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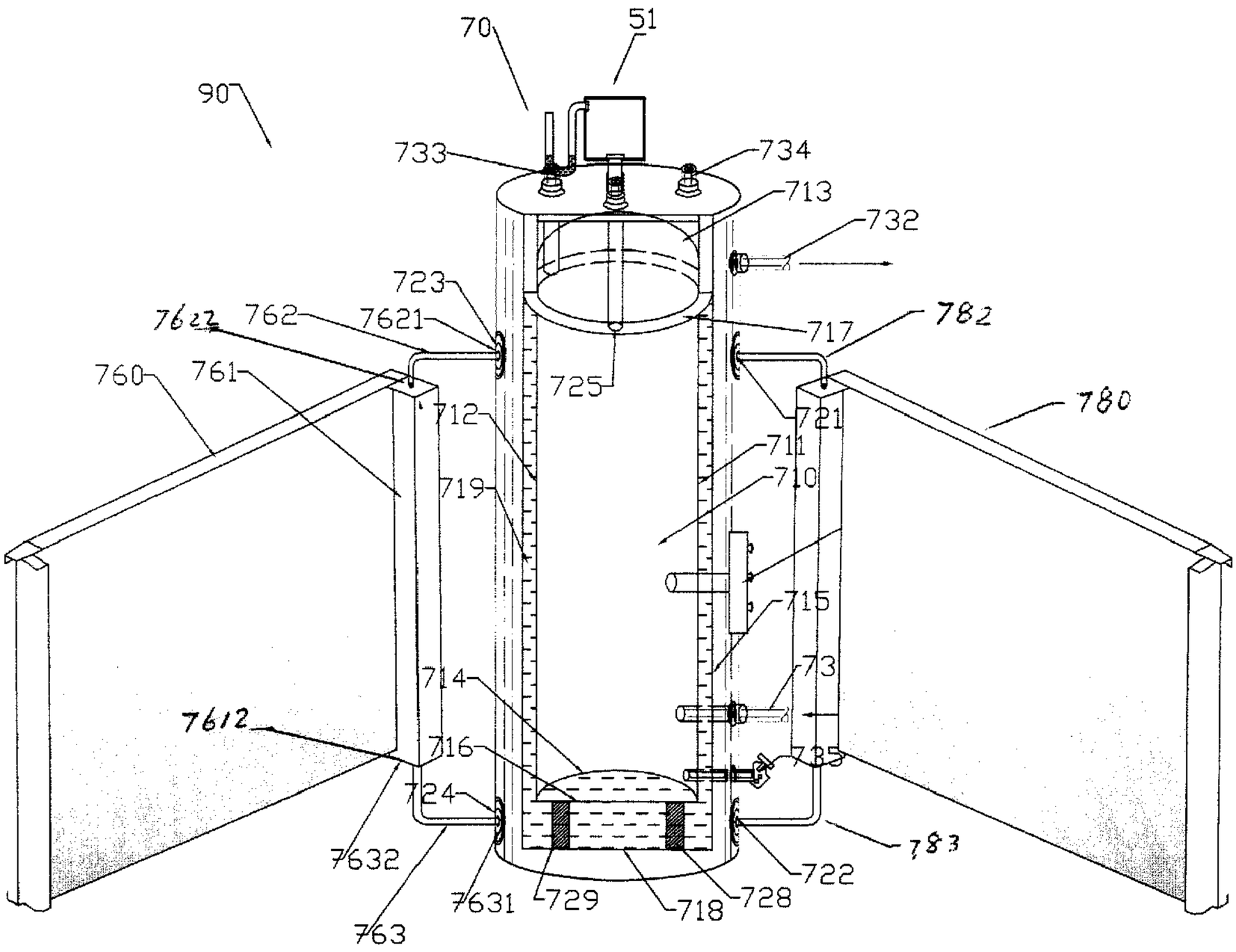
(54) Titre : CHAUFFAGE D'UN FLUIDE EN CIRCULATION COMMANDEE PAR LA CHALEUR ET RESERVOIR DE STOCKAGE ET SYSTEME CONNEXE

(54) Title: HEAT DRIVEN SELF-CIRCULATING FLUID HEATING AND STORAGE TANK AND SYSTEM



(57) Abrégé/Abstract:
A fluid heating and storage tank with double layer walls is provided. The tank includes two couples for inlets and outlets of a fluid which is a liquid. The tank further includes at least one breathing port which is connected to a second space, and at least one apparatus, for condensing and reclaiming of the liquid vapor, is mounted at the breathing port. The fluid heating and storage tank

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(57) Abrégé(suite)/Abstract(continued):
may be provided with one or two heaters. The heaters may provide heat with the same or different energy resources, and they may be double solar heat collectors orientated in any angle, especially in 90 degree and 180 degree. These solar heaters may be used to form the module units of various building elements.

ABSTRACT

A fluid heating and storage tank with double layer walls is provided. The tank includes two couples for inlets and outlets of a fluid which is a liquid. The tank further includes at least one breathing port which is connected to a second space, and at least one apparatus, for condensing and reclaiming of the liquid vapor, is mounted at the breathing port. The fluid heating and storage tank may be provided with one or two heaters. The heaters may provide heat with the same or different energy resources, and they may be double solar heat collectors orientated in any angle, especially in 90 degree and 180 degree. These solar heaters may be used to form the module units of various building elements.

HEAT DRIVEN SELF-CIRCULATING FLUID HEATING AND STORAGE TANK AND SYSTEM

FIELD OF TECHNOLOGY

The present disclosure relates to fluid heating and storage tanks, especially relates to the fluid heating and storage tanks having double walls. It also relates to heat driven and self-circulating fluid heating and storage systems using the tanks and having multiple energy sources, especially the solar heat collectors.

BACKGROUND

At present the solar heat application is becoming more and more popular. To reduce the hardware, software, installation, operation and maintenance costs, the applicant of this application disclosed a self-powered pump and liquid heat drive and self-circulation technology in the patent applications No. CA2628605 and PCT 2009000531. In another patent application CA2678584, the applicant of this application further disclosed several liquid heat driven and self-circulating systems. All these systems need the basic equipment—fluid heating and storage tank. The tanks described in above-mentioned patent applications are different in construction in the above mentioned systems. It is not convenient for manufacture and installation. One purpose of this application is to develop tanks for the heat driven self-circulating solar heating and storage systems by standard and modularization manufacture.

The solar energy varies in different seasons, locations and weather. Thus the solar energy in the solar heat collected in a solar heating system is not steady. It is expected by solar energy customers that a fluid heating and storage tank can be used not only for solar energy, but also for other energy sources.

Many efforts have been made to integrate the solar heating system with the building in last few decades. The liquid heat driven and self-circulating technology has made the integration of the solar heating system with the buildings much easier. It is the third purpose of this invention to make the solar heating systems an integral structure part of the module units of the building.

The fluid heating and storage tanks with double walls are presently known. However, the existing tanks can not be used for heat driven and self-circulation fluid heating and storage system when the tank is not located higher than the heater. The existing tanks for multi-energy sources also can not be used in a heat driven and self-circulation system.

The liquid vaporizing and escaping of the heating liquid is a risk for the continue safety operation of a heat driven and self-circulation liquid heating and storage system. Some solutions to solve such problem have been developed in above-mentioned patent applications. This disclosure provides an improved and more efficient liquid vapor condensing and reclaiming apparatus.

SUMMERY:

The present disclosure aims at the new requirements of solar heat applications and also includes the improvement to our pending patent technologies.

In one aspect, the present disclosure is to provide two layer wall fluid heating and storage tank for the heat driven self-circulating solar heating and storage systems by standard and modularization manufacture.

In another aspect, the present disclosure is to provide the heat driven self-circulating fluid heating and storage systems employing above-mentioned fluid heating and storage tank.

In third aspects, the present disclosure is to provide the solar heat driven self-circulating solar heating and storage system that can be used for the units of the building walls, fences and verandas selectively.

Following are the detailed summery of present disclosure.

1. A fluid heating and storage tank with two layer walls and two storage spaces comprising:

a first airtight container for a primary fluid enclosed by a first layer wall having a primary fluid inlet and a primary fluid outlet;

a second airtight container for a secondary fluid which is a liquid and enclosed by a second layer wall together with part of said first wall;

said first container being in fluid isolation from said second container, therefore said primary fluid is in fluid isolation from said secondary fluid;

a first inlet, a first outlet, a second inlet and a second outlet for secondary fluid arranged at said second layer wall; two said inlets being located not lower than two said outlets;

at least one breathing fitting arranged at said fluid heating and storage tank and being located higher than said inlet ports for said second container for connecting inside space of said second container to atmosphere directly or indirectly selectively;

at least one apparatus for condensing and reclaiming said secondary fluid vapor connected to the said breathing fitting, said apparatus comprising:

an airtight container for containing any escaped heated secondary liquid and vapor from said second container; and said airtight container having a base and a top; said airtight container further having a inner tool for condensing the liquid vapor, e.g. having a inner heat conductive wall and a set of condensing pieces installed therein selectively;

a breathing pipe having one end extending upwardly into said airtight container and being mounted at the bottom therein to said airtight container and having an opposite end connected to said breathing fitting at said fluid heating and storage tank;

a flexural pipe e.g. selectively in the form of a U shaped pipe and W shaped pipe, extending upwardly into said airtight container and having an end therein located within the airtight container and being lower than the interior top side of said airtight container and also having an opposite end located outside of said airtight container for condensing the escaped vapor and temporally storing the liquid of condensed vapor for reclaiming.

2. The fluid heating and storage tank according to claim 1 being a tank with an interior sidewall and an outer sidewall, comprising:

an interior container e.g. in the form of a columniform container for a primary fluid enclosed by first layer sidewall, a top wall and a bottom wall having a primary fluid inlet, a primary fluid outlet;

an outer container, e.g. in the form of a tube-shaped container, for secondary fluid which is a liquid having its second layer sidewall larger than the sidewall of said interior container and mounted at upper and lower edgings therein to the sidewall of said interior container;

said first container being in fluid isolation from said second container, therefore said primary fluid is in fluid isolation from said secondary fluid; said secondary fluid having a liquid level being located lower than the top of said second container;

a first inlet, a first outlet, a second inlet and a second outlet for a secondary fluid arranged at said second layer wall; said inlets being located not lower than said outlets;

at least one breathing fitting arranged at the second wall of said fluid heating and storage tank and being located higher than said inlet ports of said second container for connecting inside space of said second container to atmosphere directly and indirectly selectively;

at least one apparatus for condensing and reclaiming said secondary fluid vapor connected to the said breathing fitting, said apparatus comprising:

an airtight container for containing any escaped heated secondary liquid and vapor from said second container and said airtight container having a base and a top; said airtight container further having a inner tool for condensing the liquid vapor, e.g. having a inner heat conductive wall and a set of condensing pieces installed therein selectively;

a breathing pipe having its one end extending upwardly into said airtight container and being mounted at the bottom therein to said airtight container and having an opposite end connected to said breathing fitting at the second wall of said fluid heating and storage tank;

a flexural pipe e.g. selectively in the form of a U shaped pipe and W shaped pipe, extending upwardly into said airtight container and having an end therein located within the airtight

container and being lower than the interior top side of said airtight container and also having an opposite end located outside of said airtight container for condensing the escaped vapor and temporally storing the liquid of condensed vapor for reclaiming.

3. The fluid heating and storage tank according to claim 1being a tank with double layer bottom walls comprising:

a first airtight container e.g. a columniform container for a primary fluid at the upper part of said tank enclosed by the first layer sidewall, top wall and bottom wall having a primary fluid inlet and a primary fluid outlet;

a second container for a secondary fluid which is a liquid enclosed by a top wall which is said bottom wall of said first container, a bottom wall and a downwardly extended sidewall from said sidewall of said fist container;

said first container being in fluid isolation from said second container, therefore said primary fluid is in fluid isolation from said secondary fluid;

a first inlet, a first outlet, a second inlet and a second outlet for the secondary fluid arranged at the second layer wall of said fluid heating and storage tank, wherein said inlets being located not lower than said outlets;

two breathing fittings arranged at said fluid heating and storage tank and located higher than said inlet ports for said second container connecting its inside space to atmosphere directly or indirectly selectively; and

a first channel of said secondary liquid extending upwardly one end at said first inlet of secondary fluid at said second container for connecting an opposite end to a lower end of first three-way channel; said three way channel having an upper end connected to said first breathing fitting and a third end for connecting to the secondary liquid outlet of said first heater;

a second channel of said secondary liquid extending upwardly in one end at said second inlet of secondary fluid at said second container for connecting an opposite end therein to a lower end of second three-way channel; said three way channel having an upper end connected to said second breathing fitting and a third end for connecting the outlet of said second heater;

an apparatus for condensing and reclaiming said secondary fluid vapor connected to the said breathing fitting, said apparatus comprising:

an airtight container for containing any escaped heated secondary liquid and vapor from said second container and said airtight container having a base and a top; said airtight container further having a inner tool for condensing the liquid vapor, e.g. having a inner heat conductive wall and a set of condensing pieces installed therein selectively;

a breathing pipe having its one end extending upwardly into said airtight container and being mounted at the bottom therein to said airtight container and having an opposite end connected to said breathing fitting at said fluid heating and storage tank;

a flexural pipe e.g. selectively in the form of a U shaped pipe and W shaped pipe, extending upwardly into said airtight container and having an end therein located within the airtight container and being lower than the interior top side of said airtight container and also having an opposite end located outside of said airtight container for condensing the escaped vapor and temporally storing the liquid of condensed vapor for reclaiming.

4. The fluid heating and storage tank according to claim 1 being a tank with the double layer sidewalls and the double bottom walls, comprising:

an interior container e.g. a columniform container for a primary fluid enclosed by a first layer sidewall, top and bottom walls having a primary fluid inlet, and a primary fluid outlet;
an outer container e.g. tube-shaped container, for secondary fluid which is a liquid; said outer container having its second layer sidewall and a bottom wall larger than and enveloping said sidewall and bottom wall of said interior container respectively; said second layer top wall mounted at edging to said sidewall of said interior container;

said first container being in fluid isolation from said second container, therefore said primary fluid is in fluid isolation from secondary fluid; said secondary fluid having a liquid level lower than the top of said second container;

a first inlet, a first outlet, a second inlet and a second outlet for secondary fluid arranged at said second layer sidewall; two said inlets being located not lower than two said outlets;

at least one breathing fitting arranged at the second wall of said fluid heating and storage tank and being located higher than said inlet ports of said second container for connecting inside space of second container to atmosphere directly or indirectly selectively; and

at least one apparatus for condensing and reclaiming said secondary fluid vapor connected to the said breathing fitting, said apparatus comprising:

an airtight container for containing any escaped heated secondary liquid and vapor from said second container and said airtight container having a base and a top; said airtight container further having a inner tool for condensing the liquid vapor, e.g. having a inner heat conductive wall and a set of condensing pieces installed therein selectively;

a breathing pipe having its one end extending upwardly into said airtight container and being mounted at the bottom therein to said airtight container and having an opposite end connected to said breathing fitting at the second wall of said fluid heating and storage tank;

a flexural pipe e.g. selectively in the form of a U shaped pipe and W shaped pipe, extending upwardly into said airtight container and having an end therein located within the airtight

container and being lower than the interior top side of said airtight container and also having an opposite end located outside of said airtight container for condensing the escaped vapor and temporally storing the liquid of condensed vapor for reclaiming.

5. The fluid heating and storage tank according to claim 1, 2, 3 or 4 further comprising a release valve， a drain valve, a protective anode and at lest one electric heater selectively.

6. The fluid heating and storage tank according to claim 1, 2, 3 or 4 wherein said outer layer wall is made of a material selected from the group including plastic, ceramic, metal such as copper, stainless steel and steel plated by porcelain enamel and glass; said wall having selectively a columniform, oblong and oval shape; said outer wall is heat insulated and with a crust.

7. The inner layer wall of fluid heating and storage tank according to claim 1, 2, 3 or 4 is made of heat conductive metals selected from the group including copper, stainless steel, steel plated by the porcelain enamel and steel plated by the glass selectively.

8. The fluid heating and storage tank according to claim 1, 2, 3, or 4 wherein said two outlets are arranged at said second wall in 180 degree; and said two inlets are also arranged at said second wall in 180 degree; and each couple of said inlet and said outlet may be oriented at a perpendicular manner selectively.

9. The fluid heating and storage tank according to claim 1, 2, 3, or 4 wherein said two outlets are arranged at said second sidewall in 90 degree; and said two inlets are also arranged at said second sidewall in 90 degree; and each couple of said inlet and outlet being oriented at a perpendicular manner selectively.

10. The fluid heating and storage tank according to claim 1, 2, 3, or 4 further comprising two back up bolt caps for capping said inlet and outlet fittings and two back up bolt caps for capping said breathing fittings when said fittings are not being used;

11. The fluid heating and storage tank according to claim 1, 2, 3, or 4 further comprising a separating plate, mounted within the space of said second container for separating said secondary fluid space into two sub-spaces for isolating the liquid therein in two sub-spaces; said two couples of said inlets and said outlets being arranged at second wall of two said sub-spaces; and said breathing fitting being arranged at a top wall of said sub-spaces.

12. The fluid heating and storage tank according to claim 3 wherein said channel for said secondary fluid is a conduit or a slot attached at the wall of the fluid heating and storage tank.

13. A heat driven and self-circulated fluid heating and storage system, comprising:

a heater for heating secondary fluid which is a liquid having a inlet and a outlet, said inlet being located not lower than said outlet;

a fluid heating and storage tank with two layer walls and two storage spaces comprising:

a first airtight container for a primary fluid enclosed by a first layer wall having a primary fluid inlet and a primary fluid outlet;

a second airtight container for a secondary fluid which is a liquid and enclosed by a second layer wall together with part of said first wall;

said first container being in fluid isolation from said second container, therefore said primary fluid is in fluid isolation from said secondary fluid;

a first inlet, a first outlet, a second inlet and a second outlet for secondary fluid arranged at said second layer wall; two said inlets being located not lower than two said outlets;

at least one breathing fitting arranged at said fluid heating and storage tank and being located higher than said inlet ports for said second container for connecting inside space of said second container to atmosphere directly or indirectly selectively;

at least one apparatus for condensing and reclaiming said secondary fluid vapor connected to the said breathing fitting, said apparatus comprising:

an airtight container for containing any escaped heated secondary liquid and vapor from said second container; and said airtight container having a base and a top; said airtight container further having a inner tool for condensing the liquid vapor, e.g. having a inner heat conductive wall and a set of condensing pieces installed therein selectively;

a breathing pipe having one end extending upwardly into said airtight container and being mounted at the bottom therein to said airtight container and having an opposite end connected to said breathing fitting at said fluid heating and storage tank;

a flexural pipe e.g. selectively in the form of a U shaped pipe and W shaped pipe, extending upwardly into said airtight container and having an end therein located within the airtight container and being lower than the interior top side of said airtight container and also having an opposite end located outside of said airtight container for condensing the escaped vapor and temporally storing the liquid of condensed vapor for reclaiming.

a first conduit having its one end connected to said outlet of said heater and an opposite end connected to said first inlet of said fluid heating and storage tank located not lower than said outlet of said heater;

a second conduit having one end connected to said inlet of said heater and an opposite end connected to said first outlet of said fluid heating and storage tank;

two caps being located for closing a couple of said inlet and outlet of said fluid heating and storage tank;

14. A heat driven self-circulated fluid heating and storage system comprising:

A fluid heating and storage tank with two layer walls and two storage spaces comprising:

a first airtight container for a primary fluid enclosed by a first layer wall having a primary fluid inlet and a primary fluid outlet;

a second airtight container for a secondary fluid which is a liquid and enclosed by a second layer wall together with part of said first wall;

said first container being in fluid isolation from said second container, therefore said primary fluid is in fluid isolation from said secondary fluid;

a first inlet, a first outlet, a second inlet and a second outlet for secondary fluid arranged at said second layer wall; two said inlets being located not lower than two said outlets;

at least one breathing fitting arranged at said fluid heating and storage tank and being located higher than said inlet ports for said second container for connecting inside space of said second container to atmosphere directly or indirectly selectively;

at least one apparatus for condensing and reclaiming said secondary fluid vapor connected to the said breathing fitting, said apparatus comprising:

an airtight container for containing any escaped heated secondary liquid and vapor from said second container; and said airtight container having a base and a top; said airtight container further having a inner tool for condensing the liquid vapor, e.g. having a inner heat conductive wall and a set of condensing pieces installed therein selectively;

a breathing pipe having one end extending upwardly into said airtight container and being mounted at the bottom therein to said airtight container and having an opposite end connected to said breathing fitting at said fluid heating and storage tank;

a flexural pipe e.g. selectively in the form of a U shaped pipe and W shaped pipe, extending upwardly into said airtight container and having an end therein located within the airtight container and being lower than the interior top side of said airtight container and also having an opposite end located outside of said airtight container for condensing the escaped vapor and temporally storing the liquid of condensed vapor for reclaiming.

a first heater for a secondary fluid which is a liquid; said first heater having a secondary liquid inlet and an outlet;

a second heater for secondary fluid which is a liquid; said second heater having a secondary liquid inlet and a outlet;

said inlets of said two heaters being located not higher than said outlets;

a first conduit having one end connected to said outlet of first said heater and an opposite end connected to said first inlet fitting of fluid heating and storage tank being located not lower than said outlet of first heater;

a second conduit having one end connected to said inlet of first heater and an opposite end connected to said first outlet of said fluid heating and storage tank;

a third conduit having one end connected to said outlet of said second heater and an opposite end connected to said second inlet of said fluid heating and storage tank being located not lower than said outlet of said second heater;

a forth conduit having one end connected to said inlet of second heater and an opposite end connected to said second outlet of fluid heating and storage tank;

15. A heat driven and self-circulated fluid heating and storage system, comprising:

a fluid heating and storage tank with two layer walls and two storage spaces comprising:

a first airtight container for a primary fluid enclosed by a first layer wall having a primary fluid inlet and a primary fluid outlet;

a second airtight container for a secondary fluid which is a liquid and enclosed by a second layer wall together with part of said first wall;

said first container being in fluid isolation from said second container, therefore said primary fluid is in fluid isolation from said secondary fluid;

a first inlet, a first outlet, a second inlet and a second outlet for secondary fluid arranged at said second layer wall; two said inlets being located not lower than two said outlets;

at least one breathing fitting arranged at said fluid heating and storage tank and being located higher than said inlet ports for said second container for connecting inside space of said second container to atmosphere directly or indirectly selectively;

at least one apparatus for condensing and reclaiming said secondary fluid vapor connected to the said breathing fitting, said apparatus comprising:

an airtight container for containing any escaped heated secondary liquid and vapor from said second container; and said airtight container having a base and a top; said airtight container further having a inner tool for condensing the liquid vapor, e.g. having a inner heat conductive wall and a set of condensing pieces installed therein selectively;

a breathing pipe having one end extending upwardly into said airtight container and being mounted at the bottom therein to said airtight container and having an opposite end connected to said breathing fitting at said fluid heating and storage tank;

a flexural pipe e.g. selectively in the form of a U shaped pipe and W shaped pipe, extending upwardly into said airtight container and having an end therein located within the airtight container and being lower than the interior top side of said airtight container and also having an opposite end located outside of said airtight container for condensing the escaped vapor and temporally storing the liquid of condensed vapor for reclaiming.

a heater for heating secondary fluid which is liquid having a inlet and a outlet, said inlet being located not higher than outlet;

a heat appliance, e.g. a heat radiator, having a inlet and a outlet for said secondary fluid which connected to the outlet and inlet of said fluid heating and storage tank;

a first conduit having one end connected to said outlet of said heater and an opposite end connected to said first inlet of said fluid heating and storage tank located not lower than said outlet of said first heater;

a second conduit having one end connected to said inlet of said heater and an opposite end connected to said first outlet of said fluid heating and storage tank;

a third conduit having one end connected to said inlet of said heat appliance and an opposite end connected to said second outlet of said fluid heating and storage tank;

a forth conduit having one end connected to said outlet of heat appliance and an opposite end connected to said second inlet of fluid heating and storage tank; said second inlet located not higher than said outlet of said fluid heating and storage tank.

16. The heat driven self-circulated fluid heating and storage system according to claim 13, 14 or 15 wherein said heater for heating secondary fluid is a solar heat collector chosen from the group consisting a plate solar heat collector, a plate solar heat collector with heat tubes, a vacuumed tube solar heat collector, a vacuumed tube solar heat collector with heat tubes, and a U shaped pipe solar heat collector;

17. The heat driven self-circulated fluid heating and storage system according to claim 13, 14 or 15 wherein said heater is a heater using another energy source except solar energy, said heater comprising:

an airtight container for a secondary fluid which is a liquid having an lower inlet and an upper outlet for said secondary fluid located in a heat insulator; said container having said another energy heating source located at the lower and inner part of the heat insulator for heating the liquid in said airtight container;

Said airtight container being made of a heat conductive material chosen from the group consisting a ceramic, a glass and a metal e.g. cooper, steel selectively; said container being in a cylindraceous shape and tubiform shape selectively;

said another energy source including the energy of fossil fuel, biomes, nature gas, earth, air and electricity selectively.

18. The heat driven self-circulated fluid heating and storage system according to claim 13, 14, 15, 16 or 17 wherein said heater for heating secondary fluid having a power pump for pumping the secondary liquid; said second container for secondary liquid having at least one space being connected to said heater; said space having no breathing function e.g. no breathing port and the breathing fitting is selectively closed by a cap,.

19. The heat driven self-circulated fluid heating and storage system with at least one solar heat collector in claim 13, 14, 15 or claim 16 are used to form solar heating module units for various building elements including selectively building walls, fences and verandas; wherein said module units formed with two said solar heat collectors being arranged in 180 degree are the plane unit of the building walls, fences and verandas selectively; and the units with two said solar heat collectors arranged in less than 180 degree are the corner units of the building walls, fences and verandas selectively.

20. The heat driven and self-circulated fluid heating and storage system according to claim 15 wherein said heat appliance is a heat radiator, comprising:

a heated air generator having a fluid radiator having a set of tubes and an inlet and an outlet for said secondary fluid with at least one control valve; said radiator having a crust with a window for directing the heated air to a certain direction; said radiator further having one or more fans with controller for transmission of the heated air directionally; said outlet and inlet of said radiator connected to the inlet and the outlet of said fluid heating and storage tank respectively.

Other aspects and features of present disclosure will become apparent to those ordinarily skilled in the art upon review of following description of specific embodiments of the invention in conjunction with the accompanying figures.

BRIEF DISCRIPTION OF THE DRAWINGS:

In the drawings which illustrate exemplary embodiments of this invention:

Fig.1 is a schematic diagram illustrating the fluid heating and storage tank with double sidewalls;

Fig.2 is a schematic diagram illustrating the fluid heating and storage tank with double bottom walls;

Fig.3 is a schematic diagram illustrating an apparatus for liquid vapor condensing and reclaiming;

Fig.4 is a schematic diagram illustrating another kind of apparatus for liquid vapor condensing and reclaiming;

Fig.5 is a schematic diagram illustrating the heat driven and self-circulation fluid heating and storage system employing a fluid heating and storage tank with double sidewalls and double bottom walls and one solar heat collector;

Fig.6 is a schematic diagram illustrating the heat driven and self-circulation fluid heating and storage system employing a fluid heating and storage tank with double sidewalls and double bottom walls and two solar heat collectors;

Fig.7 is a schematic diagram illustrating the heat driven and self-circulation fluid heating and storage system employing a fluid heating and storage tank with double sidewalls and double bottom walls and two liquid heaters;

Fig.8 is a schematic diagram illustrating the heat driven and self-circulation fluid heating and storage system employing a fluid heating and storage tank with double sidewalls and double bottom walls and one solar heat collector and a radiator;

DETAILED DISCRIPTION

The fluid heating and storage tank 10 in Fig.1 is a water tank. It has an interior container 111 comprising sidewall 112, a top cap 113, a bottom cap114 to form an enclosed space 110 for a first fluid, which is water. The tank has a cold water inlet 131 and a hot water outlet 132, a release valve 133 at the top (it may at the sidewall too), a drain valve 135 and one electric power heater 136. Of cause two electric power heaters can be provided if it is necessary.

A column-shaped (or other shaped) second layer wall 115 is arranged outside of the interior container 111. Its top cap (here is a ring) 117 is mounted at the sidewall of the tank and its bottom 118 is under the bottom edge 116 of the interior container. Such that the container 119 or second space is enclosed by the bottom cap and sidewall 112 of the interior container, outer wall 115, ring 117 and bottom cap 118. The second container is for the second fluid, which is a liquid e.g. water or ethylene glycol etc.

At the second wall the inlets 121 and 123, outlets 122 and 124 are arranged for a secondary fluid. The outlet 122 and 124 are not higher than the outlet 121 and 123 to sure the self-circulating of the heated liquid. At the bottom cap of second wall there are may some struts 128 and 129 are provide to support the interior container for the second wall.

The heat of the container 119 is transferred to the fluid in the interior container 111 through the sidewall 112 and the bottom cap114. So that the material of the interior-container needs to be a heat conductive material e.g. copper, aluminum, stainless steel or steel plated glass or porcelain enamel.

A breathing channel extends upwardly from the top port 125 and it is connected to the breathing fitting 126 at the top of the tank.

A second fluid condensing and reclaim apparatus 51 is connected at the fitting 126. Fig.3 is a schematic diagram illustrating the apparatus 51.

The apparatus 51 is an airtight container. It has a top 511 and a bottom 512 and sidewall 513. An inlet pipe 52 having its one end extending upwardly from the bottom into the container and is mounted to the bottom of the container. In Fig. 3, the inlet pipe 52 is a hollow bolt. Its opposite end 522 can be revolved directly into the breathing fitting at the top of the tank.

A flexural U-shaped pipe 53 (it may be many other shape pipes, e.g. W-shaped etc.) extends its one end 531 from the sidewall of the container 51 into the container and under the tope wall 511. Its upper end is spaced from the top wall. The other parts including its lower part of the pipe are located outside of the tank. The pipe extents its opposite end downwardly first and then upwardly. So that the opposite end of pipe 53 is facing upwardly and its lower part 533 is located near to the bottom of the container.

Referring to Fig. 4, an alternative fluid vapor condensing and reclaiming apparatus is illustrated. Except U-shaped tube 63, other parts of this second embodiment are similar to apparatus 51 described above. The reference numerals in this drawing are changed from the first digital 5 to 6. Otherwise the construction is similar to apparatus 51 described above.

A U-shaped tube 63 extends upwardly its one end 634 from the bottom 612 of the container 61 into the container and under the top wall 611. There is a gap between the end and the top wall. In Figure 6, the apparatus provides the breathing for the liquid due to expansion and contraction. A small amount of condensed liquid is retained at the bottom part of the apparatus 61, which prevents further vapor from escaping into the atmosphere through the U-shaped tube 63.

Fig.4 is a schematic diagram illustrating another kind of apparatus for liquid vapor condensing and reclaiming. The feature of above mentioned container is to condense the liquid vapor in the container and let the condensed liquid returns to the heater. Usually any inside wall of a container at the temperature less than 100 degree can make the vapor condensing. Usually any metal, e.g. plastic, glass or polymeric material, can be used for making the container. When the system and environment temperature is high, in order to speed up the condensing processing, some condensing pieces may be installed in the container (did not shown in the Fig.3 and 4). The flexural pipe 63 also needs to make the vapor condense in the tube. Furthermore, at the U shaped lower part of the pipe a few condensed liquid can be stored temporary to block the escaping of the escaped vapor. The flexural pipe can be made of many different materials e.g. glass, metal, plastic, polymeric material etc. The shapes of the pipe are flexible, e.g. U shaped, W shaped or the like in which the bottom part of the pipe can store some condensed liquid. Transparent pipes may be used to provide visible monitoring of the condensed liquid.

One of the main concerns for an operating heat driven self-circulating fluid heating and storage tank e.g. solar heating system is the fluid vaporizing and the vapor escaping through the breathing port. It may result a fail of the system operation. The application of the above introduced apparatus for fluid condensing and reclaiming resolves this problem completely. Usually the container of the apparatus are made of transparency materials, e.g. transparent glass, plastic or polymeric materials, thus the liquid level of the heat exchanger can be visually monitored, and the more liquid can be added through the breathing port if it is necessary.

When the position of the secondary bottom wall is moved upwardly until it is connecting to the edge of the first bottom wall, the tank becomes a fluid heating and storage tank with double sidewalls. Fig.5 also illustrates the operation situation of a tank with double side walls but without double bottom wall.

There are two spare bolt caps for closing the unused inlet and outlet and one spare bolt cap for closing the unused breathing fitting. If necessary, all the breathing ports can be closed. In this case, the tank can be used as a regular tank with heat exchanger or used with self-power pump or electric pump.

Fig.2 is schematic diagram illustrating the fluid heating and storage tank with double bottom walls, which is a columned water tank 20. The columned sidewall 201, coronary top cap 202 and bottom cap 203 form a closed space 21 for primary fluid, which can be water. The sidewall 201 extends from the bottom edge 206 and forms a new extended sidewall 204. The sidewall 204 together with the first bottom wall 203 and the second bottom wall 205 enclose a second space 22 for the secondary fluid which can be water or a antifreeze e.g. glycol etc. On the sidewall 201 of the tank, there are two pipes 208 and 209 arranged in 180° relative to one another. Their lower ends 221 and 222 extended respectively through the sidewall and into the second space 22. The other ends 223 and 224 extended upwardly around the sidewall and are connected to a three-way pipe joint. The upper end of the three-way pipe extends to the top of the tank. The third port of the three—way pipe is for connecting to the heater of secondary fluid. The two tubes 208 and 209 may be other kinds of channels. For example they may be two slots to cling at the surface of the sidewall. One end of these tubes extends into the second space and the opposite end extends to the top of the tank. For the rust protection purpose, the inside of the channels need to plat glass or porcelain enamel. Alternatively, the tubes or channels may be arranged inside of the tanks. The ends of the pipes or channels also may be located at some locations under the top of the tank. The angle of the two pipes 208 and 209 on the sidewall of the tank may also be located at 90 degrees or other selected angles.

At the sidewall near the bottom, the outlets 212 and 214 of the secondary fluid are arranged. Fig. 5 also shows that the second space of the tank is separated into two left and right sub-spaces by a clapboard 207. The liquids in these two sub-spaces are isolated. There are two separated sub-liquid systems in the second space. This kind of the system is used for two kinds of heaters in the two sides of the tank. Especially it is used for the system wherein one heater requires the forced circulating. For example, first heater is a solar heater and second heater is another energy heater which needs a forced circulating, e.g. earth energy or air energy. For using some r energy source, e.g. biomes energy, gas energy and fossil fuel energy, if there is no need of a forced circulation, the secondary liquid system may either separated or not separated. Correspondingly the breathing ports 223 and 224 can be connected to the atmosphere by two ports or either one (e.g. 224) of two ports, when the other port is closed by a spare cap.

When the two heaters connected to the tank are both solar heat collector, the clapboard in the second space of water tank may not necessary. Then the top ends of two pipes are opened

It can be understood by those skilled in the art that many common elements, for example, release valve, drain valve, protective anode and one or two electric heater(s) etc may also provided in the tank. Further more, a heat insulation layer and a crust outside of the tank wall may be provided. All of these elements are shown in Fig. 1. Please refer to Figure 1.

Fig.6 is a schematic diagram illustrating the heat driven and self-circulation fluid heating and storage system employing a fluid heating and storage tank with double sidewalls and double bottom walls and two solar heat collectors. Even both solar heat collectors in Fig.6 are plate solar heat collectors. But each of them can be any kind of the solar heat collector, for example, the plate solar heat collector (with or without the heat tube), Vacuumed tube solar heat collector (with or without the heat tube) and U-shaped solar heat collector etc.

The solar heat collector 760 in Fig.6 has a secondary fluid inlet 7611 and outlet 7612. The first conduit 762 is connected its one end to inlet 422 of the tank and an opposite end to the outlet 7611 of the solar heat collector 761. The one end of second conduit 763 is connected to the outlet of the tank and the opposite end 7632 to the inlet of solar heat collector 760. The second solar heat collector 780 has similar connection arrangement.

Based on the application requirement, two couple inlet and outlet, 721/722 and 723/724 may be arranged at the sidewall in any angle from 90-180 degree. When the heat driven self-circulated liquid heating system is used as building elements, for example as a unit element of the roof, fence, veranda etc, the units with two solar heat collectors arranged in 180 degree are the plane unit of building walls, fences and verandas. The units with two solar heat collectors arranged in 90 degree are the corner units.

As a building component unit, the heat driven and self-circulating solar heating and storage system should be and can be a compacted component. In Fig. 6, when the solar heat collectors are moved close to the fluid heating and storage tank and make the solar heat collector's sizes larger, a compacted solar heating and storage system will be find.

Similar to those shown in Fig. 5, each of the two couple of inlet/outlet ports is in a plumb line. However, the angle of the solar heat collector may be oriented to an obliquity (i.e. not 90 degree) angle to the surface of the earth. Even if the inlet and out ports are in a plumb line, we still can adjust the arrangement of connecting conduits 762, 763,782and 783 to let the solar heat collector to be at an obliquity angle (not 90 degree) to the surface of the earth for receiving a point-black amount of sun light. It is also possible to arrange the entire unit of the solar heat collector and the tank to stay at an oblique angle to the earth. In this case the tank is catty-cornered. To protect the fall, the support of the system needs a special design.

After installation, the heat driven self-circulating solar heating and storage system 90 comes into being two fluidly separated but heat connected liquid spaces. The first space is the interior container of tank 70 which may be filled with the liquid to be heated e.g. water, air or other fluids. The second space is formed by the interlayer 719, two conflux tubes of the two solar heat collectors, connecting conduits and the inner space of the apparatus for fluid condensing and reclaiming 51. This close-loop system connects to the atmosphere indirectly through the U-

shaped tube 63. After the system is installed, the system will be filled with the heat conductive liquid, e.g. water or glycol. The liquid level in the tank will be lower than the breathing fitting.

When the sunlight irradiation heats the liquid in the solar heat collectors 760 and 780, the liquid in the conflux tubes 761 and 781 (within the heat insulation which is not shown in the Figure) is heated and tends to flow upwardly. The heated liquid flows through the connecting conduit 762 into the interlayer 719, and the heated liquid transfers its heat to the liquid in the tank through the sidewall and bottom wall of the interior container. Then the liquid temperature drops and the volume of the liquid also drops too. Through the outlet 724 and the conduit pipe 763, the cooled liquid flows back into solar heat collector 760 again for being heated. This processing continues in circles to heat the water in the tank by the solar heater. In this process, the solar heat is the only energy source to drive the circulating liquid and to complete the energy exchange. Therefore, no other energy source, e.g. electric power, is required except the solar heat. In this process, when the sunlight is stronger, the heat circulation will be faster, whereas the heat circulating is slower, when the sunlight is weaker. When there is no sunlight, the heat circulating will terminate completely. It is not necessary to provide additional controller for controlling the liquid circulation. This head driven system has the functions of self-driven, self-control and self-circulating.

When the system is in operation, the breathing port 725 serves several important functions. First it releases the pressure in the system caused by the heated liquid expansion for keeping the system pressure closes to the atmospheric pressure. It also provides a space for the liquid's breathing (namely, expansion and contraction) so as to facilitate the self –circulating operation. When the heater is in operation, the heated liquid causes some liquid and vapor to flow into the container 51. The part of the vapor is cooled and condensed in the container 51, and then is returned to the heat exchanger. Some vapor may escape into the U-Shaped tube and then change into liquid, which will stay in the lower part of the tube. The gathered liquid in the tube blocks the further escape of vapor and would enhance further vapor to condense in the tube. When the heater stops working, the liquid in the container 51 and interlayer 719 cools down and contracts, so that the system generates a negative pressure to reclaim all the liquid gathered in the U-shaped tube to be drawn back into the heat exchanger. Even though the space storing the heat liquid is connected to the atmosphere directly or indirectly, the system working temperature is high, but the loss of the secondary liquid through vaporizing is not significant. Accordingly the system operates continuously and safely.

For the space or other reasons, sometimes the solar heating system may be equipped with single solar heat collector only. In this case, the solar heat collector 780 may be removed and the spare inlet and outlet ports 421 and 423 are closed as shown in Fig.5. In another alternative, we can also replace the single solar heat collector by another type of heater operated with another energy source.

Based on the above-mentioned description, the tank in Fig.5 and Fig. 6 can be replaced by a tank with double layers of sidewalls or double layers of bottom walls.

Fig. 7 illustrates a heat driven self-circulating liquid heating and storage system 11 using a tank 10 with double layer sidewalls and bottom walls. Comparing to Fig. 5, a solar hear collector 760 and a other energy source heater. The system illustrated shows a nature gas heater.

The tank 10, solar heat collector 760 and the connections between it and the tank are the same as shown in Fig.6. Here the nature gas heater 1100 is a central vacant cylinder (or other shaped e.g. taper, square etc) metal (or ceramic etc) tank. There is a second liquid inlet 1106 provided at the bottom wall and a conduit connects the inlet with an outlet 124. At the upper (or top) sidewall there is a secondary fluid outlet 1105, which is connected to an inlet 123 of the tank through conduit 1107. A valve 1109 mounted in series to the tube 1107 is operative for turning off the gas supply when the heater is out of service. A similar valve may also be connected to the bottom conduit for the same purpose. The cover 1113 is for sheltering from the spark occurring in the heater.

The gas heater 1100 has a outer wall 1101 and a interior 1102 and heat insulation 1103 (not show in the figure). The secondary fluid is stored in the space enclosed by interior and outer walls, top and bottoms caps. The interior chamber 1104 has a gas burner 1110 which is supplied the gas by gas pipe 1111. There is a control valve 1112 for adjusting the gas supply.

When the system is in operation, the nature gas burns in the chamber 1104 of the heater to heat the inside wall 1102, thus the liquid, of the heater 1100 (there may be protective coat for heat insulation and corrosion protection). The heated liquid passes through the outlet 1105 and conduit 1107 to reach in the interlayer 119 of the tank. After the secondary liquid has transferred the heat to the water in the tank, the secondary liquid returns to the heater 1100 through the outlet of the tank. This processing is similar to the solar heat collector.

For a heat driven self-circulating fluid heating and storage system with a solar heat collector and another heater having another energy source, its operation is similar to that mentioned in the system with two solar heat collectors.

Even though the second heater shown in Gig. 7 is a nature gas heater, it can also be any alternative kind of non-solar heaters, e.g. fossil fuel (e.g. coal) heater, biomass energy heater, (including biomass gasification heater), nature gas, earth energy and air energy heater. The differences of this kind of the liquid heater is that the heating liquid storage space of this kind of heater is much smaller than any other kind of liquid heater. For example, one metal tube can be the storage container of the liquid to be heated in the heater. For the reason such as heat insulation and corrosion protection e.g. a firebrick or a ceramic protective layer may be provided. Further more, this heater can be a heater of earth or air heat energy. Because these kinds of the heaters usually need the forced circulation, so the heaters need a separator (e.g. separator 207 in Fig.2) to separate the liquid into two sub-systems. In this case, only the sub-system connected to the solar heat collector has a breathing port. Another sub-system either has no breathing port or the port is closed with a spare cap.

Fig. 8 illustrates the heat driven self-circulating fluid heating and storage system 130 with a heat appliance (here is a radiator). The system includes a solar heater 760, a radiator and a liquid heating and storage tank 10 with double sidewalls and double bottom walls. In Fig. 8, the tank 10

and radiator and their connections are same as the embodiment shown in Fig.7. The radiator includes a fin pipe 771 (it also can be a coil tube, helix tube, straight tube or a flat heat exchanger etc). Two pipes connect inlet 773 and outlet 774 of the radiator to the inlet 123 and the outlet 124 of the tank respectively. Two valves 777 and 778 are for separating the radiator with the tank when necessary.

Solar heat collector 760 receives solar energy and transfers it to the tank 10, so the temperature in the tank is higher than the temperature of the surrounding air. When heated air is required, the valve 777 and 778 of the tank are opened, so that the hot water circulates into valve 777 and go through fin tube 771 to emit warm air there from. After the emission of warm air , the cold water then goes through valve 778 to returns to the bottom of the tank 10. In order to increase the amount of heated air generating and to send the air to a planned direction, a cover 772 with an active window 770 may be provided. (as shown in the figure 8, the window is opened upwardly. The cover 772 has an inlet 779 for the air to be heated. In fact the direction of the window can be varied. One or more fans may be provided in the cover to speed up the heat pervasion from the fin tube. (the fans did not show in the figure). If a canal is added to the window of cover 772, the heated air can be transferred to a desire location (the canal did not show in the figure).

It can be note that the fitting 123 of the tank is an inlet when it is connected to a heater, but when it is connected to a radiator, it becomes an outlet, while the fitting 124 is an outlet when it is connected to a heater, but it becomes an inlet when it is connected to a radiator,.

It is also possible to install the radiator or other heat appliances in a heat driven and self-circulating system with two solar heat collectors or with one solar hear and one other heat source. In this case, the fluid heating and storage tank need three couple inlets and outlets.

While the present invention has been shown and described in the preferred embodiments thereof, it will be apparent that various modifications can be made therein without departing from the spirit or essential attributes thereof, and it is desired therefore that only such limitations be placed thereon as are imposed by the appended claims.

WHAT IS CLAIMED IS:

1. A fluid heating and storage tank with two layer walls and two storage spaces comprising:

a first container for a primary fluid enclosed by a first layer wall having a primary fluid inlet and a primary fluid outlet;

a second container for a secondary fluid which is a liquid and enclosed by a second layer wall, said second layer wall together with part of said first layer wall of said first container forming an inside space;

said first container being in fluid isolation from said second container, therefore said primary fluid is in fluid isolation from said secondary fluid;

a first inlet, a first outlet, a second inlet and a second outlet for secondary fluid arranged at said second layer wall of said second container; said first inlet and said second inlet being located not lower than said first outlet and said second outlet;

at least one breathing fitting arranged at said fluid heating and storage tank and being located higher than said first inlet and said second inlet of said second container for connecting said inside space of said second container to atmosphere directly or indirectly selectively;

at least one secondary fluid vapor condensing and reclaiming apparatus connected to said breathing fitting.

2. The fluid heating and storage tank according to claim 1, having an interior sidewall and an outer sidewall, and wherein

said first container is an interior container in the form of a columniform container having a side wall, a top wall, and a bottom wall;

said second container is an outer container, in the form of a tube-shaped container, and said second layer wall of said second container being larger than said first layer wall of said interior container and being mounted at upper and lower edgings therein to said first layer wall of said interior container;

said secondary fluid having a liquid level located lower than the top of said second container;

said breathing fitting being arranged at said second layer wall of said second container.

3. The fluid heating and storage tank according to claim 1, having double layer bottom walls, and wherein

said first container is an airtight container having a columniform with said primary fluid enclosed in an upper part of said tank;

said secondary fluid is enclosed by a top wall and a bottom wall, wherein said top wall is a bottom wall of said first container, and said bottom wall is a downwardly extended sidewall from a sidewall of said fist container;

two breathing fittings are arranged at said fluid heating and storage tank; and

a first channel of said secondary liquid extending upwardly in one end at said first inlet of secondary fluid at said second container for connecting an opposite end therein to a lower end of a first three-way channel; and said three way channel having an upper end connected to said first breathing fitting and a third end for connecting to a secondary liquid outlet of a first heater;

a second channel of said secondary liquid extending upwardly in one end at said second inlet of secondary fluid at said second container for connecting an opposite end therein to a lower end of said second three-way channel; said three way channel having an upper end connected to said second breathing fitting and a third end for connecting the outlet of a second heater.

4. The fluid heating and storage tank according to claim 1 having double layer sidewalls and double layer bottom walls, and wherein

said first container is an interior container in the form of a columniform container having a first layer wall, a top wall, and a bottom wall;

said second container is a tube-shaped outer container having a second layer wall and a bottom wall larger than and enveloping said first layer wall and bottom wall of said interior container respectively; and a second layer top wall mounted at edging to said first layer wall of said interior container;

said secondary fluid having a liquid level located lower than the top of said second container.

5. The fluid heating and storage tank according to claim 1, 2, 3 or 4 further comprising a release valve, a drain valve, a protective anode and at least one electric heater selectively.

6. The fluid heating and storage tank according to claim 1, 2, 3 or 4 wherein said outer layer wall is made of a material selected from the group consisting of: plastic, ceramic, copper, stainless steel, steel plated with porcelain enamel, and glass; said outer layer wall having selectively a columniform, oblong, and oval shape; and is heat insulated and with a crust.

7. The fluid heating and storage tank according to claim 1, 2, 3 or 4 wherein said first layer wall is made of heat conductive metals selected from the group consisting of: copper, stainless steel, steel plated with porcelain enamel, and steel plated with glass.

8. The fluid heating and storage tank according to claim 1, 2, 3, or 4 wherein said first outlet and said second outlet are positioned diametrically opposite to one another on said second layer wall first inlet and said second inlet are also positioned diametrically opposite to one another on said second layer wall, and said first inlet and said second inlet having an inlet couple connected thereto and said first outlet and said second outlet having an outlet couple connected thereto, and said inlet couple being extending outward in two directions perpendicular to one another.

9. The fluid heating and storage tank according to claim 1, 2, 3, or 4 wherein said first outlet and said second outlet are arranged on said second layer wall in positions located orthogonal to one another; and said first outlet and said second outlet are also arranged on said second layer wall in positions located orthogonal to one another; and said first inlet and said second inlet having an inlet couple connected thereto, and said first outlet and said second outlet having an outlet couple connected thereto, and said inlet couple and said outlet couple being extending outwards in two directions perpendicular to one another.

10. The fluid heating and storage tank according to claim 1, 2, 3, or 4 further comprising two back up bolt caps for selectively capping fittings of said first inlet, said first outlet, said second inlet, and said second outlet, and two back up bolt caps for selectively capping said breathing fittings.

11. The fluid heating and storage tank according to claim 1, 2, 3, or 4 further comprising a separating plate, mounted within said inside space of said second container for separating said inside space containing said secondary fluid into two sub-spaces for isolating the secondary fluid in said two sub-spaces from one another; couples provided for connecting to said first inlet, second inlet, first outlet and second outlet respectively being arranged at a second wall of said two sub-spaces; and said breathing fitting being arranged at a top wall of said two sub-spaces.

12. The fluid heating and storage tank according to claim 3 wherein said channel for said secondary fluid is selectively a conduit attached to or a slot formed at said first layer wall of the fluid heating and storage tank.

13. The fluid heating and storage tank according to Claim 1, form a part of a heat driven self-circulating system, further comprising

a heater for heating said secondary fluid, said heater having a connection inlet and a connection outlet, said connection inlet being located not lower than said connection outlet;

a first conduit having its one end connected to said connection outlet of said heater and an opposite end connected to said first inlet of said fluid heating and storage tank,

a second conduit having one end connected to said connection inlet of said heater and an opposite end connected to said first outlet of said fluid heating and storage tank;

two caps being provided for closing said second inlet and said second outlet of said fluid heating and storage tank.

14. The fluid heating and storage tank according to Claim 1, form a part of a fluid heating and storage system, further comprising:

a first heater for said secondary fluid; said first heater having a secondary liquid inlet and a secondary liquid outlet; and said secondary liquid inlet being located not higher than said secondary liquid outlet;

a second heater for said secondary fluid; said second heater having an additional secondary liquid inlet and an additional secondary liquid outlet; and said additional secondary liquid inlet being located not higher than said additional secondary liquid outlet;

a first conduit having one end connected to said secondary liquid outlet of said first heater and an opposite end connected to said first inlet of fluid heating and storage tank and being located not lower than said secondary liquid outlet of first heater;

a second conduit having one end connected to said secondary liquid inlet of said first heater and an opposite end connected to said first outlet of said fluid heating and storage tank;

a third conduit having one end connected to said additional secondary liquid outlet of said second heater and an opposite end connected to said second inlet of said fluid heating and storage tank and being located not lower than said additional secondary liquid outlet of said second heater;

a forth conduit having one end connected to said additional secondary liquid inlet of said second heater and an opposite end connected to said second outlet of fluid heating and storage tank.

15. The fluid heating and storage tank according to Claim 1, forms a part of a fluid heating and storage system, further comprising:

a heater for heating said secondary fluid and having an inlet and an outlet, said inlet of said heater being located not higher than said outlet of said heater;

a heat radiator, having a inlet and a outlet;

a first conduit having one end connected to said outlet of said heater and an opposite end connected to said first inlet of said fluid heating and storage tank, and being located not lower than said outlet of said first heater;

a second conduit having one end connected to said inlet of said heater and an opposite end connected to said first outlet of said fluid heating and storage tank;

a third conduit having one end connected to said inlet of said heater and an opposite end connected to said second outlet of said fluid heating and storage tank;

a forth conduit having one end connected to said outlet of a heat radiator and an opposite end connected to said second inlet of fluid heating and storage tank; said second inlet of said fluid heating and storage tank being located not higher than said outlet of said fluid heating and storage tank.

16. The fluid heating and storage tank according to claim 13, 14 or 15 wherein said heater for heating said secondary fluid is a solar heat collector chosen from the group consisting of: a plate solar heat collector, a plate solar heat collector with heat tubes, a vacuumed tube solar heat collector, a vacuumed tube solar heat collector with heat tubes, and a U shaped pipe solar heat collector.

17. The fluid heating and storage tank according to claim 13, 14 or 15 wherein said heater is a heater using another energy source other than solar energy, and said heater comprising:

an airtight container for a secondary fluid and having a lower inlet and an upper outlet for said secondary fluid and being located in a heat insulator; said airtight container having said another energy source located at a lower and inner part of the heat insulator for heating the fluid in said airtight container;

said airtight container being made of a heat conductive material chosen from the group consisting of: a ceramic, a glass and cooper, a glass and steel; and said airtight container being of a cylindraceous shape and tubiform shape selectively; and

said another energy source including energy derived from the group consisting of: fossil fuel, biomes, nature gas, earth, air and electricity selectively.

18. The fluid heating and storage tank according to claim 13, 14, 15, 16 or 17 wherein said heater for heating said secondary fluid comprising a power pump for pumping said secondary fluid; said second container for said secondary liquid having at least one space being connected to said heater.

19. The fluid heating and storage tank according to claim 13, 14, 15 or claim 16 including at least one solar heat collector forming solar heating module units for various building elements.

20. The fluid heating and storage tank according to claim 15 wherein said heat radiator, comprising:
a heated air generator having a fluid radiator having a set of tubes and an inlet and an outlet for said secondary fluid with at least one control valve; said radiator having a crust with a window for directing heated air to a selected direction; said radiator further having at least one fan therein with controller for transmission of the heated air directionally; said outlet and said inlet of said radiator being connected to said first inlet and said first outlet of said fluid heating and storage tank respectively.

21. A fluid heating and storage system comprising:
a fluid heating and storage tank with two layer walls and two spaces comprising:

a first container for a primary fluid enclosed by a first layer wall having a primary fluid inlet and a primary fluid outlet;

a second container for a secondary fluid which is a liquid and enclosed by a second layer wall, said second layer wall together with part of said first layer wall of said first container forming an inside space;

said first container being in fluid isolation from said second container, therefore said primary fluid is in fluid isolation from said secondary fluid;

a first inlet, a first outlet, a second inlet, and a second outlet for secondary fluid, arranged at said second layer wall of said second container, said first inlet and said second inlet being located not lower than said first outlet and said second outlet respectively;

at least one breathing fitting arranged at said fluid heating and storage tank and being located higher than said first inlet and said second inlet of said second container, for connecting said inside space of said second container to atmosphere directly or indirectly selectively;

at least one secondary fluid vapor condensing and reclaiming apparatus connected to said breathing fitting.

22. The fluid heating and storage tank according to Claim 1, 2, 3 or 4 wherein said secondary fluid vapor condensing and reclaiming apparatus is selected from the group consisting of:

an airtight container for capturing heated liquid and vapor from said second container, and said airtight container having a base and a top, and an inner tool for condensing said heated liquid and vapor; a breathing pipe having one end extending upwardly into said airtight container and being mounted at a bottom end therein to said airtight container and having an opposite end connected to said breathing fitting at said fluid heating and storage tank; a flexural pipe extending upwardly into said airtight container and having an end therein located within the airtight container and being located lower than an interior top side of said airtight container and also having an opposite end located outside of said airtight container for condensing a vapor portion of said heated liquid and vapor to a condensed liquid and temporarily storing said condensed liquid for reclaiming;

an inside wall of said second container;

a condensing piece;

a flexural pipe; and

a transparent tub.

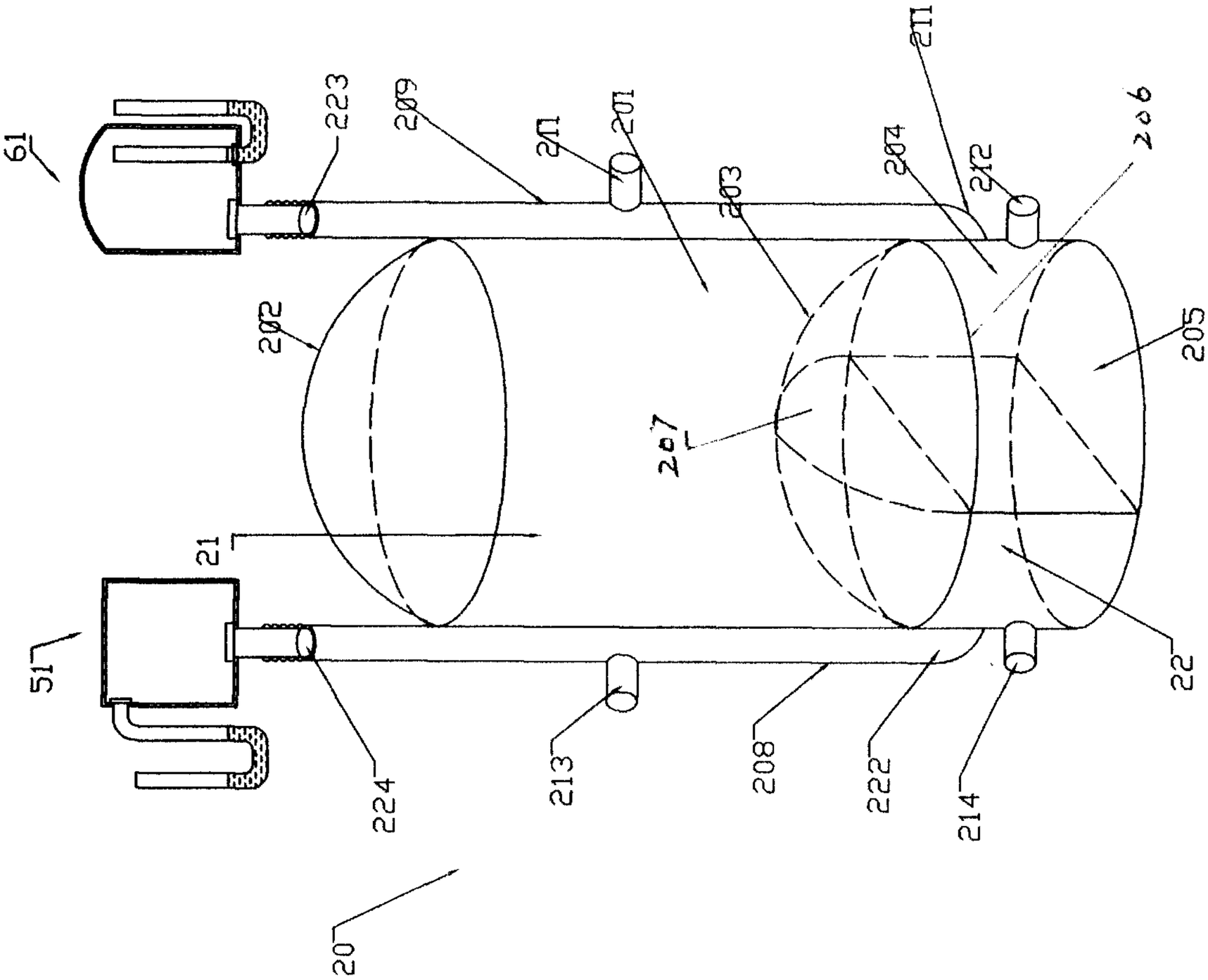
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FIG. 2

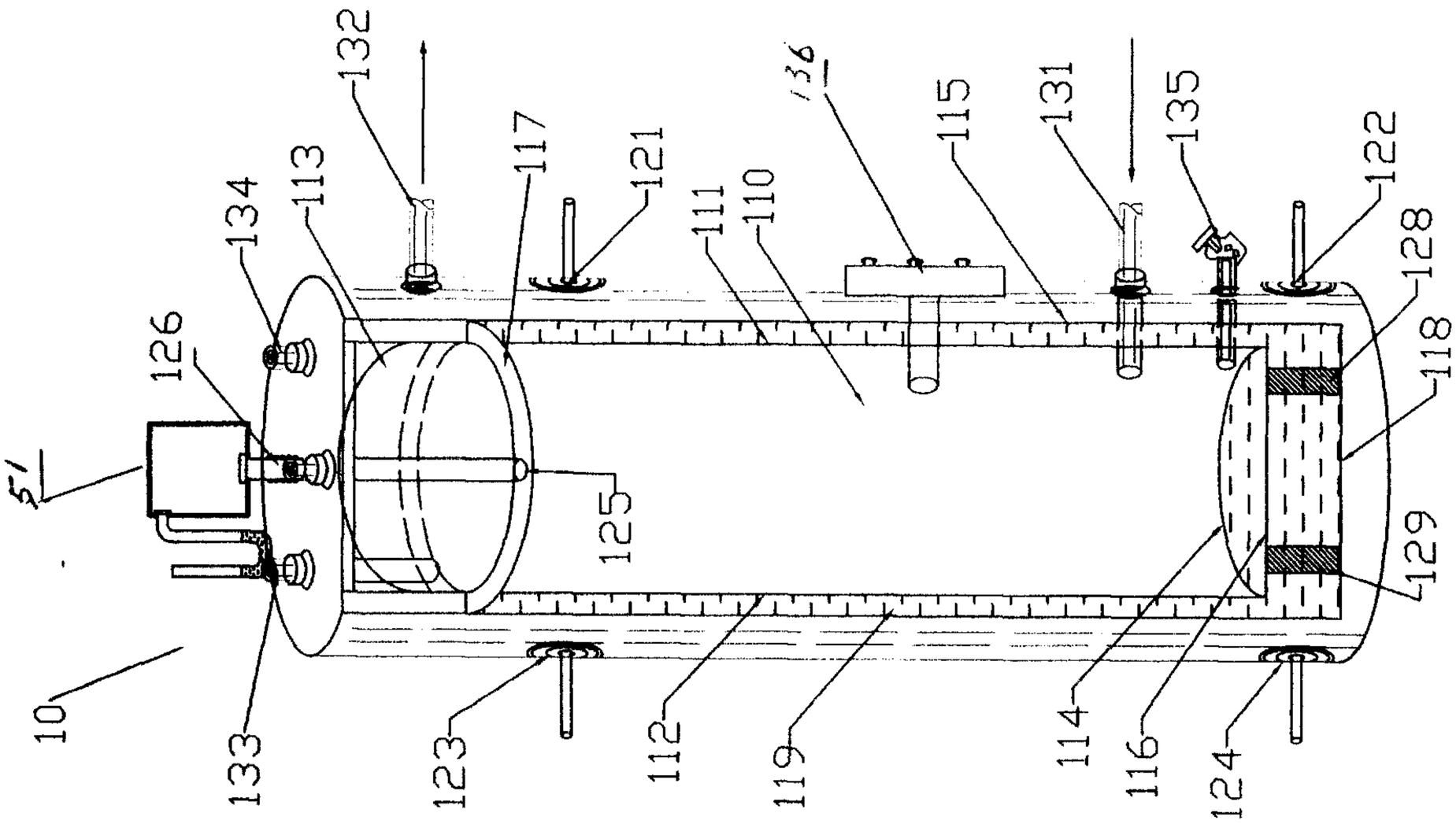
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FIG. 1

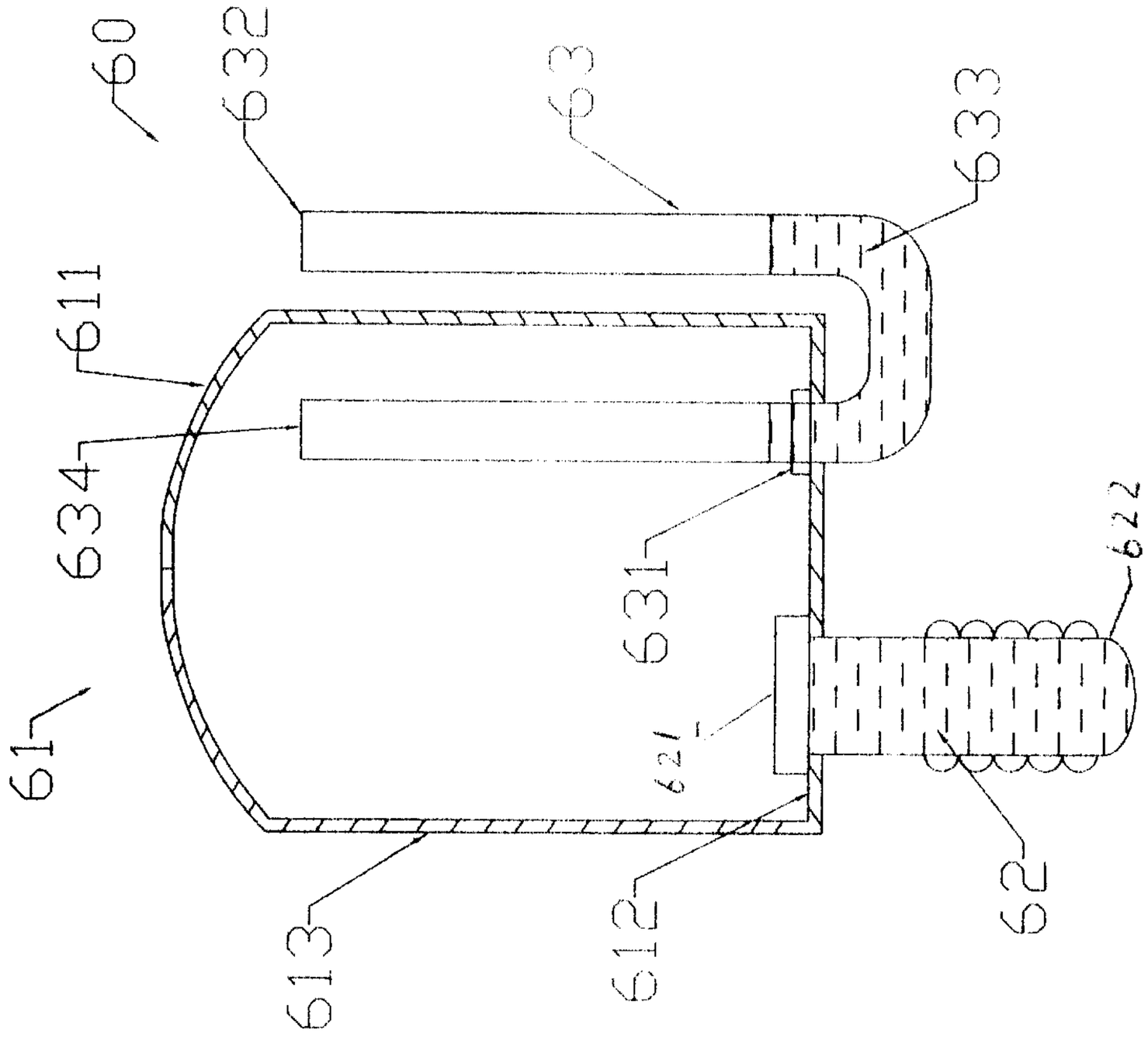
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FIG. 4

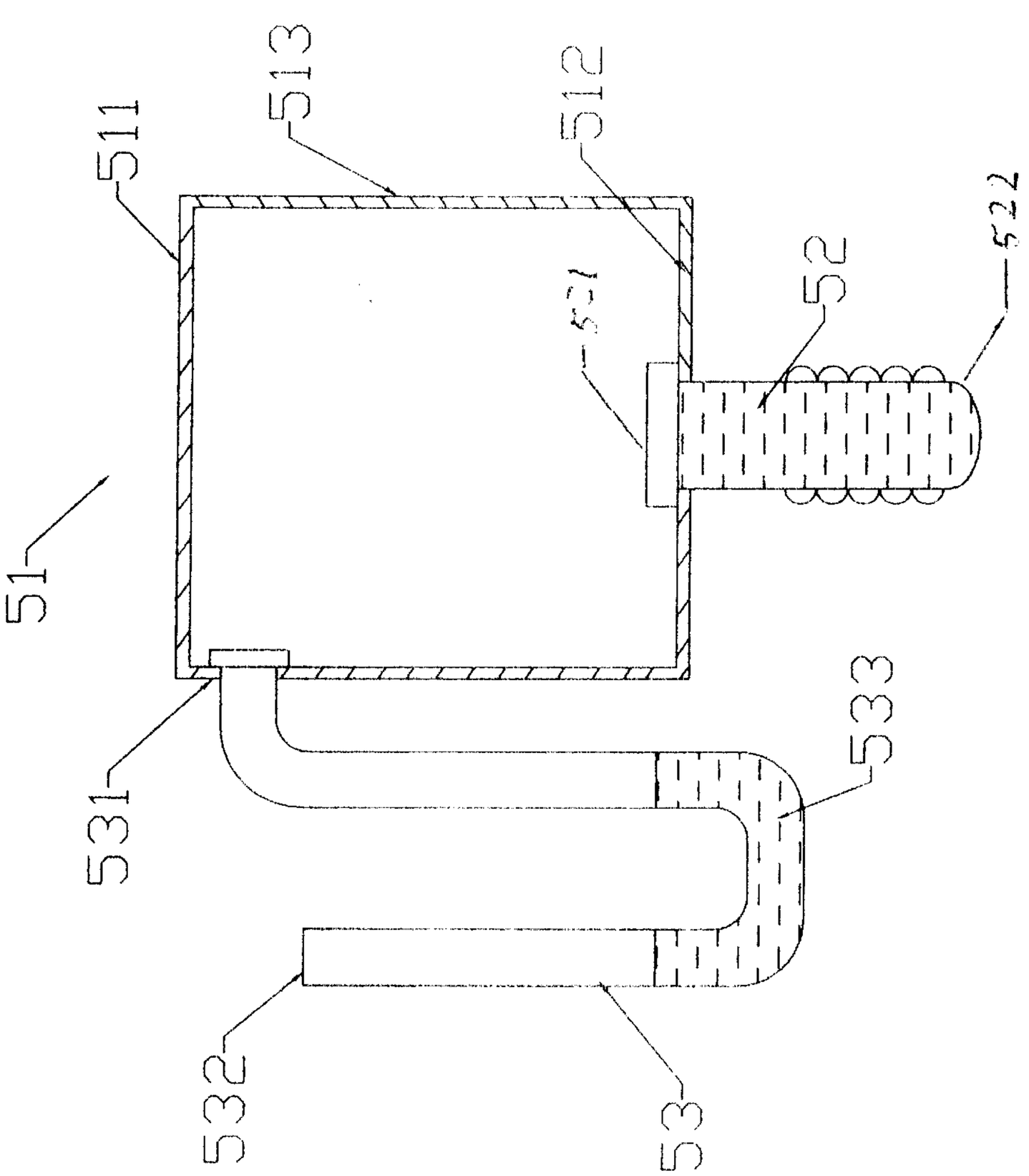
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FIG. 3

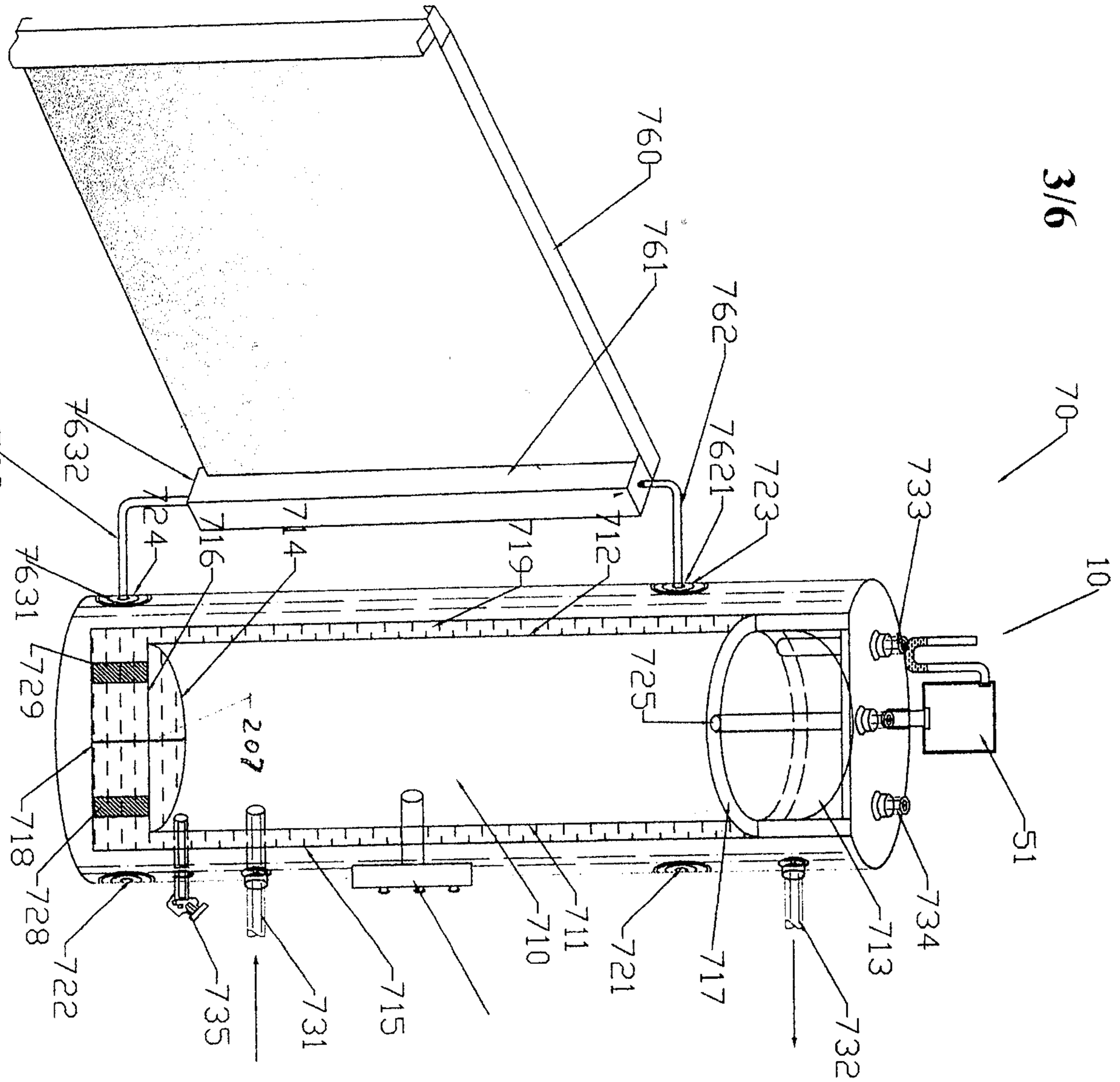
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FIG. 5

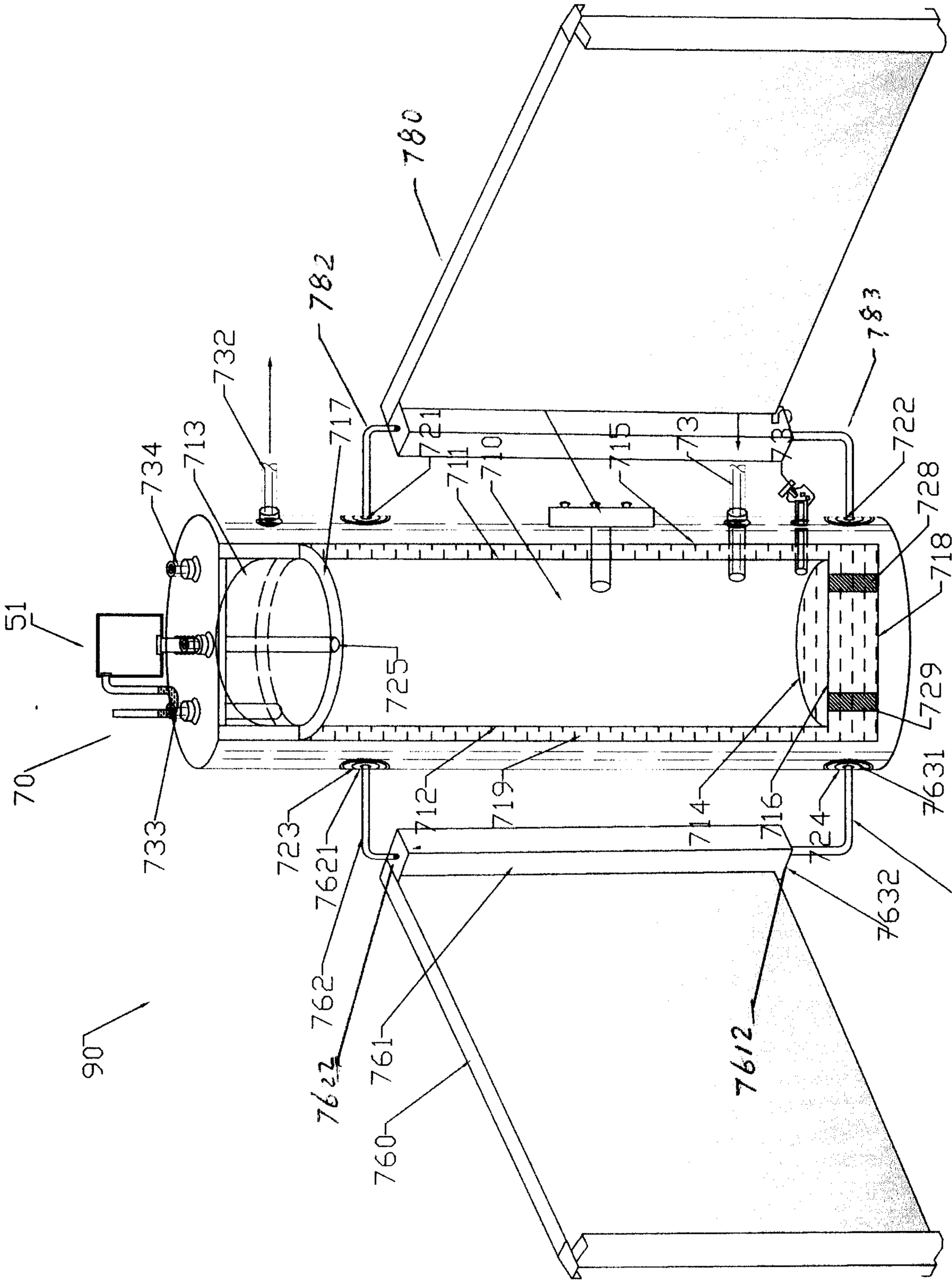
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FIG. 6

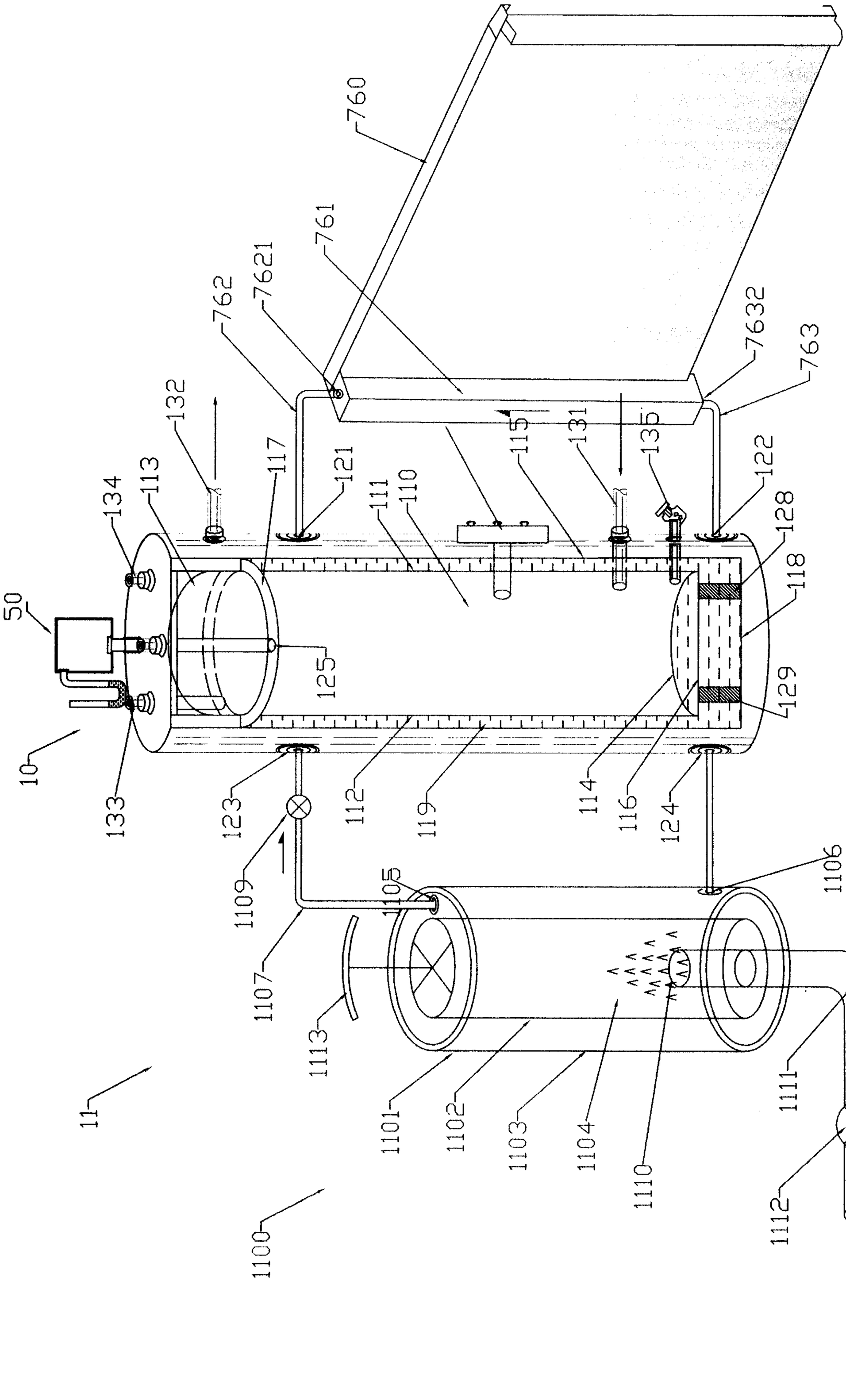
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FIG. 7

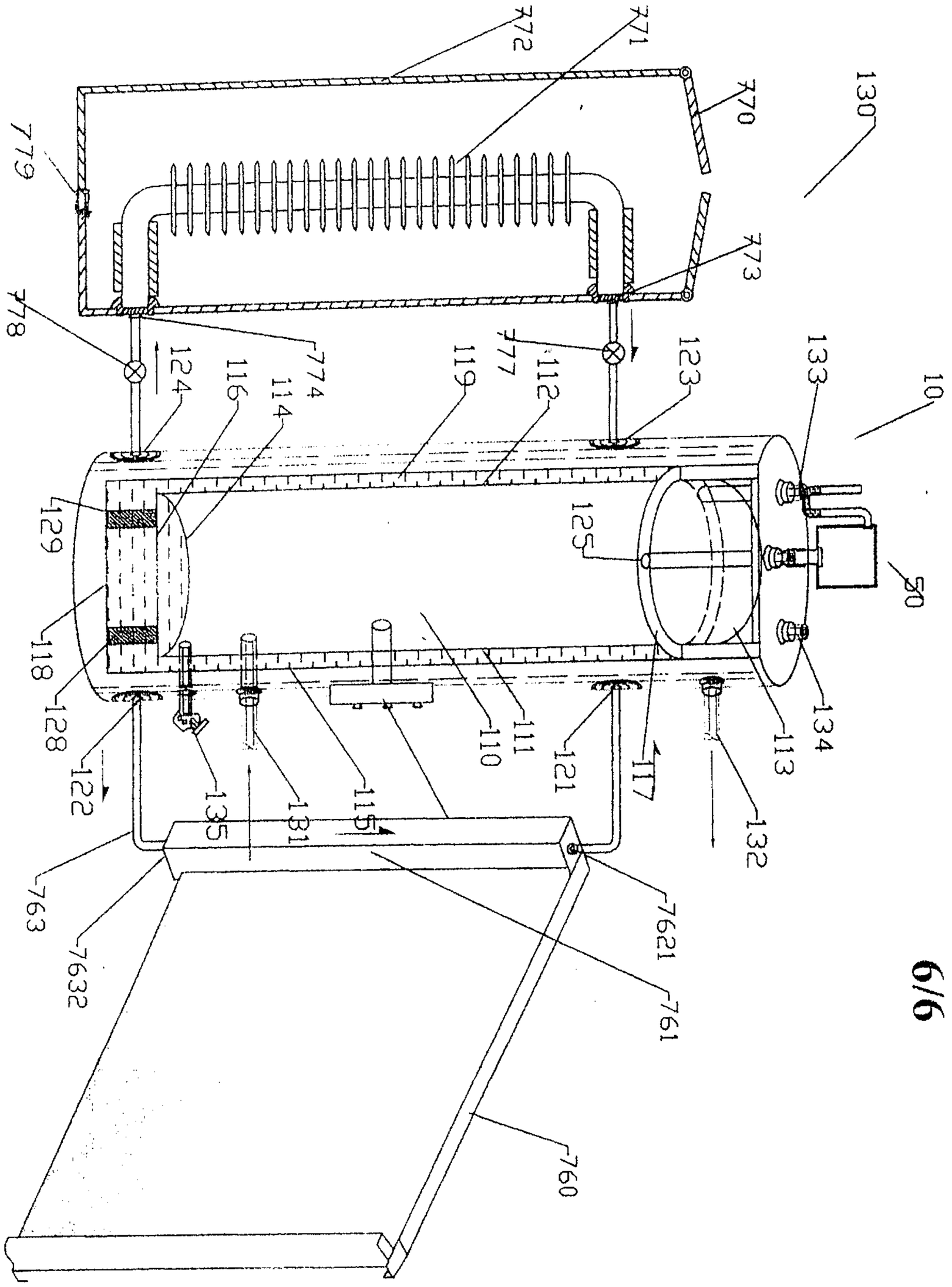
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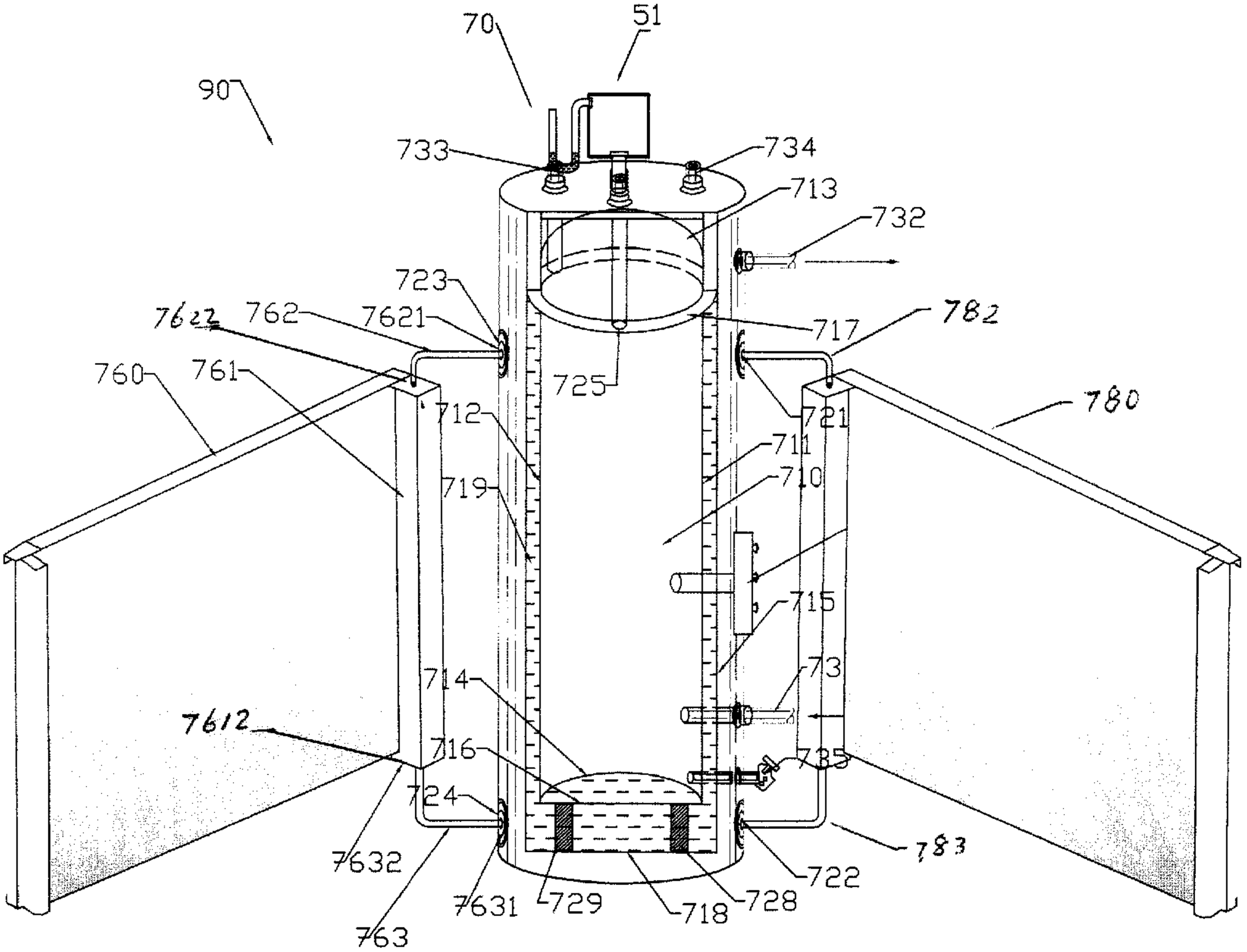
FIG. 8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