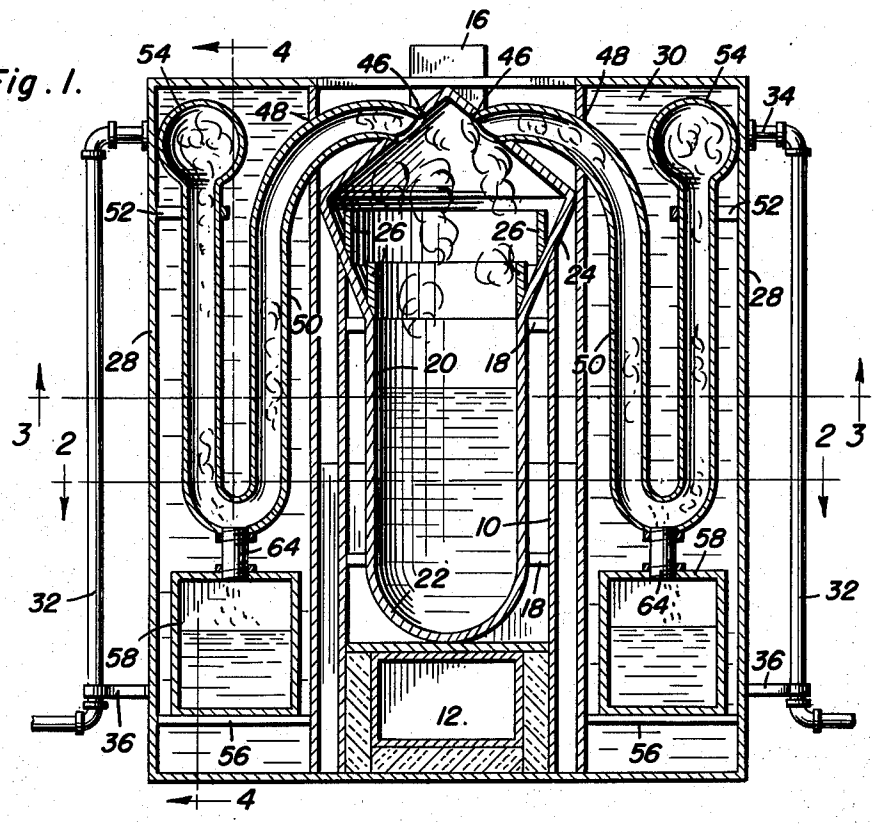
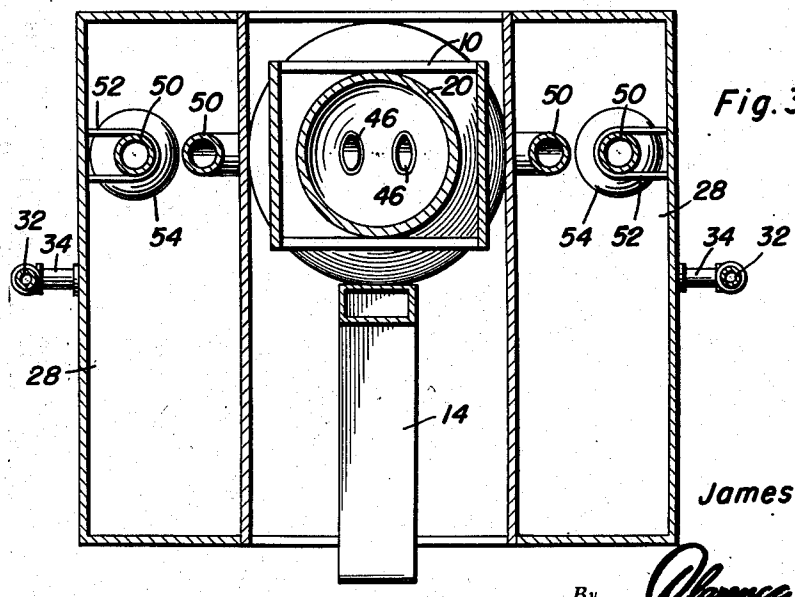


Fig. 3.



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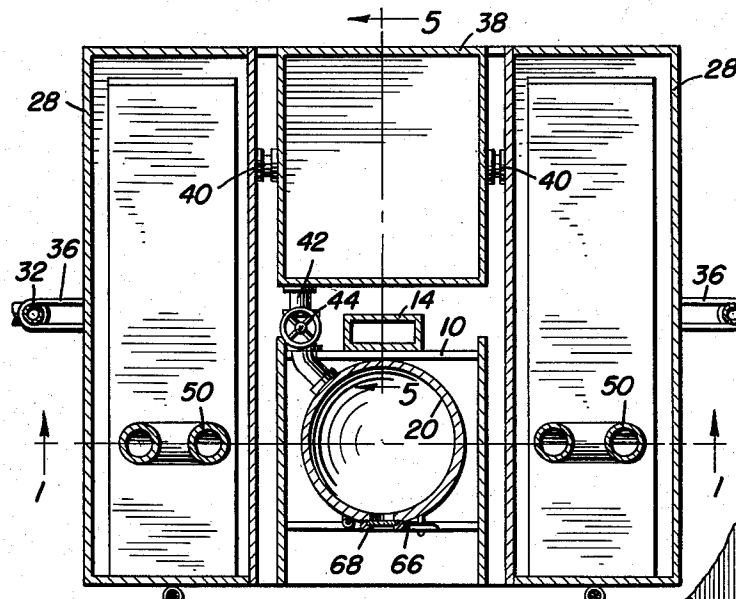


Fig. 2.

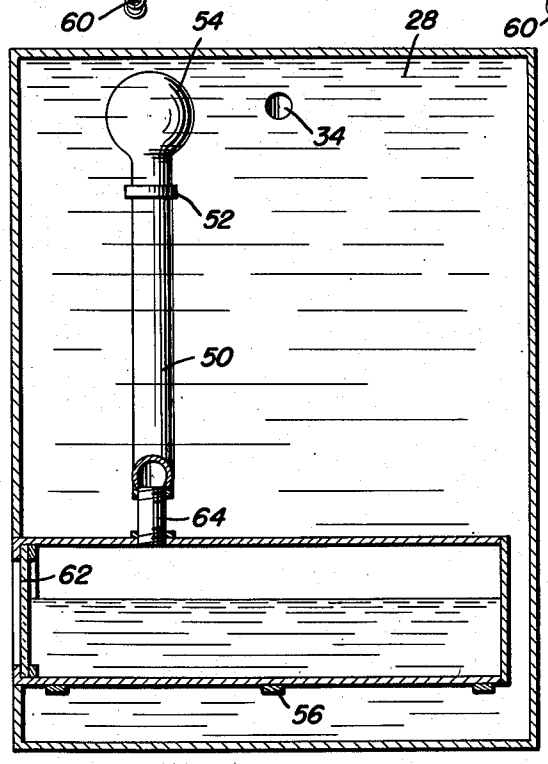


Fig. 4.

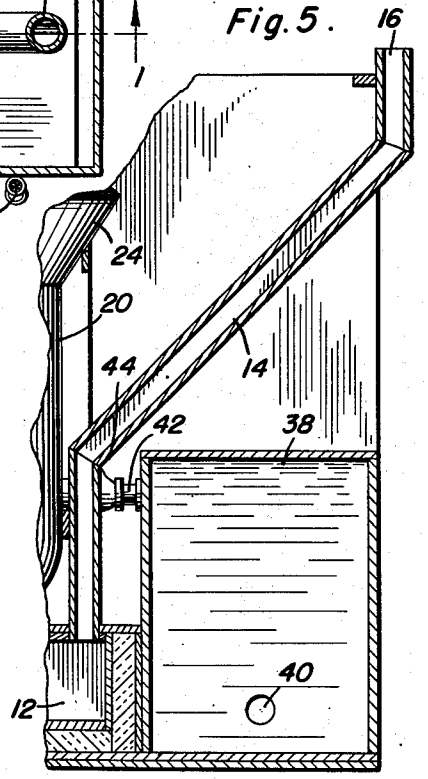


Fig. 5.

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UNITED STATES PATENT OFFICE

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SALT WATER EVAPORATOR

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Application May 3, 1949, Serial No. 91,102

2 Claims. (Cl. 202—186)

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This invention relates to a salt water evaporator of novel construction and design, the primary object of which is to provide a means for efficiently recovering salt and distilled water from natural and artificial salt-containing bodies of water with a minimum expenditure of fuel.

A further object of this invention is to provide an evaporator of the character described in which the salt water is efficiently pre-heated by the condenser tubes before it is conducted into the evaporator or boiler itself, the salt water serving, at the same time, as the coolant for the condenser tubes.

A further object of this invention is to provide an evaporator of the character described including a hood at the top of the boiler and baffles in the hood to allow only water vapor instead of condensed water from entering into the condenser tubes, thus preventing any back pressure on the boiler and eliminating any possibility of explosion of the boiler.

Yet another object of this invention is to provide an evaporator of the character described which is relatively simple in design and construction, easy to operate, and serves as an extremely efficient means for removing both salt and distilled water from any readily available salt water source.

These, together with various ancillary objects and features of the invention which will later become apparent as the following description proceeds, are attained by the device, a preferred embodiment of which has been illustrated, by way of example only, in the accompanying drawings, wherein:

Figure 1 is a vertical sectional view through the evaporator, some parts being shown in elevation;

Figure 2 is a sectional view taken substantially in the plane of section line 2—2 of Figure 1;

Figure 3 is a sectional view taken substantially in the plane of section line 3—3 of Figure 1;

Figure 4 is a sectional view taken substantially in the plane of section line 4—4 of Figure 1; and

Figure 5 is a sectional view taken substantially in the plane of section line 5—5 of Figure 2.

Specific reference will now be made to the drawings. In the several views, in the accompanying drawings and in the following specification, similar reference characters indicate corresponding elements throughout.

Indicated generally at 10 is a substantially rectangular furnace having a conventional firebox 12 from which extends an angulated flue pipe 14 communicative with a chimney 16 to the

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rear of the furnace. The furnace casing 10 is provided with straps 18 for securely retaining a substantially cylindrical boiler 20 having a preferably rounded bottom 22 positioned just above the firebox 12.

Integral with the top of the boiler 20 and supported on the side walls of the furnace casing 10 is a preferably pointed hood 24, the inner side walls of which retain circular baffle plates 26 positioned immediately above the top open end of the boiler for a purpose to be later described.

At both sides of the furnace and boiler, a pair of substantially rectangular vertically extending tanks 28 are provided for retaining salt water 30. The salt water is conducted to the tank from a source such as the ocean or a sea via pipes 32 which are communicative with the interior of the tanks, preferably at their upper ends, by means of suitable couplings 34. The pipes are maintained in position on the side walls of the tanks by means of straps 36.

To the rear of the boiler is positioned a further salt water tank 38 which is shorter in height than the tanks 28 and which is communicative with the tank 28 by means of suitable pipes 40. A conduit 42 interconnects the shorter tank 38 with the boiler 20, as shown clearly in Figure 2, the conduit 42 having a conventional hand-operated valve 44. Thus, it will be seen that salt water will be conducted in controlled amounts from any source to the two tanks 28, thence to the tank 38, and thereafter to the bottom of the boiler 20.

The hood 24 is provided with apertures 46 adjacent its top end while the inner side walls of the tanks 28 are also provided with apertures 48 adjacent their top ends. Condenser tubes 50 extend through the apertures 46 and 48, and, as will be seen clearly from the drawings, these tubes are U-shaped and positioned within the salt water tanks 28, being retained therein by means of suitable straps 52. The free ends of the U-shaped tubes are provided with enlarged bulb portions 54 to allow a slight expansion of the distilled water vapors.

Retained upon suitable supports 56 within each of the salt water tanks 28 are horizontally extending, substantially rectangular distilled water receiving tanks 58 having withdrawal spouts 60 and window portions 62 for viewing the amount of distilled water collected therein. At their top ends, the distilled water tanks 58 are provided with pipes 64 interconnecting the distilled water tanks with the web portions of the condenser

tubes **50**. The front of the boiler **20** is further provided with any suitable door **66** for the removal of salt remaining in the boiler and a window **68** for viewing the interior of the boiler.

In practical operation, salt water is conducted through the salt water tanks **28** and **38** and, by means of the hand-operated valve **44**, a controlled flow of the salt water is permitted to enter the bottom of the boiler **20**. As the salt water is heated in the boiler, water vapor passes through the condenser tubes **50**. The baffle **26** serves to obstruct the flow of any liquid water into the condenser tubes **50**. The water vapors in the condenser tubes **50** are cooled by the cold salt water in the water tanks **28**, and when the water vapor condenses, it flows through the conduit **64** into the water receiving tanks **58**. Thus, it will be seen that the salt water is pre-heated in the tanks **28** by the hot water vapor in the condenser tubes **50** and also serves as the coolant for the distilled water vapors. The cooperation between the baffles **26** and the expansion bulbs **54** prevents any build up of back pressure within the system, thus eliminating the possibility of explosion of the boiler.

In view of the foregoing description taken in conjunction with the accompanying drawings, it is believed that a clear understanding of the device will be quite apparent to those skilled in this art. A more detailed description is accordingly deemed unnecessary.

It is to be understood, however, that even though there is herein shown and described a preferred embodiment of the invention, the same is susceptible to certain changes fully comprehended by the spirit of the invention as herein described and within the scope of the appended claims.

Having described the invention, what is claimed as new is:

1. A salt water evaporator comprising a boiler, means for heating said boiler, a hood on said boiler, a pair of condenser tubes connected adjacent the top of the hood, baffles in said hood for inhibiting water flow into said condenser tubes, said condenser tubes being of substantially U-shape, an enlarged bulb-shaped portion at the free end of each of said tubes, a condensate tank for each tube, connections from the lowermost portion of each tube to the respective condensate tank, a salt water intake tank surrounding each of said condenser tubes, means for supplying salt water to said intake tanks, a salt water tank connected to said intake tanks, a connection from said salt water tank to said boiler, a valve in said connection, and a salt removal door in said boiler.

2. A salt water evaporator comprising a boiler, means for heating said boiler, a pointed hood on said boiler, a pair of condenser tubes connected adjacent the apex of the hood, baffles in said hood for inhibiting water flow into said condenser tubes, said condenser tubes being of substantially U-shape, an enlarged bulb shaped portion at the free end of each of said tubes, a condensate tank for each tube, connections from the lowermost portion of each tube to the respective condensate tank, a salt water intake tank surrounding each of said condenser tubes and its connected condensate tank, means for supplying salt water to said intake tanks, a mixing tank connected to said intake tanks, a connection from said salt water tank to said boiler, a valve in said connection, and a salt removal door in said boiler.

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