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Declarations under Rule 4.17:

- as to the identity of the inventor (Rule 4.17(i))
- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
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[Continued on next page]

(54) Title: SOLAR COOKING APPLIANCES

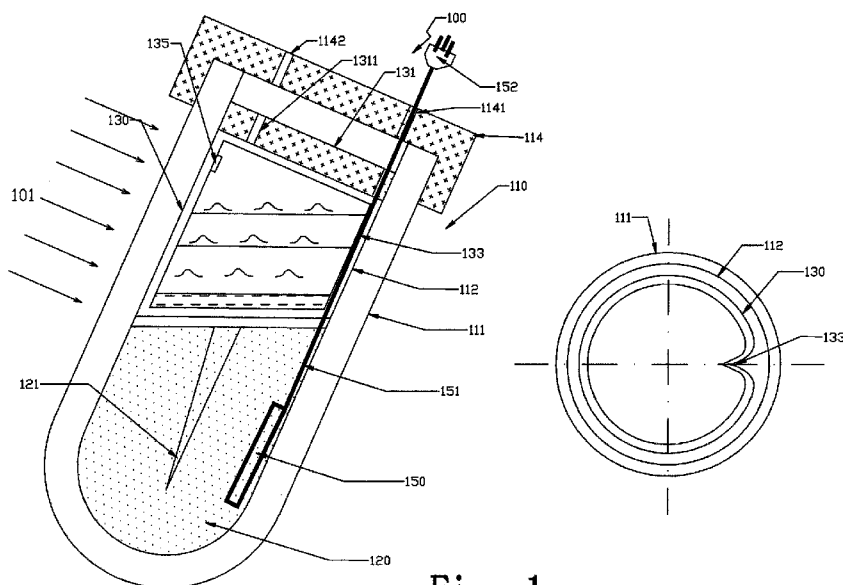


Fig. 1

(57) Abstract: A set of solar cooking appliances comprising a solar heat collector to collect and store solar heat, a heat storage and conducting material partially filling said solar heat collector and a set of solar cooking utensils, where each utensil is sized to fit a shape and size of the internal shape and size of the solar collector. The utensil having an inner wall which is heatingly connected the heat storage and conducting material to transfer heat to said inner wall. The utensil having a removable part for opening and closing said utensil during cooking.



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## SOLAR COOKING APPLIANCES

### FIELD OF TECHNOLOGY

**[0001]** The present disclosure relates to solar heat application field, especially related to solar cooking appliances to cook the food in the solar heat collector.

### BACKGROUND

**[0002]** For all kinds of existing energy sources in the earth, solar energy is the most widespread, the richest and the most uniformly distributed energy source. Solar energy can be used very easily. It is available every day, everywhere and for every body.

**[0003]** For all kinds of human energy consuming activities, cooking food and beverage is the most often activity and has the longest history. Every body in anywhere needs to cook the foods every day.

**[0004]** It is very interesting and valuable topic to use solar energy for food cooking. There are many efforts in this field. (Please refer to the existing patents).

**[0005]** The solar power on a unit earth area is not very large. The solar radiation intensity is varied from North to South and from morning to afternoon. It depends on the weather and is also different in four seasons, so that to develop an economic solar cooking appliance is always a challenge and need continue efforts.

**[0005]** In view of these difficulties, some solar cooking appliances tried to make the sunlight receiving area as large as possible. But the heat insulation for the received heat is difficult. Some solar cooking appliances follow and focus the sunlight using expensive automation system and need additional power to run the system. Some solar cooking appliances also use the heat storage materials. The materials may be expensive and not easy to get.

**[0006]** The present disclosure absorbs the historic experience and combines the new solar water heating technologies and developed a set of economic and practicable solar cooking appliances.

### SUMMARY

**[0007]** The object of this disclosure is to improve the existing technologies and provide a set of solar cooking appliances that is economy, easy to manufacture and use and high efficient. The invention takes following steps to overcome the difficulties of applying solar energy for food cooking:

**[0008]** To use the evacuated solar heat collector for optimum heat collecting;

**[0009]** To filled heat storage and conducting material in the evacuated solar heat collector for storing and saving heat to provide a continue and stable cooking heat;

**[0010]** A light reflector focuses the surrounding light to the cooking appliances;

**[0011]** A sundial indicates the light direction, an adjustable and rotatable fixing and supporting trestle allows to receiving the highest solar power;

**[0012]** A electric power supply provides a backup power source when the solar power is not enough. Further more, the solar cooking appliances also provide backup or energy storage equipment at low electricity price period for cooking at electric power outage.

**[0013]** Following are the detailed summary of present disclosure.

**[0014]** In accordance with one aspect of the present disclosure there is provided a set of solar cooking appliances, comprising: a solar heat collector wherein the solar heat is collected and stored, further more food is cooked or heated inside, said solar heat collector having a removable part for covering during cooking; the heat storage and conducting material that partially filled in said solar heat collector; a set of solar cooking utensils, each said utensil having the size and shape to fit the internal size and shape of the solar heat collector for a closed heat connection with the inner wall of said solar heat collector and also with said heat storage and conducting material within said solar heat collector; each said utensil having a removable part for closing said utensil during cooking; an utensil is located in said solar heat collector during cooking; and the necessary accessories that including a fixing and supporting trestle with a rotatable base and adjustable incidence angle that arrange and support the each part of the solar cooking appliances at a proper situation; the light reflecting object and a cone bar attached to the solar heat collector perpendicularly to show the angle of sun light;

**[0015]** The said solar heat collector is a evacuated-tube solar heat collector; or a group of modular evacuated-tube solar heat collectors that mounted in a certain shape, e.g. in parallel row, in full or partial cone-shaped column, etc; the said heat storage and conducting material can be a solid material, or a liquid material or a chemical or change head storage materials, or the combination of two or more materials mentioned above. The said heat conducting material can be a heat tube, or a heat conductor. For safety reason, transparent cover or evacuated toughened-glass tube solar heat collector are suggested.

**[0016]** In accordance with another aspect of the present disclosure there is provided a set of solar cooking utensils, each of said utensil is a cylinder container made of stainless steel, that is located in an evacuated-tube solar heat collector, having a removable and detachable handle at the inner wall; said container having a diameter near but not bigger than the inner diameter of said evacuated-tube solar heat collector; a pleated structure on the wall of said container from the top to the bottom to provide a gap and patch for air exchange and allow a minor adjustable diameter for said container. These utensils can be

a solar coffee/tea maker, a steamer, a solar cooking fryer; a cooking wok or pot, a boiler, a cooking pan etc.

[0017] In accordance with another aspect of the present disclosure there is provided a set of solar cooking appliances that mainly use the solar heat, but use electricity as a backup, comprising, a solar heat collector wherein the solar heat is collected and stored, further more food is cooked or heated inside, said solar heat collector having a removable part for covering during cooking; the heat storage and conducting material that partially filled in said solar heat collector; a set of solar cooking utensils, each said utensil having the size and shape to fit the internal size and shape of the solar heat collector for a closed heat connection with the inner wall of said solar heat collector and also with said heat storage and conducting material within said solar heat collector; each said utensil having a removable part for closing said utensil during cooking; an utensil is located in said solar heat collector during cooking; and the necessary accessories that including a fixing and supporting trestle with a rotatable base and adjustable incidence angle that arrange and support the each part of the solar cooking appliances at a proper situation; the light reflecting object and a cone bar attached to the solar heat collector perpendicularly to show the angle of sun light; a electric heat element with power supply and a measuring, indication and controlling systems for the solar cooking appliance's operating characteristic parameter, e.g. timing, temperature, pressure, moisture etc.

[0018] Other aspects and features of the present disclosure will become apparent to those ordinarily skilled in the art upon review of the following description of specific embodiments of the invention in conjunction with the accompanying figures.

#### BRIEF DISCRPTION OF THE DRAWINGS

[0019] In the figures which illustrate exemplary embodiments of this invention:

[0020] Fig. 1 is a schematic diagram illustrating a evacuated-tube solar cooking appliances in vertical section and cross section view;

[0021] Fig. 2 is a set of solar cooking appliances is illustrated schematically in a perspective view;

[0022] Fig. 3 illustrates schematically a set of exemplary solar heat collectors in vertical section view;

#### DETAILED DESCRIPTION

[0023] Referring to Fig.1, an evacuated-tube solar cooking appliances are illustrated in vertical section and cross section view during use.

[0024] A set of solar cooking appliances 100 includes a solar heat collector 110, the heat storage and conducting material 120, a heat conducting medium 121, a solar cooking

utensil 130, a removable part 114 of 110 and a removable part 131 for 130, and a electric heat element 150 with power supply.

**[0025]** Solar heat collector may be any kind of solar heat collector that can heat the heat storage and conducting material 120 to the temperature higher than the water boiling temperature. In this case, the solar heat collector 110 is an evacuated-tube solar heat collector. It may also is a group of modular evacuated-tube solar heat collectors that mounted in a certain shape, e.g. in parallel row, in full or partial cone-shaped column as its one of the examples shown in Fig 2. The solar heat collector 110 has a removable part 114 with two holes 1141 and 1142. The hole 1141 is a path of power cable and air. The hole 1142 is to continue the hole 1311 for releasing of cooking steam.

**[0026]** The evacuated-tube solar heat collectors 110 has transparent outer layer 111 and inner layer 112. It is evacuated in between. The inner layer 112 has a heat absorbing coating that does not show in the Fig 1. The evacuated-tube solar heat collector 110 has the same material and manufacture processing as the evacuated-tube solar heat collector that used for solar water heating. But the evacuated-tube solar heat collector used in solar cooking has a larger diameter and a shorter length comparing to the regular evacuated-tube.

**[0027]** The evacuated-tube solar heat collector 110 is made of glass. In case the glass tube is broken, the glass piece is dangers for the user. So the solar heat collector has a transparent plastic cover for safety reason. (not shown in Fig. 1). The transparent plastic cover can be either the mantles for each tube or a protective cover for an entire collector panel. But the plastic protective mantles may reduce the efficiency of the solar heat collector. So an evacuated toughened-glass tube solar heat collector is a better solution.

**[0028]** The heat and conducting material 120 in this case is salt or quartz sand for storing the solar heat and transferring heat to the cooking utensil 130. In fact, many kinds of the materials can be used as the solar heat storage and conducting material. For example, they are solid materials such as salt and sand, liquid material, such as water and oil including cooking oil and petroleum products; phase change material, such as paraffin and metals. The cook takes place in the tube wherein utensil is located, so the food safety needs to put special attention. In this invention, we prefer the salt, quartz or basalt sand, cooking oil and large piece of metal. For the heat conducting materials, except the materials mentioned above, metal or alloy conductors and heat tube are suggested.

**[0029]** In Fig.1 there is another heat conducting material 121. In this case, this is a copper conductor in T shape inserted in the heat storage and conducting material 120 for faster transferring the solar heat to the cooking utensil 130. The conductor 121 can be any other heat conductivity conductor or a heat tube. The heat conducting material 121 is not a necessary component. In many cases, without the heat conducting material 121, the solar cooking appliances work well.

**[0030]** The cooking utensil 130 is a cylinder container located inside of solar heat collector 110 upper the salt or sand 120. It made of stainless steel. The cooking utensil

130 has a removable part 131 with a hole 1311, it is a stopper inserted in the cooking utensil 130. The utensil has a diameter near but not bigger than the inner diameter of the evacuated-tube solar heat collector 110. A pleated structure 133 is on the wall of the container from the top to the bottom to provide a gap and patch for air exchange and power cable 151. Furthermore it allows a minor adjustable diameter for the container 130. The cooking utensil 130 further includes a removable and detachable handle 135 at the inner wall for removing the utensil 130 from the solar heat collector 110.

**[0031]** In Fig.1, the utensil 130 is a food steamer. Three layers of steam basket are arranged in the utensil upper the water in the bottom. The food is cooked on the steam basket. In fact, the cylinder container, i.e. the utensil 130, can be many kinds of the utensils. We can have a set of cylinder containers for different cooking purposes. For example, second container can have water and coffee or tea for cooking. It is a solar coffee/tea maker. Third container can have a wire mesh container to hold food when frying and drain them after cooked. It is a solar cooking fryer. Fourth container can have a whisker net made of several curved and intersecting steel wires used to press the food sheets close to the inner wall of container for roasting or baking. Fifth container can back and roast breads and cookies. Of cause, if in the container food and water are arranged for braising or boiling. It is a cooking wok or pot. Based on above descriptions, it is believed that other modifications to the utensils used in this solar heat collector 110 will be apparent to those skilled in the art and, therefore, the invention is defined in the claims.

**[0032]** A removable part 114 covers the top of solar heat collector 110. It has two holes 1141 and 1142. The first hole 1141 connects to said gap and path for air exchange and power cable 133. The second hole 1142 continues the hole 1311 in the stopper 131 of the container 130. The stopper may be a plant fibril cork with an air gap or a hole.

**[0033]** The electric heat element 150 with power supply is a very low power electric heat element. It located under the cooking utensil 130 and within heat storage and conducting material 120. A power cable 151 has very high resistive heat temperature that connects the electric heat element 150 to power supply plug 152 outside of the solar heat collector 110, through the path formed by a pleated structure 133 on the walls of the utensil 130. The electric heat element 150 may further includes a measuring, indicating and controlling systems for the solar cooking appliance's operating characteristic parameter, e.g. timing, temperature, pressure, moisture etc. These equipments are not shown in Fig. 1. The electric heat element with power supply can be removed from the set of cooking appliance. In this case the set of solar cooking appliances is still a complete cooking appliances that use solar heat as only energy source. Fig. 3 shows the solar heat collectors without electric heat element.

**[0034]** Some time the evacuated-tubes are mounted in a raw for cooking several foods at the same time.

**[0035]** Refer to Fig. 2, a set of solar cooking appliances 200 is illustrated schematically in a perspective view. Five evacuated tube solar heat collector 201, 202, 203, 204 and 205 are mounted in a parallel raw.

**[0036]** A fixing and supporting trestle 206 arranges and supports the five solar heat collectors at the proper locations and situations. The movable support 207 allows the adjustment of the incidence angle of the solar heat collector 210 to the sunlight. Four wheels 241, 242, 243 and 244 are installed in the four bottom corners of the supporting trestle 206 for adjust the direction of the solar heat collector 210. (243 and 244 are not shown in Fig.2). A sundial (not shown in Fig. 2) is a cone bar. It attaches to the solar heat collector 210 perpendicularly for indicating the incidence angle of sunlight;

**[0037]** A light reflecting object (not shown in Fig. 2) is equipped under the evacuated-tube for focusing the surrounding sun light to the solar heat collector;

**[0038]** When the solar light shines on the solar heat collector 210, the cooking processing in each utensil is the same as the processing mentioned in Fig. 1. We'll not repeat it again.

**[0039]** Referring to Fig. 3, a set of exemplary solar heat collectors are illustrated schematically in vertical sections.

**[0040]** Fig. 3 A is a schematic vertical section view of an evacuated-tube solar heat collector partially filled with liquid heat storage and conduction material, e.g. water or oil. In some cases, water can also be a heat transferring medium for food cooking.

**[0041]** Fig. 3 B is a schematic vertical section view of an evacuated-tube solar heat collector partially filled with solid heat storage and conduction material, e.g. ore stone or turves.

**[0042]** Fig. 3 C is a schematic vertical section view of an evacuated-tube solar heat collector partially filled with sand and having a heat tube or a heat conductor as the heat transferring medium.

**[0043]** Fig. 3 D is a schematic vertical section view of an evacuated-tube solar heat collector partially filled with a combination of solid and liquid heat storage and conducting materials, e.g. quartz sand and cooking oil;

**[0044]** Fig. 3 E is a schematic partial vertical section view of a group of modular evacuated-tube solar heat collectors that mounted in a vertical parallel raw;

**[0045]** Fig. 3 F is a schematic partial vertical section view of a group of modular evacuated-tube solar heat collectors that mounted in a horizontal parallel raw;

**[0046]** When set up a solar cooking appliance, not only these kinds of solar heat collectors but also more kinds of their varieties and combinations can be selected and used.

**[0047]** Based on the detailed description of the samples, other modifications will be apparent to those skilled in the art and, therefore, the invention is defined in the claims.

## I CLAIM

1. A set of solar cooking appliances, comprising:

A solar heat collector wherein the solar heat is collected and stored, further more food is cooked or heated inside, said solar heat collector having a removable part for covering during cooking;

The heat storage and conducting material that partially filled in said solar heat collector;

A set of solar cooking utensils, each said utensil having the size and shape to fit the internal size and shape of the solar heat collector for a closed heat connection with the inner wall of said solar heat collector and also with said heat storage and conducting material within said solar heat collector; each said utensil having a removable part for closing said utensil during cooking; an utensil is located in said solar heat collector during cooking; and

The necessary accessories;

2. The said solar heat collector, according to claim 1, that is a evacuated-tube solar heat collector;
3. The said solar heat collector, according to claim 1, that is a group of modular evacuated-tube solar heat collectors that mounted in a certain shape, e.g. in parallel row, in full or partial cone-shaped column, etc;
4. The said evacuated-tube solar heat collector, according to claim 2 and claim 3, that is a evacuated toughened-glass tube solar heat collector;
5. The said evacuated-tube solar heat collector, according to claim 2 and claim 3, further comprising a transparent plastic protective mantle for safety reason;
6. The said heat storage and conducting material, according to claim1, that is a solid material, e.g. salt or quartz sand;
7. The said heat storage and conducting material, according to claim1, that is a liquid material, e.g. cooking oil or water;
8. The said heat storage and conducting material, according to claim1, that is a phase change head storage materials, e.g. paraffin or multi-H<sub>2</sub>O chemical;
9. The said heat storage and conducting material, according to claim1, that is a combination of two or more heat storage and conducting materials, e.g. colza oil in quartz sand or bean oil with basalt sand;

10. The said heat conducting material, according to claim 1, comprising metal conductor, e.g. copper or heat conductive alloy;
11. The said heat conducting material, according to claim 1, comprising a heat tube;
12. A set of solar cooking utensils, according to claim 1, each of said utensil is a cylinder container made of stainless steel, that is located in an evacuated-tube solar heat collector, having a removable and detachable handle at the inner wall; said container having a diameter near but not bigger than the inner diameter of said evacuated-tube solar heat collector; a pleated structure on the wall of said container from the top to the bottom to provide a gap and patch for air exchange and allow a minor adjustable diameter for said container;
13. A cylinder container, according to claim 12, comprising a solar coffee/tea maker wherein water and coffee or tea are arranged for making coffee or tea.
14. A cylinder container, according to claim 12 comprising a steamer wherein one or more perforated baskets in parallel suspended in the container and having water in the bottom of the container for water steam to cook food.
15. A cylinder container, according to claim 12 comprising a solar cooking fryer wherein a wire mesh container to hold food while frying and drain them after cooking.
16. A cylinder container, according to claim 12, wherein comprising a whisker net made of several curved and intersecting steel wires used to press the food sheets close to the wall of said container for roasting or baking.
17. A cylinder container, according to claim 12, comprising a cooking wok or pot wherein food and water are arranged for braising or boiling.
18. A cylinder container, according to claim 12, comprising a solar cooking pan wherein one or more small frying pan(s) in parallel suspended in the container for fry, sauté or brown foods.
19. The removable part of a solar heat collector, according to claim 1, that is a stopper, e.g. a plant fibril cork with an air gap or a hole;
20. The removable part for covering, of a cooking utensil according to claim 1, comprising two holes, wherein the first hole connected to said gap and path for air exchange, according to claim 12, the second hole continues the hole in the stopper of the container.
21. The said accessories, according to Claim 1, comprising a fixing and supporting trestle that arranges and supports the each part of the solar cooking appliances at a appropriate position;

22. The said fixing and supporting trestle, according to Claim 21, comprising a structure that allows the adjustment of the incidence angle of the solar heat collector to the sun light;
23. The said fixing and supporting trestle, according to Claim 21, comprising a structure that allows the adjustment of the direction of solar heat collector to the sun light, e.g. a rotatable base;
24. The said accessories, according to Claim 1, comprising the light reflecting object that focuses the surrounding sun light to the solar heat collector;
25. The said accessories, according to claim 1, comprising a sundial, e.g. a cone bar attached to the solar heat collector perpendicularly to show the angle of sun light;
26. The said accessories, according to claim 1, comprising a bag and/or membrane for wrap up or cover the food in the solar cooking appliance, e.g. metal, paper or plastic bag and/or membrane;
27. The said accessories, according to claim 1, comprising a suitcase, wherein the solar cooking appliances are arranged and packaged to form a potable solar cooking appliances;
28. A set of solar cooking appliances, comprising:

A solar heat collector wherein the solar heat is collected and stored, further more food is cooked or heated inside, said solar heat collector having a removable part for covering during cooking;

The heat storage and conducting material that partially filled in said solar heat collector;

A set of solar cooking utensils, each said utensil having the size and shape to fit the internal size and shape of the solar heat collector for a closed heat connection with the inner wall of said solar heat collector and also with said heat storage and conducting material within said solar heat collector; each said utensil having a removable part for closing said utensil during cooking; an utensil is located in said solar heat collector during cooking;

An electric heat element with power supply; and

The necessary accessories;

29. The said an electric power heat element with power supply, according to claim 28 comprising:

a very low power electric heat element located under the cooking utensil and within heat storage and conducting material; a power cable having very high resistant heat temperature, that connects the electric heat element to power supply plug outside of the solar heat collector, through the path formed by a pleated structure on the walls of the containers, according to claim 12;

30. The said an electric power heat element with power supply, according to claim 28 further comprising: a measuring, indicating and controlling system for the solar cooking appliance's operating characteristic parameter, e.g. timing, temperature, pressure, moisture etc;

**AMENDED CLAIMS**

received by the International Bureau on 03 January 2011 (03.01.11)

**I CLAIM**

1. (Currently Amended) A solar cooking appliance, comprising:

a solar heat collector to collect and store solar heat,

a solid heat storage and conducting material partially filling said solar heat collector, wherein said solar heat collector can heat said solid heat storage and conducting material to a temperature higher than the water boiling temperature;

a solar cooking utensil located within the solar heat collector, wherein said solar cooking utensil is sized to fit a size and shape of the internal size and shape of the solar heat collector, and said utensil having a wall which is thermally connected to the internal wall of the solar heat collector and the solid heat storage and conducting material to transfer heat to the utensil, and said utensil having a removable part for opening and closing said utensil.

2. (Currently Amended) The solar cooking appliance according to claim 1, wherein said solar heat collector is selected from an evacuated-tube solar heat collector and a plurality of modular evacuated-tube solar heat collectors.

3. (Cancelled)

4. (Currently Amended) The solar cooking appliance according to claim 2, wherein said evacuated-tube solar heat collector comprises an evacuated toughened-glass tube solar heat collector or a transparent plastic protective mantle for safety reason.

5. (Cancelled)

6. (Currently Amended) The solar cooking appliance according to claim 1, wherein said solid heat storage and conducting material is selected from a group of salt, sand, a quartz sand, a solid chemical material, a solid multi- H<sub>2</sub>O chemical material, a basalt sand, a heat conductor

made of metal, a copper, a heat conductive alloy, and a combination of these heat storage and conducting materials.

7. (Cancelled)
8. (Cancelled)
9. (Currently Amended) The solar cooking appliances according to claim 1, wherein said solid heat storage and conducting material is selected from the group of a combination of two or more said solid heat storage and conducting materials, said solid heat storage and conduction material containing a few liquid material, wherein said liquid material can be heated to a temperature higher than the water boiling temperature.
10. (Currently Amended) The solar cooking appliances according to claim 9, wherein said solid heat storage and conducting material is selected from the group of the quartz sand a few colza oil and basalt sand a few bean oil.
11. (Cancelled)
12. (Currently Amended) The solar cooking appliance according to claim 1, wherein said solar cooking utensil is a stainless steel container, wherein said container having a removable and detachable handle at an internal wall and a pleated structure on a external wall from top to bottom to provide a gap and path for air exchange and allow a minor adjustable diameter for said container.
13. (Currently Amended) The solar cooking appliance according to claim 12, wherein said solar cooking utensil is a coffee and/or tea maker.
14. (Cancelled)
15. (Currently Amended) The solar cooking appliance according to claim 12, wherein said solar cooking utensil further comprises a part selected from the group including:

a fryer with a wire mesh for frying and draining a food,  
a whisker net to press the food to an internal wall of said utensil for food roasting and baking,  
a wok and pot.

16. (Cancelled)

17. (Cancelled)

18. (Currently Amended) The solar coking appliance, according to claim 1, wherein said solar cooking utensil is a pan, wherein one or more small frying pan(s) in parallel suspended in the utensil for fry, sauté or brown a food.

19. (Currently Amended) The solar coking appliance according to claim 1, wherein said solar heat collector further comprises a removable part for opening and closing an open end of the solar heat collector, and said removable part has a hole.

20. (Currently Amended) The solar coking appliance according to claim 1, wherein said the removable part of the solar cooking utensil further comprises a hole.

21. (Currently Amended) The solar cooking appliance according to claim 1, further including one or more of  
a trestle for arranging and supporting the parts of the solar cooking appliances,  
an inclining structure for adjusting angle of said solar heat collector to sunlight,  
a directional structure for adjusting direction of said solar heat collector to sunlight,  
a light reflector to focus surrounding sunlight to the solar heat collector, and  
a sundial attached to the solar heat collector perpendicularly for showing the angle of the sun light.

22. (Cancelled)

23. (Cancelled)

24. (Cancelled)

25. (Cancelled)

26. (Currently Amended) The solar cooking appliance according to claim 1, further comprises a bag and/or a membrane for wrapping or covering a food to be cooked in the solar cooking appliance, wherein said bag and/or membrane is made of a material selected from the group of a metal, a paper, a plastic and their combination.

27. (Currently Amended) The solar cooking appliance according to claim 1, further comprises a suitcase for arranging and packaging the solar cooking appliance to form a portable solar cooking appliance.

28. (Currently Amended) A solar cooking appliance, comprising:

a solar heat collector to collect and store solar heat,

a solid heat storage and conducting material partially filling said solar heat collector, wherein said solar heat collector can heat said solid heat storage and conducting material to a temperature higher than the water boiling temperature;

a solar cooking utensil located within the solar heat collector, wherein said solar cooking utensil is sized to fit a size and shape of the internal size and shape of the solar heat collector, and said utensil having a wall which is thermally connected to the internal wall of the solar heat collector and the solid heat storage and conducting material to transfer heat to the utensil, and said utensil having a removable part for opening and closing said utensil.

an electric heater.

29. (Currently Amended) The solar cooking appliance according to claim 28, wherein said electric heater is selected from a group of

**an electric heater;**

**an electric heater comprising a very low power electric heat element located under the solar cooking utensil and within the solid heat storage and conducting material; a power cable having very high heat resistant temperature connected to an electric heating element via a power supply plug outside of the solar heat collector through a path formed by a pleated structure on the walls of the containers;**

**an electric heater comprising an operating data measuring device and a data indicating device, wherein said operating data is selected from the group of a timing, a temperature, a pressure, a moisture and a hybrid combination of above mentioned data.**

**an electric heater with a controlling system for the solar cooking appliance's operating data, wherein said operating data is selected from a group of a timing, a temperature, a pressure, a moisture and a hybrid combination of above mentioned data.**

**30. (Cancelled)**

**Statement under Article 19(1) (PCT/CA2010/001119)**

Applicant respectfully this Statement under Article 19(1) along with AMENDMENT OF THE CLAIMS.

Applicant has corrected the obvious mistakes in the claims via the claim amendment, such as the errors and mistakes of the typing, wording and grammar including the indefinite claims as stated in Written Opinion Of The International Searching Authority and the Search Report.

Applicant has amended two additional new limitations to further distinguish the current invention from the cited references. Applicant has amended the "heat storage and conducting material" to "solid heat storage and conducting material". The amended claims recite only on the solid heat storage and conducting material. The amendments narrow the scope of the heat storage and conducting materials. Applicant respectfully reiterates the advantages of the current invention application at the followings:

1. The cooking is within a solar heat collector. Most of the solar heat collectors have a very good heat insulation to reduce the heat loss, especially the evacuated tube solar heat collector. It minimizes the heat loss within the solar heat collector since there is no heat exchange loss in heat exchanger and no heat transferring loss in tubes. The efficient of this kind of solar cooking appliances is very high.
2. There is a utensil in the solar heat collector, which can be removed out of the solar heat collector and be cleaned. It is much safer and convenient. The problem caused by water sediment can be solved easily.

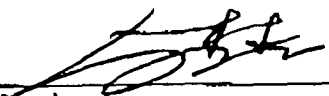
Applicant further respectfully submits that the solid heat storage and conducting material as disclosed in the original application provides following advantages:

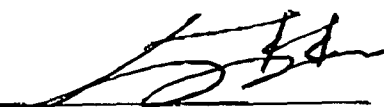
1. **Safety:** Most of the solid materials, especially the claimed salt and sand are very safe to use. There is no fire hazard comparing to the oil as a heat storage and conducting material.
2. **Easy to obtain:** The solid heat storage and conducting material are very easy to obtain. Especially the claimed sand and salt can be obtained almost anywhere worldwide.
3. **Economical:** The cost of the claimed sand and salt is relatively low.

4. Electric heater can be arranged within solar heat collector. It will make the use of the electricity very efficient.
5. High cooking temperature: The claimed solar cooking appliance is capable of working under a temperature much higher than the water boiling temperature, it is capable of supporting all kinds of the cooking styles.
6. Environment friendly: Many claimed solid materials are environment friendly. No pollution concern after use.
7. Easy for maintenance: In the operation there is no material loss caused by evaporation.

Based on above statement, Applicant respectfully submits that the amendments to the claims have no significant affect to the applications and functions of amended solar heat collector. So no significant modification to the application file is required. Some descriptions in the original specification may need to be modified or removed. They are related to liquid and phase change materials (liquid to vapor for example).

Respectfully submitted,

By   
Lin, Huazi

By   
Lin, Huazi (President)  
W&E International (Canada) Corp.

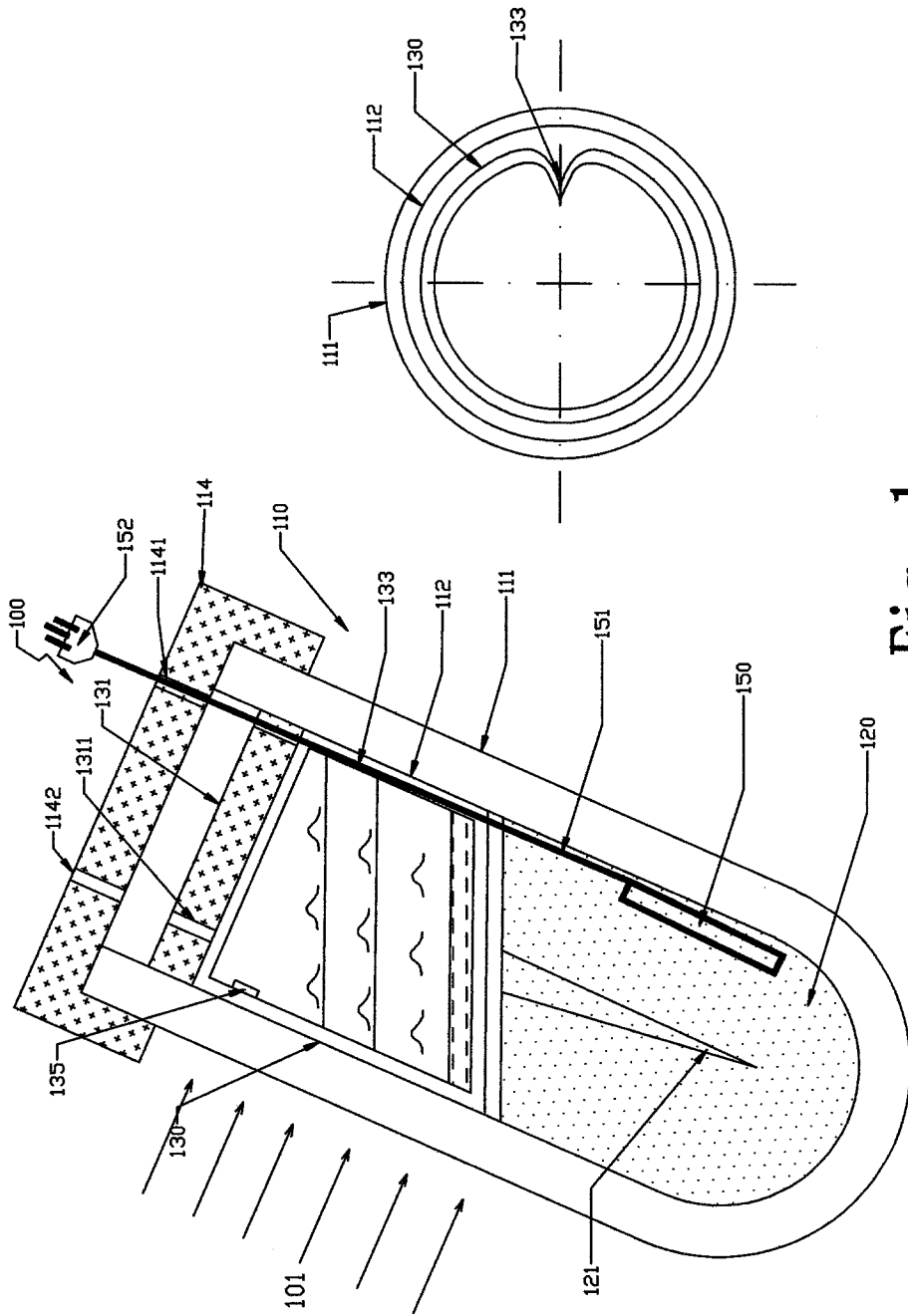


Fig. 1

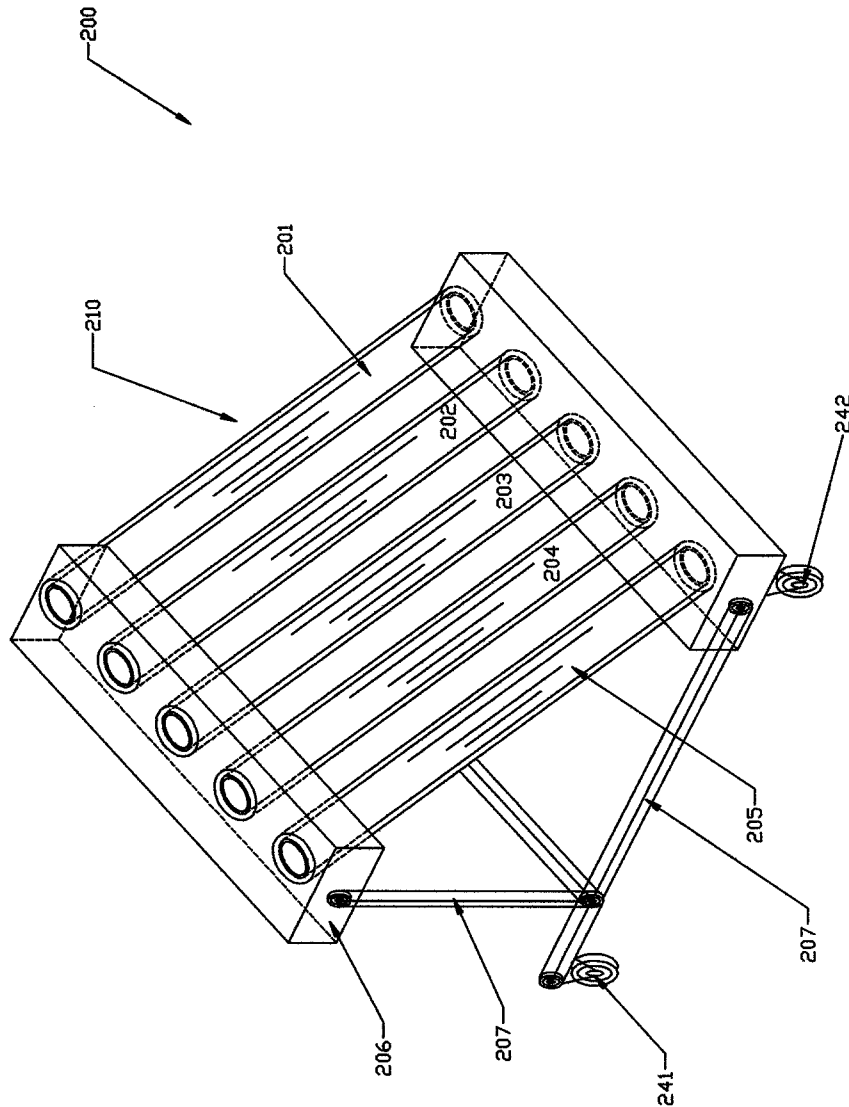


Fig. 2

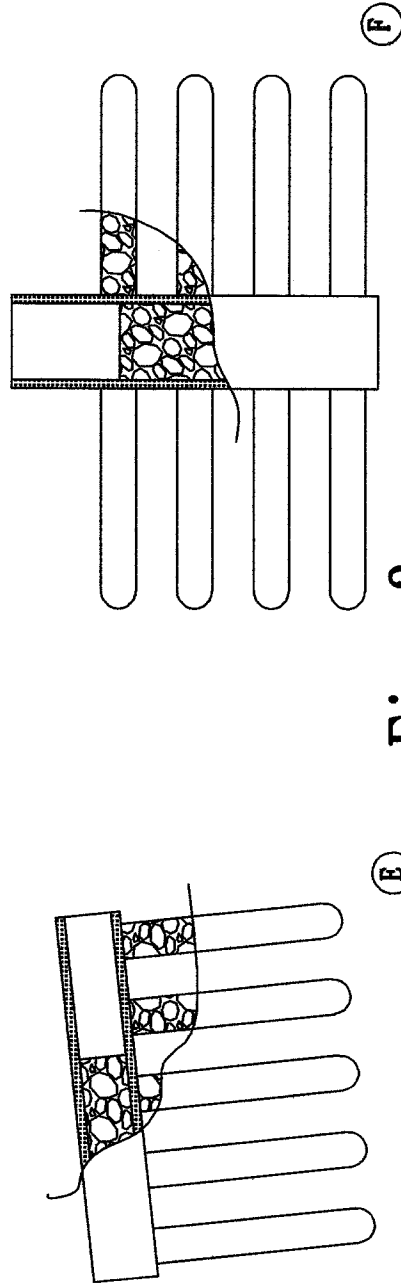
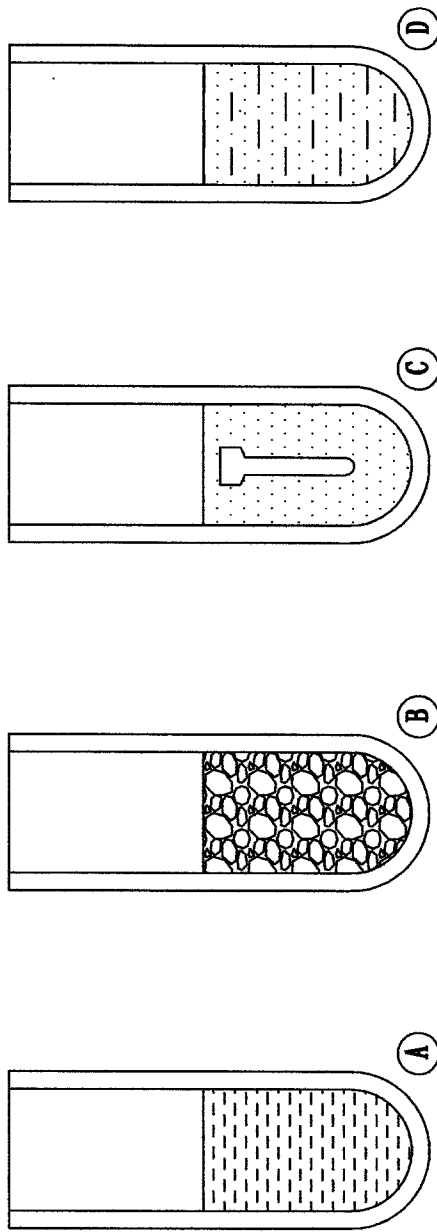


Fig. 3

**INTERNATIONAL SEARCH REPORT**

International application No.  
PCT/CA2010/001119

<p>A. CLASSIFICATION OF SUBJECT MATTER  <b>IPC: F24J 2/02 (2006.01) , A47J 27/00 (2006.01) , A47J 36/24 (2006.01) , F24J 2/05 (2006.01)</b>                  According to International Patent Classification (IPC) or to both national classification and IPC</p>											
<p>B. FIELDS SEARCHED</p> <p>Minimum documentation searched (classification system followed by classification symbols)</p> <p>IPC(2006.01): F24J and A47J</p> <p>Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched</p> <p>Electronic database(s) consulted during the international search (name of database(s) and, where practicable, search terms used)                  Epoque (Epodoc), Canadian Patent Database (CPD), Internet</p>											
<p>C. DOCUMENTS CONSIDERED TO BE RELEVANT</p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:10%;">Category*</th> <th style="width:60%;">Citation of document, with indication, where appropriate, of the relevant passages</th> <th style="width:30%;">Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td align="center">X</td> <td>MULLER, DR. HEINZ-JOACHIM, "Solar Steam Cooker", 46th ANZSES (Australian and New Zealand Solar Energy Society) Conference [online], ISES-AP 2008 [retrieved on 12-10-2010]. Retrieved from the Internet: &lt;URL: <a href="http://www.sun2steam.com.au/solarcooker/cooker.pdf">http://www.sun2steam.com.au/solarcooker/cooker.pdf</a>&gt;.</td> <td align="center">1-30</td> </tr> <tr> <td align="center">X</td> <td>CN 201206904 Y (JINGTIAN, ZHAO et al.) 11 March 2009 (11-03-2009) *whole document*</td> <td align="center">1-30</td> </tr> </tbody> </table>			Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X	MULLER, DR. HEINZ-JOACHIM, "Solar Steam Cooker", 46th ANZSES (Australian and New Zealand Solar Energy Society) Conference [online], ISES-AP 2008 [retrieved on 12-10-2010]. Retrieved from the Internet: <URL: <a href="http://www.sun2steam.com.au/solarcooker/cooker.pdf">http://www.sun2steam.com.au/solarcooker/cooker.pdf</a> >.	1-30	X	CN 201206904 Y (JINGTIAN, ZHAO et al.) 11 March 2009 (11-03-2009) *whole document*	1-30
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.									
X	MULLER, DR. HEINZ-JOACHIM, "Solar Steam Cooker", 46th ANZSES (Australian and New Zealand Solar Energy Society) Conference [online], ISES-AP 2008 [retrieved on 12-10-2010]. Retrieved from the Internet: <URL: <a href="http://www.sun2steam.com.au/solarcooker/cooker.pdf">http://www.sun2steam.com.au/solarcooker/cooker.pdf</a> >.	1-30									
X	CN 201206904 Y (JINGTIAN, ZHAO et al.) 11 March 2009 (11-03-2009) *whole document*	1-30									
<p><input type="checkbox"/> Further documents are listed in the continuation of Box C.</p>		<p><input checked="" type="checkbox"/> See patent family annex.</p>									
<p>* Special categories of cited documents :</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&amp;" document member of the same patent family</p>										
<p>Date of the actual completion of the international search</p> <p>19 October 2010 (19-10-2010)</p>	<p>Date of mailing of the international search report</p> <p>2 November 2010 (02-11-2010)</p>										
<p>Name and mailing address of the ISA/CA</p> <p>Canadian Intellectual Property Office                  Place du Portage I, C114 - 1st Floor, Box PCT                  50 Victoria Street                  Gatineau, Quebec K1A 0C9                  Facsimile No.: 001-819-953-2476</p>	<p>Authorized officer</p> <p>Kristian MacKenzie (819) 934-4267</p>										

**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

International application No.  
**PCT/CA2010/001119**

Patent Document Cited in Search Report	Publication Date	Patent Family Member(s)	Publication Date
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CN201206904Y	11-03-2009	CN201206904Y	11-03-2009
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