fluid vapor distillation apparatus is a regenerative blower fluidly connected to the evaporator condenser. The regenerative blower compresses steam, and the compressed steam flows to the evaporative condenser where compressed steam is transformed into product fluid.

[0009] The water vapor distillation system also includes a Stirling engine electrically connected to the water vapor distillation apparatus. The Stirling engine at least partially powers the water vapor distillation apparatus.

[0010] Some embodiments of this aspect of the present invention include where the Stirling engine includes at least one rocking drive mechanism where the rocking drive mechanism includes: a rocking beam having a rocker pivot, at least one cylinder and at least one piston. The piston is housed within a respective cylinder. The piston is capable of substantially linearly reciprocating within the respective cylinder. Also, the drive mechanism includes at least one coupling assembly having a proximal end and a distal end. The proximal end is connected to the piston and the distal end is connected to the rocking beam by an end pivot. The linear motion of the piston is converted to rotary motion of the rocking beam. Also, a crankcase housing the rocking beam and housing a first portion of the coupling assembly is included. A crankshaft coupled to the rocking beam by way of a connecting rod is also included. The rotary motion of the rocking beam is transferred to the crankshaft. The machine also includes a working space housing the at least one cylinder, the at least one piston and a second portion of the coupling assembly. A seal is included for sealing the workspace from the crankcase.

[0011] Additionally, some embodiments of this aspect of the present invention include any one or more of the following: where the seal is a rolling diaphragm; also, where the coupling assembly further includes a piston rod and a link rod; where the piston rod and link rod are coupled together by a coupling means; where the heat exchanger is disposed about the housing of the evaporator condenser; where the heat exchanger further comprising wherein the outer tube is a source fluid flow path and the at least one inner tube is a product fluid flow path; where the heat exchanger further comprising at least three inner tubes; where the evaporator condenser further includes a steam chest fluidly connected to the plurality of tubes; and where the regenerative blower further includes an impeller assembly driven by a magnetic drive coupling.

[0012] These aspects of the invention are not meant to be exclusive and other features, aspects, and advantages of the present invention will be readily apparent to those of ordinary skill in the art when read in conjunction with the appended claims and accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] These and other features and advantages of the present invention will be better understood by reading the following detailed description, taken together with the drawings wherein:

[0014] FIG. **1** is an isometric view of the water vapor distillation apparatus;

[0015] FIG. **1**A is an exploded view of the exemplary embodiment of the disclosure;

[0016] FIG. **1**B is a cross-section view of the exemplary embodiment;

[0017] FIG. **1**C is a cross-section view of the exemplary embodiment;

[0018] FIG. **1**D is an assembly view of the exemplary embodiment;

[0019] FIG. **1**E is a detail view of the exemplary embodiment of the frame;

[0020] FIG. **1**F is an assembly view of an alternate embodiment;

[0021] FIG. **1**G is an assembly view of an alternate embodiment;

[0022] FIG. **1**H is an assembly view of an alternate embodiment;

[0023] FIG. **2** is an assembly view of the exemplary embodiment of the tube-in-tube heat exchanger assembly;

[0024] FIG. **2**A is an exploded view one embodiment of the tube-in-tube heat exchanger;

[0025] FIG. **2**B is an isometric view of the exemplary embodiment of the tube-in-tube heat exchanger from the back;

[0026] FIG. **2**C is an isometric view of the exemplary embodiment of the tube-in-tube heat exchanger from the front;

[0027] FIG. **2**D is a cross-section view of one embodiment of the tube-in-tube heat exchanger;

[0028] FIG. **2**E is an exploded view of an alternate embodiment of a tube-in-tube heat exchanger;

[0029] FIG. **2**F is a cut away view of one embodiment of the tube-in-tube heat exchanger illustrating the helical arrangement of the inner tubes;

[0030] FIG. **2**G is an exploded view of an alternate embodiment of a tube-in-tube heat exchanger;

[0031] FIG. **2**H is an isometric view of the exemplary embodiment of the tube-in-tube heat exchanger;

[0032] FIG. **2**I is an isometric view of the exemplary embodiment of the tube-in-tube heat exchanger;

[0033] FIG. **2**J is an exploded view of an alternate embodiment of the tube-in-tube heat exchanger configuration;

[0034] FIG. **2**K is an assembly view of an alternate embodiment of the tube-in-tube heat exchanger configuration;

[0035] FIG. **2**L is an assembly view of an alternate embodiment of the tube-in-tube heat exchanger configuration;

[0036] FIG. **2**M is a detail view of an alternate embodiment of the tube-in-tube heat exchanger configuration;

[0037] FIG. **2**N is a detail view of an alternate embodiment of the tube-in-tube heat exchanger configuration;

[0038] FIG. **2**O is a schematic of an alternate embodiment of the tube-in-tube heat exchanger configuration;

[0039] FIG. **2**P is an assembly view of an alternate embodiment of the heat exchanger;

[0040] FIG. **2**Q is an exploded view of an alternate embodiment of the heat exchanger;

[0041] FIG. **2**R is a section view of an alternate embodiment of the heat exchanger;

[0042] FIG. **3** is an exploded view of the connectors for the fitting assembly that attaches to the tube-in-tube heat exchanger;

[0043] FIG. **3**A is a cross-section view of fitting assembly for the tube-in-tube heat exchanger;

[0044] FIG. **3**B is a cross-section view of fitting assembly for the tube-in-tube heat exchanger;

[0045] FIG. **3**C is an isometric view of the exemplary embodiment for the first connector;

[0046] FIG. **3**D is a cross-section view of the exemplary embodiment for the first connector;