



EUROPEAN PATENT APPLICATION

(43) Date of publication:
29.07.2020 Bulletin 2020/31

(51) Int Cl.:
F24C 7/08 (2006.01)

(21) Application number: **19219718.4**

(22) Date of filing: **26.12.2019**

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(72) Inventors:
• **KAHVECIOGLU, Yunus Emre**
45030 Manisa (TR)
• **ASIK, Rustem**
45030 Manisa (TR)

(74) Representative: **Cayli, Hülya**
Paragon Consultancy Incorporated
Koza Sokak No: 63/2
GOP 06540 Ankara (TR)

(30) Priority: **25.01.2019 TR 201901195**

(71) Applicant: **Vestel Beyaz Eşya Sanayi ve Ticaret
A.Ş.**
45030 Manisa (TR)

(54) **AN OVEN WITH SOUS-VIDE FUNCTION AND A METHOD THEREOF**

(57) An oven and a method thereof, the oven comprising a body (1) having a cooking chamber (1a) and a first opening (1b); a door (2); a control panel (3) having a display (4); a second opening (1d) which is located on a base surface (1c) of the cooking chamber (1a) and opens into a chamber (1e) provided at a lower part of the base surface (1c); a heater (6) located in the chamber (1e); a cooking surface (5) placed at the second opening (1d) so as to cover the heater (6), suitable for placing a cooking vessel (9) thereon, and transmitting heat from

the heater (6) to the cooking vessel (9) through direct transmission; a gasket (10) which is located at the sides of the cooking surface (5) contacting the base surface (1c), and prevents transmission of heat from the cooking surface (5) to the base surface (1c) and the cooking chamber (1a); a temperature sensor located at the cooking chamber (1a) and detecting a temperature of the water inside the cooking vessel (9); a control unit which controls the heater (6) based on data received from the control panel (3) and the temperature sensor.

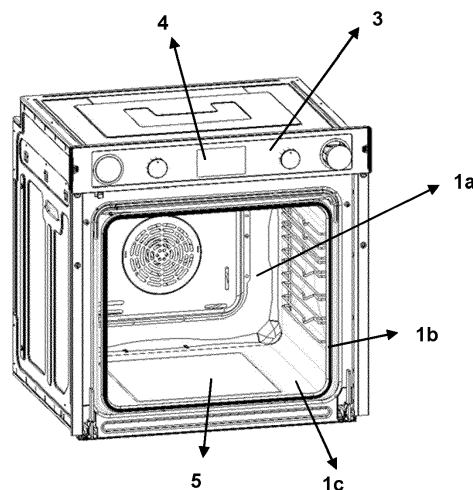


Figure – 2

Description

Technical Field

[0001] The present invention relates to an oven with a cooking function called sous-vide in which foods are cooked in water at a constant temperature under vacuum, and an operation method for said oven.

Background of the Invention

[0002] Cooking technique in water at a constant temperature under vacuum (sous-vide) is such a cooking technique that relies on immersing any food inside a vacuum bag in water which is under precise temperature control. For said cooking technique, food to be cooked is initially packed under vacuum inside a vacuum bag. Then, the food inside the vacuum bag is placed in a water-filled chamber, and the water is heated. Temperature of water and cooking time are determined according to food type and cooking level desired. Said temperature is generally selected with a 0.1-1°C of precision, and water is kept constant at the selected temperature with the same precision. Further, it is also important that the temperature is homogenously close throughout the water with the same precision. Thanks to the sous-vide cooking technique, all parts of the food can be cooked homogeneously, and cooking level of the food does not change with each cooking cycle since the cooking temperature is constant. Moreover, even though the food is cooked for a long time, there is no risk for food to burn or char as the temperature that the food contact does not increase continuously. In the sous-vide technique, there is no decrease in nutritional value of foods during cooking because cooking temperatures are lower than that of the conventional cooking methods, and the food does not dry as it is kept in a bag and cooked at low temperatures.

[0003] Currently, sous-vide devices are used to cook food, which is packed under vacuum, in water that is kept at a constant temperature by means of sous-vide technique. Such devices comprise a chamber and make temperature of the water placed in the chamber reach the desired level to keep it constant for the desired period of time. Some of these devices stir the water at the same time, enabling temperature of water to be homogenous inside a vessel. However, necessity of using sous-vide devices for implementing the abovementioned cooking technique causes additional costs and occupies space for home-use purposes.

Brief Description of the Invention

[0004] The oven according to the present invention comprises at least one body having at least one cooking chamber in which cooking process is performed, and at least a first opening for access into the cooking chamber; at least one door which is located on the first opening and controls access into the cooking chamber upon being

brought into an opened-closed position; at least one control panel for controlling and monitoring the functions of the oven by a user and having at least one display, wherein the oven further comprises:

- at least a second opening which is located on a base surface of the cooking chamber and opens into at least one chamber provided at a lower part of the base surface;
- at least one heater located in the chamber;
- at least one cooking surface placed on the second opening so as to cover the heater, suitable for placing at least one water-filled cooking vessel thereon, and transmitting heat from the heater to the cooking vessel through direct transmission, the cooking vessel being placed on the cooking surface and contacting the same;
- at least one gasket located at the sides of the cooking surface which contact the base surface, and preventing transmission of heat from the cooking surface to the base surface and the cooking chamber;
- at least one temperature sensor located at the cooking chamber and detecting a temperature of the water inside the cooking vessel;
- at least one control unit which is in connection with the control panel, the heater and the temperature sensor, and controls the heater based on data received from the control panel and the temperature sensor.

[0005] The operation method according to the invention for use in oven of the present invention comprises the steps of:

- inputting, by the user via the control panel, a command for performing cooking with a cooking technique in water at a constant temperature under vacuum (sous-vide) and at least one data concerning the food to be cooked;
- transmitting, by the control unit, a message to the user via the display to place the cooking vessel empty on the cooking surface according to the command received;
- detecting, by the weight sensor, weight of the cooking vessel placed on the cooking surface by the user, and sending a first weight value to the control unit;
- transmitting, by the control unit, a message to the user via the display to place the food to be cooked into the cooking vessel and place the cooking vessel onto the cooking surface;
- performing a measurement by the weight sensor once again and sending a second weight value to the control unit;
- determining the difference between the first weight value and the second weight value by the control unit to detect an amount of the food to be cooked;
- filling the cooking vessel with water to initiate the cooking function;

- determining, by the control unit, a cooking temperature and time according to the data for the food to be cooked which is input by the user and the detected data for the amount of food to be cooked, and operating the heater;
- detecting by the control unit a temperature of the water inside the cooking vessel by means of the temperature sensor to control power of the heater and keep the temperature of water constant at determined cooking temperature;
- ending the cooking process by the control unit at the end of the determined cooking time.

Object of the Invention

[0006] An object of the present invention is to provide an oven with a cooking function called sous-vide in which foods are cooked in water at a constant temperature under vacuum, and an operation method for said oven.

[0007] Another object of the present invention is to provide an oven which minimises necessity of an external device to cook foods in water at constant temperature under vacuum, and an operation method for said oven.

[0008] A further object of the present invention is to provide an easy-to-use, practical and reliable oven, and an operation method for said oven.

Description of the Drawings

[0009] Exemplary embodiments of the oven according to the present invention are illustrated in the attached drawings, in which:

Figure 1 is a frontal view of the oven according to the invention.

Figure 2 is a perspective view of the oven according to the invention with the door being unassembled.

Figure 3 is another perspective view of the oven according to the invention with the door being unassembled.

Figure 4 is a detailed view of surface and heater of the oven according to the invention, which provide cooking in water at constant temperature under vacuum.

Figure 5 is a perspective view of the oven according to the invention during cooking process, with the door being unassembled.

Figure 6 is a graphical view of temperature change of the oven according to the invention during cooking process.

Figure 7 is another graphical view of temperature change of the oven according to the invention during cooking process.

Figure 8 is a front sectional view of the oven according to the invention.

[0010] All the parts illustrated in figures are individually assigned a reference numeral and the corresponding

terms of these numbers are listed below:

Body	(1)
Cooking chamber	(1a)
First opening	(1b)
Base surface	(1c)
Second opening	(1d)
Chamber	(1e)
Door	(2)
Control panel	(3)
Display	(4)
Cooking surface	(5)
Heater	(6)
Weight sensor	(7)
Fan	(8)
Cooking vessel	(9)
Gasket	(10)
Stirrer	(11)
Cooking temperature	(T)
First temperature	(T1)
Second temperature	(T2)
Third temperature	(T3)
Fourth temperature	(T4)

Description of the Invention

[0011] Cooking technique in water at a constant temperature under vacuum (sous-vide) is such a cooking technique that relies on immersing any food inside a vacuum bag in water which is under precise temperature control. Currently, sous-vide devices are used to cook food, which is packed under vacuum, in water that is kept at a constant temperature by means of sous-vide technique. Such devices comprise a chamber and make temperature of the water placed in the chamber reach the desired level to keep it constant for the desired period of time. Some of these devices stir the water at the same time, enabling temperature of water to be homogenous inside a vessel. However, necessity of using sous-vide devices for implementing the abovementioned cooking technique causes additional costs and occupies space for home-use purposes. Therefore, with the present invention, there are provided an oven with a cooking function called sous-vide, and an operation method for said oven.

[0012] The oven according to the present invention, exemplary views of which are illustrated in figures 1-8, comprises at least one body (1) having at least one cooking chamber (1a) in which cooking process is performed, and at least a first opening (1b) for access into the cooking chamber (1a) and preferably located on a front surface thereof; at least one door (2) which is located on the first opening (1b) and controls access into the cooking chamber (1a) upon being brought into an opened-closed position; at least one control panel (3) for controlling and

monitoring the functions of the oven by a user, having at least one display (4) and preferably located at the front surface of the body (1), wherein the oven further comprises:

- at least a second opening (1d) which is located on a base surface (1c) of the cooking chamber (1a) and opens into at least one chamber (1e) provided at a lower part of the base surface (1c);
- at least one heater (6) located in the chamber (1e);
- at least one cooking surface (5) placed on the second opening (1d) so as to cover the heater (6), suitable for placing at least one water-filled cooking vessel (9) thereon, and transmitting heat from the heater (6) to the cooking vessel (9) through direct transmission, the cooking vessel (9) being placed on the cooking surface (5) and contacting the same;
- at least one gasket (10) located at the sides of the cooking surface (5) which contact the base surface (1c), and preventing transmission of heat from the cooking surface (5) to the base surface (1c) and the cooking chamber (1a);
- at least one temperature sensor (not shown in the figures) located at the cooking chamber (1a) and detecting a temperature of the water inside the cooking vessel (9);
- at least one control unit (not shown in the figures) which is in connection with the control panel (3), the heater (6) and the temperature sensor, and controls the heater (6) based on data received from the control panel (3) and the temperature sensor.

[0013] In an exemplary embodiment of the invention, vacuumed food and a sufficient amount of water for the food are placed in the cooking vessel (9) by the user, and the cooking vessel (9) is positioned on the cooking surface (5). Then, the user chooses the data concerning type of the food to be cooked, weight of the food and desired cooking level by means of the control panel (3). According to the data received from the control panel (3), the control unit enables the data concerning cooking temperature (T) and time, which are to be implemented, to be displayed to the user by means of the display (4). The user is able to change the displayed temperature and time values manually by means of the control panel (3) or initiate the cooking process with displayed values. Once the cooking process is initiated, the control unit controls the heat transmitted to the heater (6) according to data received from the control panel (3) and the temperature sensor. By means of data received from the temperature sensor, temperature of water inside the cooking vessel (9) is monitored, and the control unit controls power of the heater (6) throughout the cooking process according to said data in order to keep temperature chosen for the cooking process constant precisely. The cooking surface (5) transmits the heat from the heater (6) directly to the cooking vessel (9) which contacts the cooking surface (5) and is placed thereon; therefore, the

water in the cooking vessel (9) is heated rapidly while the cooking chamber (1a) is almost never heated.

[0014] In a preferred embodiment of the invention, the oven comprises at least one weight sensor (7) which is located at a lower part of the cooking surface (5) and measures the weight on the cooking surface (5) so as to detect whether a cooking vessel (9) is placed on the cooking surface (5) and whether the cooking vessel (9) is filled or not. In said embodiment, the control unit can verify amount of food and water in the cooking vessel (9) according to the data received from the weight sensor (7).

[0015] In a preferred embodiment of the invention, the cooking surface (5) may be made of stainless sheet, thermally conductive plastics (TCP) material, ceramic or a composite material in which these materials are used together. The cooking surface (5) is preferably made of a hydrophobic material or covered by a material with hydrophobic feature. In said embodiment, in case water is spilled during placement or removal of the cooking vessel (9) by the user, water is easily removed from the cooking surface (5).

[0016] In a preferred embodiment of the invention, the cooking surface (5) comprises recesses and protrusions that increase thermal conduction of the cooking surface (5). In said embodiment, base of the cooking vessel (9) placed onto the cooking surface (5), which contacts the cooking surface (5), has a form that is exactly opposite to the recesses and protrusions comprised by the cooking surface (5) (i.e. having a form that exactly corresponds to the cooking surface (5)). In said embodiment, surface area of the cooking surface (5) and the cooking vessel (9) in contact with each other and accordingly the thermal conduction are increased.

[0017] In a preferred embodiment of the invention, the temperature sensor is a cable temperature sensor with one end thereof suitable for being connected to a temperature sensor connection housing (not shown in the figures) provided at the cooking chamber (1a), the other end thereof suitable for being positioned to contact water inside the cooking vessel (9) and measure the temperature of the water. In another preferred embodiment of the invention, the temperature sensor is such a temperature sensor that measures wirelessly, such as infrared, laser or the like. In a preferred embodiment of the invention, the temperature sensor is such a temperature sensor which is used in existing ovens and designed to measure central temperature of meat (meat probe).

[0018] In a preferred embodiment of the invention, the oven comprises at least one transmission line (not shown in the figures), at least a first end of which is in connection with a water installation, at least a second end of which is suitable for being placed in the cooking vessel (9) by the user, wherein the transmission line enables water from the water installation to be transmitted into the cooking vessel (9). In said embodiment, the user places the cooking vessel (9) onto the cooking surface (5) and directs the second end of the transmission line into the cooking vessel (9). In said embodiment, when the cook-

ing vessel (9) is placed onto the cooking surface (5), the weight sensor (7) detects placement of the vessel, and provides water transmission into the cooking vessel (9) by means of the transmission line. In another preferred embodiment of the invention, the oven comprises at least one water tank (not shown in the figures). In said embodiment, the first end of the transmission line is connected to the water tank and transmits the water received from the water tank to the cooking vessel (9). Moreover, in said embodiments, the weight sensor (7) measures the amount of water, and water filling process is finished after water reaches a sufficient level.

[0019] In preferred embodiments of the invention, while the cooking vessel (9) may be any kind of cooking vessel, it may also be a cooking vessel (9) developed for use in said oven. In a preferred embodiment of the invention, the cooking vessel (9) comprises therein at least one stirrer (11) which is preferably located at a lower part of the cooking vessel (9) and has at least one fan (8) and at least one movement mechanism (not shown in the figures) for moving the fan (8). In said embodiment, the stirrer (11) is operated during cooking process, making temperature distribution more homogenous inside the water. When the stirrer (11) is operated, water inside the cooking vessel (9) moves with the rotation of the fan (8), thereby stirring the water inside the cooking vessel (9). While the movement mechanism moving the stirrer (11) may be driven by a motor of the cooking vessel (9), the oven according to the invention preferably comprises at least one trigger unit (not shown in the figures) located on the cooking surface (5) on which the cooking vessel (9) is placed, and a motor (not shown in the figures) preferably in connection with the trigger unit, wherein when the cooking vessel (9) is positioned on the cooking surface (5), connection between the trigger unit and the movement mechanism is provided and the trigger unit transmits the movement of the motor to the movement mechanism to rotate the fan (8).

[0020] In a preferred embodiment of the invention, the oven comprises a magnetic trigger unit (not shown in the figures) having at least one pair of electromagnets which comprises at least a first electromagnet and at least a second electromagnet which are provided at a lower part of the cooking surface (5), can be turned on and off by the control unit, and are located oppositely. In said embodiment, when a "magnetic stirring bar" with N and S poles, which is affected by a magnetic field change and moves accordingly, is placed at the water inside the cooking vessel (9) placed on the cooking surface (5), and when the magnetic trigger unit is activated, opposed poles of the first electromagnet and the second electromagnet are changed continuously as N-S and S-N. As a result of this change, the magnetic stirring bar starts to rotate around its own axis. Movement of the magnetic stirring bar inside water stirs the water and minimises temperature differences inside the water.

[0021] In a preferred embodiment of the invention, the cooking surface (5) is circular and is able to rotate around

its own axis. In said embodiment, the oven comprises at least a second movement mechanism (not shown in the figures) which provides movement of the cooking surface (5). The second movement mechanism is controlled by the control unit and enables the cooking vessel (9) on the cooking surface (5) to rotate around its own axis together with the cooking surface (5) during the cooking process. With said movement, water inside the cooking vessel (9) is stirred much better and heated more homogeneously. In said embodiment, the cooking surface (5) can rotate around its own axis at different speeds in the clockwise or anti-clockwise direction; and an efficient stirring process is provided by triggering the directions and speeds of rotation with different arrangements. When the rotation is provided at a constant angular speed, a force applied to water particles is from the centre towards outside of the circle, and when the rotation movement is provided at a varying angular speed, the force can be applied to the water particles at the movement axis, as well. This enables water to be stirred and shaken better in the cooking vessel (9). In order to achieve this, the cooking surface (5) can be rotated around its own axis in different directions at varying speeds and accelerations.

[0022] In a preferred embodiment of the invention, the second movement mechanism enables the cooking surface (5) to move in three directions at horizontal and vertical axes. Therefore, during cooking, the cooking vessel (9) on the cooking surface (5) can move together with the cooking surface (5) horizontally at X and Y axes, and vertically at Z axis. The movement performed in three directions may be at different and varying speeds or accelerations for each direction, and the movement in these directions can be performed with different operating periods.

[0023] In a preferred embodiment of the invention, the heater (6) is an induction heater, wherein in said embodiment the cooking surface (5) is made of a metal which can be heated with induction. In said embodiment, in case that the base surface (1c) is made of a metal which can be heated with induction and that the inner surfaces of the cooking chamber (1a) except the base surface (1c) are made of a metal which is not affected by induction, the cooking surface (5) and the base surface (1c) are provided as a monolithic structure.

[0024] In a preferred embodiment of the invention, the oven comprises at least one thickness sensor (not shown in the figures) for measuring thickness of food inside the cooking vessel by an optical or mechanical method. In said embodiment, the user initially places the food to be cooked in the cooking vessel (9) and the cooking chamber (1a), and operates the thickness sensor. The thickness sensor can measure the thickness of the food to be cooked and notify the user or determine time and temperature information for the cooking process to be implemented by taking the thickness data into account.

[0025] In a preferred embodiment of the invention, the oven further comprises at least one camera which is in

connection with the control unit and enables the food inside the cooking vessel (9) which is placed onto the cooking surface (5) to be displayed. In said embodiment, the control unit is able to determine type of the food to be cooked with reference to an image taken by the camera and is able to take the food type information into account when determining time and temperature of the cooking process.

[0026] The operation method according to the invention for use in oven of the present invention comprises the steps of:

- inputting, by the user via the control panel, a command for performing cooking with a cooking technique in water at a constant temperature under vacuum (sous-vide) and at least one data concerning the food to be cooked (e.g. type of the food, cooking degree etc.);
- transmitting, by the control unit, a message to the user via the display (4) to place the cooking vessel (9) empty on the cooking surface (5) according to the command received;
- detecting, by the weight sensor, weight of the cooking vessel (9) placed on the cooking surface (5) by the user, and sending a first weight value to the control unit;
- transmitting, by the control unit, a message to the user via the display (4) to place the food to be cooked into the cooking vessel (9) and place the cooking vessel (9) onto the cooking surface (5);
- performing a measurement by the weight sensor once again and sending a second weight value to the control unit;
- determining the difference between the first weight value and the second weight value by the control unit to detect an amount of the food to be cooked;
- filling the cooking vessel (9) with water to initiate the cooking function;
- determining, by the control unit, a cooking temperature (T) and time according to the data for the food to be cooked which is input by the user and the detected data for the amount of food to be cooked, and operating the heater (6);
- detecting by the control unit a temperature of the water inside the cooking vessel (9) by means of the temperature sensor to control power of the heater (6) and keep the temperature of water constant at determined cooking temperature (T);
- ending the cooking process by the control unit at the end of the determined cooking time.

[0027] In a preferred embodiment of the invention, temperature-time curve of the water inside the cooking vessel (9) during heating process is illustrated in figure 6. In said embodiment, once the control unit operates the heater (6), the heater (6) starts to operate at a high power, and heats the water up to a first temperature (T1) which is below the cooking temperature (T). After temperature

of water reaches the first temperature (T1), the control unit starts to operate the heater (6) at a low power which is below the high power, and continues to heat the water. When water inside the cooking vessel (9) reaches the cooking temperature (T), the control unit turns off the heater (6). The temperature of water continues to rise some more by itself, rises up to a second temperature (T2) which is approximately above the cooking temperature (T) by a threshold value, and starts to decrease again. On the other hand, when temperature of water decreases to a third temperature value (T3) which is below the aimed cooking temperature (T) by said threshold value, the control unit operates the heater (6) again at a low power. Measured temperature of water initially decreases below the third temperature (T3) value some more, and then starts to increase again. When the cooking temperature (T) is achieved, the heater (6) is turned off again and the cooking cycle is continued. Thus, the cooking process is performed such that temperature of water is always kept close to the cooking temperature (T) within the threshold range.

[0028] In said embodiment, high power is a location in which the heater (6) operates at full performance and performs heating with a maximum capacity. On the other hand, low power indicates a location or locations in which the heater (6) draws limited power and provides less heat. While the heater (6) may be a single heater which can be operated at different power levels, it may also consist of a plurality of heater parts. In that case, the condition where all parts of the heater (6) comprising a plurality of heater parts operate concurrently is the condition in which the heater operates at high power, while the other condition, where a single part or no part operates, is providing different low power levels.

[0029] In another preferred embodiment of the invention, there is also used a fourth temperature (T4) value which is between the third temperature (T3) value and the cooking temperature (T). In said embodiment, when temperature of water decreases from the cooking temperature (T) to the fourth temperature (T4) value, the heater (6) is started to be operated by the control unit at low power. Temperature of water decreases some more even though the heater is turned on, reaches to the third temperature (T3) level and starts to rise again. Thus, it is provided that temperature of water is kept between the second and third temperature values (T2 - T3).

[0030] In a preferred embodiment of the invention, the cooking temperature (T), the first temperature (T1) and the threshold are determined automatically by the control unit according to cooking level chosen by the user (rare, medium rare, well done), weight of the food, and amount of water.

[0031] In a preferred embodiment of the invention, if the control unit detects that temperature of water rises above the second temperature (T2) and/or decreases below the third temperature (T3) during said processes, the control unit revises the threshold value. The feedback controls provided in such a manner result in a tempera-

ture change which provides the precision required for the cooking technique.

[0032] In a preferred embodiment of the invention, in order to provide circulation of water inside the cooking vessel (9), the control unit determines the speed and direction of the movement provided by the motor, the trigger unit and the second movement mechanism or the "magnetic stirring bar" that is controlled magnetically according to the weight of the cooking vessel (9), weight and type of the food placed in the cooking vessel (9) and amount of water placed in the cooking vessel (9), and accordingly, controls said movement so as to provide circulation of water throughout the cooking process. For example, if an amount of water inside the vessel is too much, stirring the water at high speed or by sudden direction changes is not preferred in that the water filled in the cooking vessel (9) may overflow.

[0033] In a preferred embodiment of the invention, the method comprises the step of transmitting water by the control unit into the cooking vessel (9) by means of the transmission line.

[0034] With the oven and operation method according to the invention, a cooking function in water at a constant temperature under vacuum (sous-vide) is provided, and the necessity of having an additional device for the cooking process is eliminated.

Claims

1. An oven which comprises at least one body (1) having at least one cooking chamber (1a) in which cooking process is performed, and at least a first opening (1b) for access into the cooking chamber (1a); at least one door (2) which is located on the first opening (1b) and controls access into the cooking chamber (1a) upon being brought into an opened-closed position; at least one control panel (3) for controlling and monitoring the functions of the oven by a user, having at least one display (4) and located on the body (1), **characterized by** comprising:

- at least a second opening (1d) which is located on a base surface (1c) of the cooking chamber (1a) and opens into at least one chamber (1e) provided at a lower part of the base surface (1c);
- at least one heater (6) located in the chamber (1e);
- at least one cooking surface (5) placed on the second opening (1d) so as to cover the heater (6), suitable for placing at least one water-filled cooking vessel (9) thereon, and transmitting heat from the heater (6) to the cooking vessel (9) through direct transmission, the cooking vessel (9) being placed on the cooking surface (5) and contacting the same;
- at least one gasket (10) located at the sides of the cooking surface (5) which contact the base

surface (1c), and preventing transmission of heat from the cooking surface (5) to the base surface (1c) and the cooking chamber (1a);

- at least one temperature sensor located at the cooking chamber (1a) and detecting a temperature of the water inside the cooking vessel (9);
- at least one control unit which is in connection with the control panel (3), the heater (6) and the temperature sensor, and controls the heater (6) based on data received from the control panel (3) and the temperature sensor.

2. An oven according to claim 1, **characterized by** comprising at least one weight sensor (7) which is located at a lower part of the cooking surface (5) and measures the weight on the cooking surface (5) so as to detect whether a cooking vessel (9) is placed on the cooking surface (5) and whether the cooking vessel (9) is filled or not.

3. An oven according to any of the preceding claims, **characterized in that** the cooking surface (5) comprises recesses and protrusions that increase thermal conduction of the cooking surface (5), and **that** the base of the cooking vessel (9) placed onto the cooking surface (5), which contacts the cooking surface (5), has a form that is exactly opposite to the form of recesses and protrusions.

4. An oven according to any of the preceding claims, **characterized by** comprising at least one transmission line, at least a first end of which is in connection with a water installation or at least one water tank comprised by the oven, at least a second end of which is suitable for being placed in the cooking vessel (9) by the user, wherein the transmission line enables water from the water installation or the water tank to be transmitted into the cooking vessel (9).

5. An oven according to any of the preceding claims, **characterized by** comprising at least one trigger unit located on the cooking surface (5), at least one motor in connection with the trigger unit, at least one fan (8) located in the cooking vessel (9), and at least one movement mechanism of which connection with the trigger unit is provided when the cooking vessel (9) is positioned on the cooking surface (5), thus enabling the fan (8) to rotate by means of the motor.

6. An oven according to any of the preceding claims, **characterized by** comprising a magnetic trigger unit having at least one pair of electromagnets which comprises at least a first electromagnet and at least a second electromagnet which enable a magnetic stirring bar placed in the water to rotate and stir the water, are provided at a lower part of the cooking surface (5), can be turned on and off by the control unit, and are located oppositely.

7. An oven according to any of the preceding claims, **characterized by** comprising at least a second movement mechanism which provides movement of the cooking surface (5) and is controlled by the control unit. 5
8. An oven according to any of the preceding claims, **characterized in that** the heater (6) is an induction heater and the cooking surface is made of a metal which can be heated with induction. 10
9. An oven according to any of the preceding claims, **characterized by** comprising at least one thickness sensor for measuring thickness of food inside the cooking vessel. 15
10. An oven according to any of the preceding claims, **characterized by** comprising at least one camera which is in connection with the control unit and enables the food inside the cooking vessel (9) which is placed onto the cooking surface (5) to be displayed. 20
11. An operation method for implementing in an oven according to any of the preceding claims, **characterized by** comprising the steps of: 25
- inputting, by the user via the control panel (3), a command for cooking with a cooking technique in water at a constant temperature under vacuum and at least one data concerning the food to be cooked; 30
 - filling the cooking vessel (9) with water to initiate the cooking function;
 - determining, by the control unit, a cooking temperature (T) and time according to the data for the food to be cooked which is input by the user, and operating the heater (6); 35
 - detecting by the control unit a temperature of the water inside the cooking vessel (9) by means of the temperature sensor to control power of the heater (6) and keep the temperature of water constant at determined cooking temperature (T); 40
 - ending the cooking process by the control unit at the end of the determined cooking time. 45
12. An operation method according to claim 11, **characterized by** comprising the steps of: 50
- transmitting, by the control unit, a message to the user via the display (4) to place the cooking vessel (9) empty on the cooking surface (5) according to the command received;
 - detecting, by the weight sensor, weight of the cooking vessel (9) placed on the cooking surface (5) by the user, and sending a first weight value to the control unit; 55
 - transmitting, by the control unit, a message to the user via the display (4) to place the food to be cooked into the cooking vessel (9) and place the cooking vessel (9) onto the cooking surface (5);
 - performing a measurement by the weight sensor once again and sending a second weight value to the control unit;
 - determining the difference between the first weight value and the second weight value by the control unit to detect an amount of the food to be cooked;
13. An operation method according to any of the claims 11 or 12, **characterized by** comprising the steps of:
- upon operating the heater (6) by the control unit, starting the operation of the heater (6) at a high power, and heating the water by the heater (6) up to a first temperature (T1) which is below the cooking temperature (T);
 - after temperature of water reaches the first temperature (T1), starting the operation of heater (6) by the control unit at a low power which is below the high power, and continuing to heat the water by the heater (6);
 - when water inside the cooking vessel (9) reaches the cooking temperature (T), turning off the heater (6) by the control unit;
 - once the temperature of water continues to rise some more by itself, rises up to a second temperature (T2) which is above the cooking temperature (T) by a threshold value and starts to decrease again, operating the heater (6) by the control unit again at a low power when temperature of water decreases to a third temperature value (T3) which is below the aimed cooking temperature (T) by said threshold value;
 - turning off the heater (6) by the control unit again when the cooking temperature (T) value is achieved, and continuing the cooking cycle.
14. An operation method according to claim 11, **characterized by** comprising the steps of: when temperature of water decreases from the cooking temperature (T) to a fourth temperature (T4) value which is between the third temperature (T3) value and the cooking temperature (T) value, operating the heater (6) by the control unit at low power in order to keep the temperature of water between the second temperature value (T2) and the third temperature value (T3) so that temperature of water decreases a little even though the heater is turned on, reaches to the third temperature (T3) value and starts to rise again, and if the control unit detects that temperature of water rises above the second temperature (T2) and/or decreases below the third temperature (T3) during said processes, revising the threshold value by the control unit.

15. An operation method according to any of the claims 11 to 14, **characterized by** comprising the steps of: enabling transmission of water by the control unit into the cooking vessel (9) by means of the transmission line, and determining by the control unit the speed and direction of the movement provided by the motor, the trigger unit and the second movement mechanism, during the cooking process, according to the weight of the cooking vessel (9), weight and type of the food placed in the cooking vessel (9) and amount of water placed in the cooking vessel (9), and providing circulation of water in the cooking vessel (9) throughout the cooking process.

5

10

15

20

25

30

35

40

45

50

55

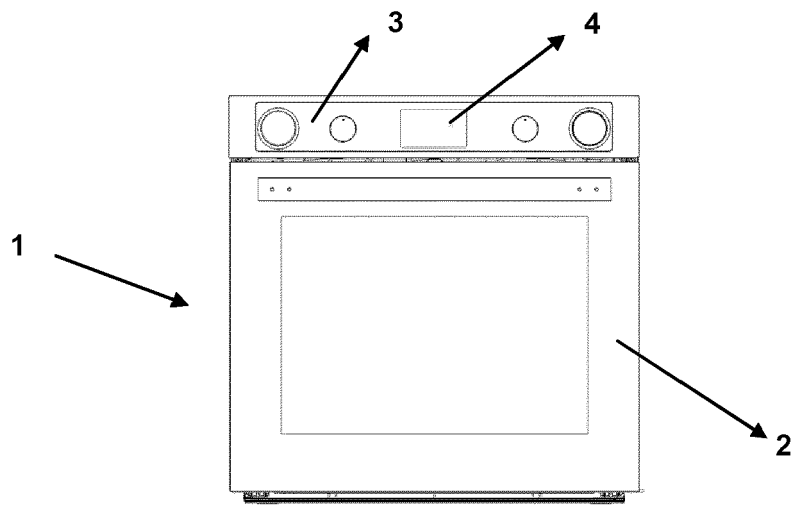


Figure – 1

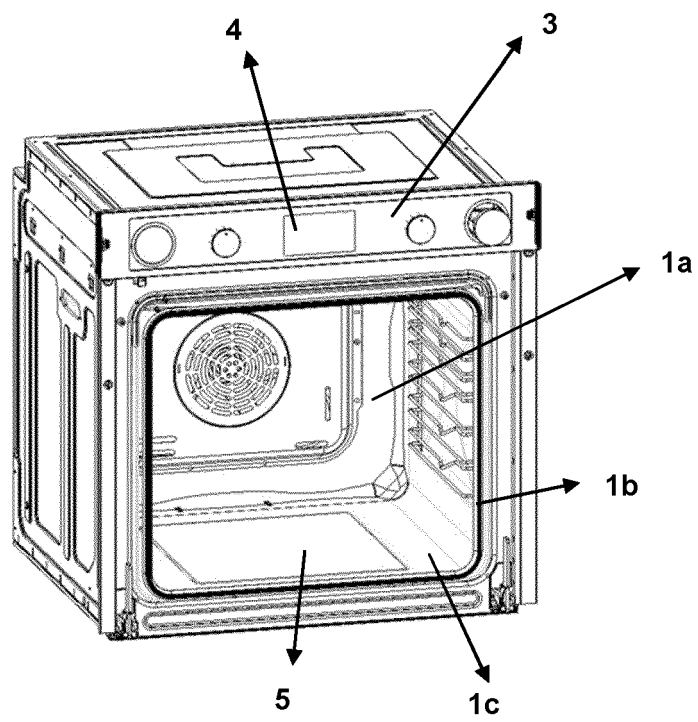


Figure – 2

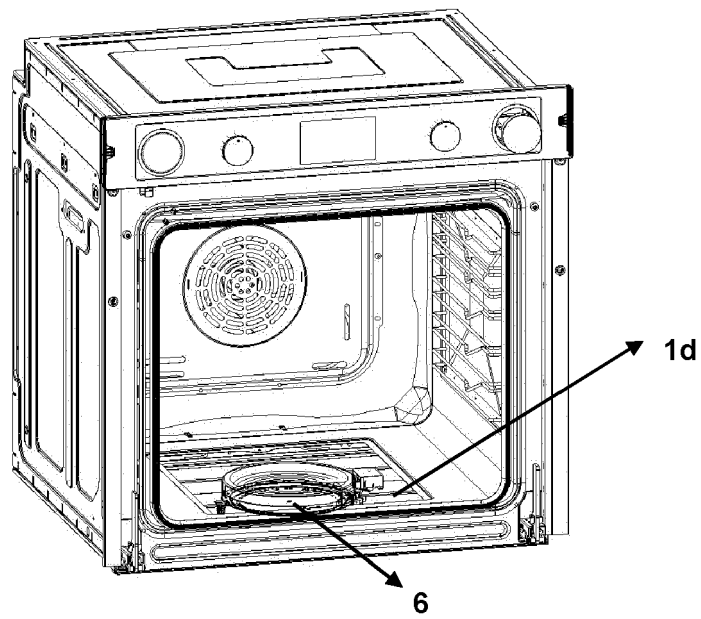


Figure - 3

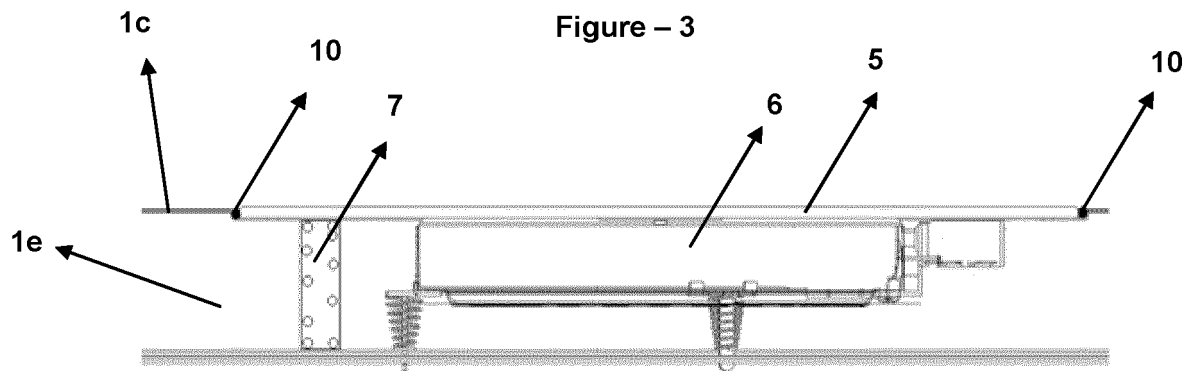


Figure - 4

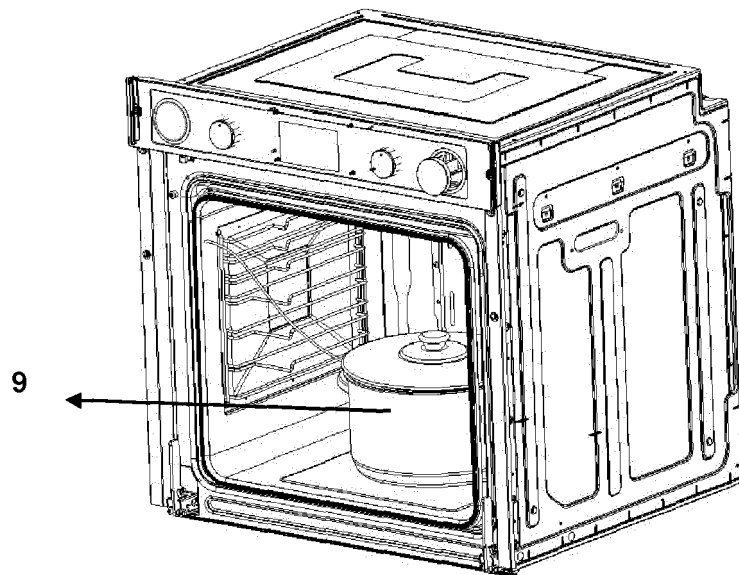


Figure – 5

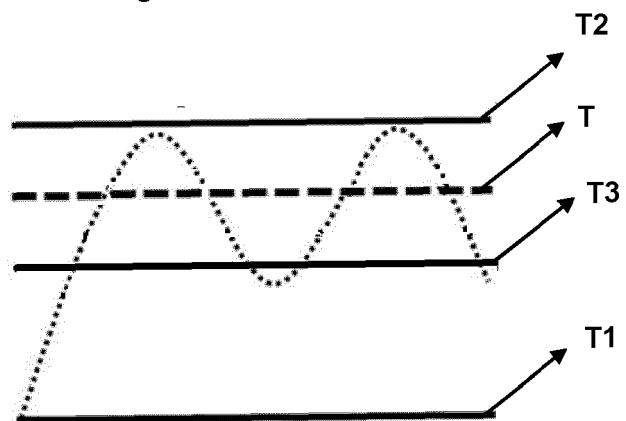


Figure – 6

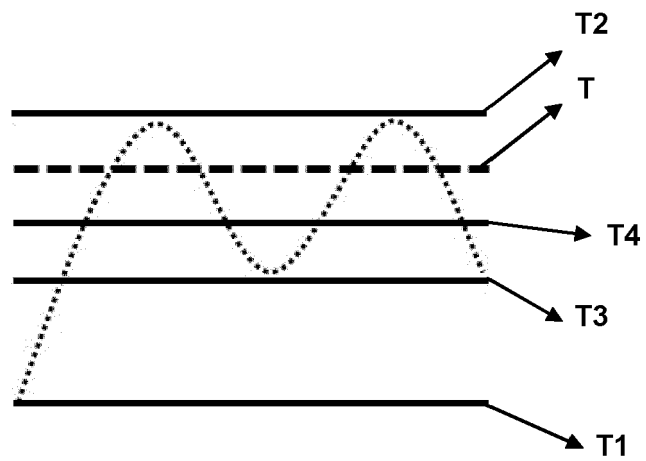


Figure - 7

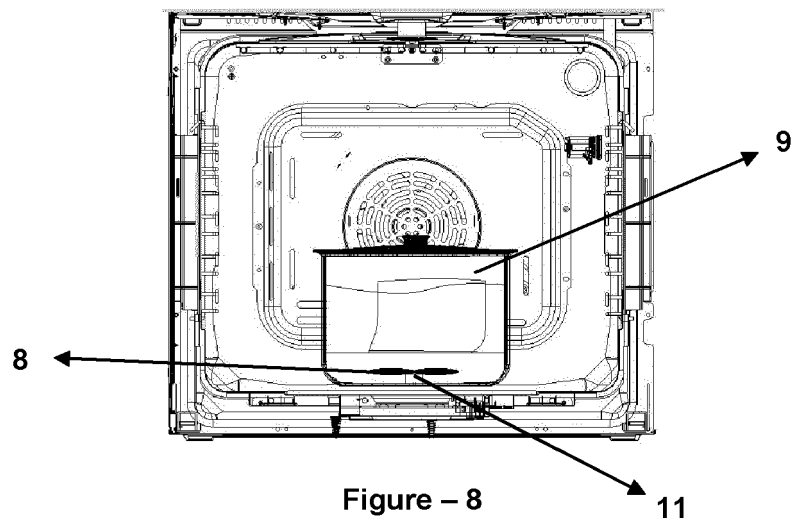


Figure - 8



EUROPEAN SEARCH REPORT

 Application Number
 EP 19 21 9718

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	CN 105 559 622 B (GUANGDONG MIDEA KITCHEN APPLIANCES MFG CO LTD; MIDEA GROUP CO LTD) 17 April 2018 (2018-04-17) * figures 1,2 * * paragraphs [0013], [0041] *	1,3,4, 6-8,10, 11,13-15	INV. F24C7/08
X	CN 106 490 966 A (HANGZHOU ROBAM APPLIANCES CO LTD) 15 March 2017 (2017-03-15) * figures 1-3 *	1,11	
A	US 2010/006558 A1 (MCCLOUGHLIN KEITH [US] ET AL) 14 January 2010 (2010-01-14) * figures 1-3 * * paragraph [0018] *	1-15	
A	EP 2 468 150 A1 (BSH BOSCH SIEMENS HAUSGERAETE [DE]) 27 June 2012 (2012-06-27) * figures 1,2 * * paragraphs [0045], [0046] *	1-15	
A	US 2018/328590 A1 (HOWARD MICHAEL ANTHONY [US] ET AL) 15 November 2018 (2018-11-15) * figures 1-6 * * paragraph [0047] *	1-15	TECHNICAL FIELDS SEARCHED (IPC) F24C
A	EP 3 086 038 A1 (WHIRLPOOL CO [US]) 26 October 2016 (2016-10-26) * figure 6 * * paragraph [0025] *	1-15	
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 29 May 2020	Examiner Moreno Rey, Marcos
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 19 21 9718

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

29-05-2020

10

15

20

25

30

35

40

45

50

55

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
CN 105559622 B	17-04-2018	NONE	
CN 106490966 A	15-03-2017	NONE	
US 2010006558 A1	14-01-2010	AU 2009268474 A1 CA 2730380 A1 CN 102132105 A EP 2300750 A2 US 2010006558 A1 WO 2010006230 A2	14-01-2010 14-01-2010 20-07-2011 30-03-2011 14-01-2010 14-01-2010
EP 2468150 A1	27-06-2012	CN 102563711 A DE 102010063876 A1 EP 2468150 A1	11-07-2012 28-06-2012 27-06-2012
US 2018328590 A1	15-11-2018	NONE	
EP 3086038 A1	26-10-2016	EP 3086038 A1 US 2016313002 A1 US 2018066844 A1	26-10-2016 27-10-2016 08-03-2018