



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
14.02.2024 Bulletin 2024/07

(51) International Patent Classification (IPC):
F24C 15/32^(2006.01) F24C 15/14^(2006.01)

(21) Application number: **23188643.3**

(52) Cooperative Patent Classification (CPC):
F24C 15/322; F24C 15/14

(22) Date of filing: **31.07.2023**

(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 ME MK MT NL
NO PL PT RO RS SE SI SK SM TR**
Designated Extension States:
BA
Designated Validation States:
KH MA MD TN

(71) Applicant: **Arçelik Anonim Sirketi**
34445 Istanbul (TR)

(72) Inventors:
• **Erdem, Funda**
34445 Istanbul (TR)
• **Dogrul, Fatma**
34445 Istanbul (TR)
• **Celik, Filiz**
34445 Istanbul (TR)
• **Cavusoglu, Gonul**
34445 Istanbul (TR)

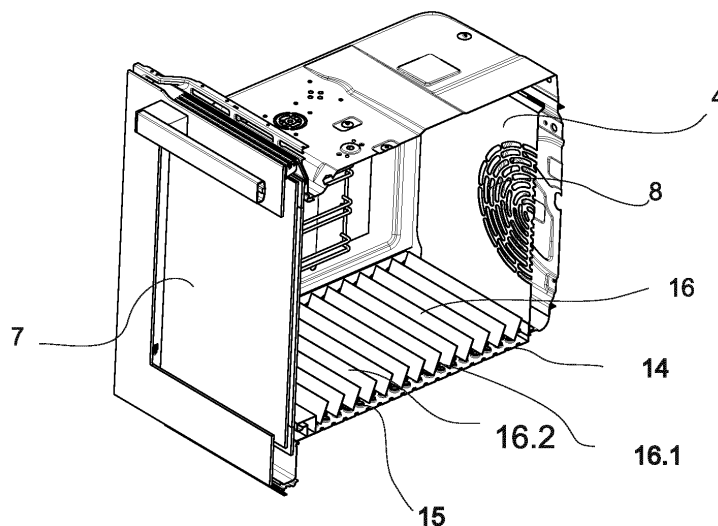
(30) Priority: **02.08.2022 TR 202212218**

(54) **OVEN HAVING AIR IMPINGEMENT JETS AND MOVABLE MECHANISM THAT CAN BE OPENED/CLOSED OVER THE NOZZLES**

(57) The present invention relates to an oven (1) comprising an oven compartment (11) which is defined by the side walls (2, 3), a rear wall (4), an upper wall (5), a lower wall (6) and a door (7) and wherein the foodstuffs to be cooked are placed by means of a cooking member; a lower plate (14) which is provided on the lower wall (6); and a plurality of jet nozzles (15) which are arranged on said lower plate (14), a plate (17) which is positioned over the jet nozzles (15) on the lower plate (14) so as to cover the entire surface of the jet nozzles (15), which has a

movable mechanism that can be opened/closed over the jet nozzles (15) and which has at least two guiding fins (16) that are positioned at an angle with respect to each other in the open position such that the inner surface (16.1) of the one faces the back surface (16.2) of the other and that form a flat surface in the closed position, and a hidden tray (18) which is disposed under the lower plate (14) and which collects the liquids that may flow from the jet nozzles (15).

Figure 2



Description

Technical Field

[0001] The present invention relates to an oven wherein the dirt on the oven base can be cleaned in household ovens with air impingement jet technology.

State of the Art

[0002] Today, the air impingement jet technology is used in ovens for various cooking applications. In the ovens with air impingement jet technology, high-speed jets of hot air impinge a foodstuff vertically and/or impinge cooking members or trays carrying foodstuffs. Hot air jets are delivered by means of nozzles. Said nozzles are generally placed on the upper and lower walls of the oven so as to be perpendicular to the foodstuff. In said ovens, high-speed jets of hot air impinge the foodstuff, thus providing more homogeneous heat distribution rates or shorter cooking times.

[0003] One of the most common problems in state of the art household ovens with air impingement jet technology is the cleaning of the bottom of the oven which is contaminated during the cooking of the foodstuff. This problem especially arises while placing the tray or oven accessories into the oven or removing the same from the oven after the cooking process. One of the most common problems is that oil or foodstuff liquids can easily spill onto the base due to the fact that the tray becomes both heavy and hot and slips on the wire rack during the cooking process performed with accessories such as Pyrex, etc. While the dirt on the floor can be cleaned manually after the cooking process in conventional ovens, this is not possible in the ovens with the air impingement jet technology with nozzles.

[0004] In the ovens with the air impingement jet technology, the problem of cleaning the bottom surface of the oven if anything or oil spills during cooking due to the nozzles on the bottom arises. Difficult-to-clean substances such as sauce or oil flowing from the lower nozzle openings collect on the oven bottom, causing the problem of the dirt burning or sticking due to the direct contact with the hot surface. Since the user cannot directly reach this surface, the problem of failing to clean the same arises.

[0005] In the state of the art Patent Application No. WO2010135693A1, an oven is disclosed, a jet nozzle which accelerates the hot air and which converts the airflow to create a relatively thin thermal boundary layer of hot air on the surface of foodstuff or any other material placed in the airflow. However, there is no explanation regarding the cleaning of jet nozzles and oven bottom in the ovens with the air impingement technology.

Brief Description of the Invention

[0006] The aim of the present invention is the realization

of an oven comprising an air impingement jet technology which eliminates the problem of the liquids, which spill from the foodstuffs while said foodstuffs are being loaded into/unloaded from the oven, being burnt or getting stuck on the oven bottom due to high temperatures, thus providing ease of cleaning.

[0007] Another aim of the present invention is the realization of an oven comprising an air impingement jet technology, which allows regional cooking and wherein the air delivered by the jet nozzles during the cooking process can be controlled locally.

[0008] Another aim of the present invention is the realization of an oven comprising an air impingement jet technology which eliminates the problem of the speed of the air, delivered by the nozzles close to the front wall of the oven, being low and hence the problem of nonhomogeneous cooking on the foodstuff surface.

[0009] Another aim of the present invention is the realization of an oven comprising an air impingement jet technology which eliminates the problem, encountered in the state of the art, of the air losing speed while flowing from the rear side of the oven towards the front side thereof, which increase the flow speed of air towards the front side of the oven and which prevents the loss in speed and heat at the front wall region of the oven.

[0010] Another aim of the present invention is the realization of an oven comprising an air impingement jet technology which eliminates the problem of the airtightness of the plates, whereon the nozzles are provided, being deteriorated due to the frequent detachment of the plates.

[0011] The oven realized in order to attain the aim of the present invention, explicated in the first claim and the respective claims thereof, comprises an oven compartment which is defined by side walls, a rear wall, an upper wall, a lower wall and a door and wherein the foodstuffs to be cooked are placed by means of a cooking member; a lower plate which is provided on the lower wall; and a plurality of jet nozzles which are arranged on said lower plate. The oven of the present invention comprises a plate which is positioned over the jet nozzles on the lower plate so as to cover the entire surface of the jet nozzles, which has a movable mechanism that can be opened/closed over the jet nozzles and which has at least two guiding fins that are positioned at an angle with respect to each other in the open position such that the inner surface of the one faces the back surface of the other and that form a flat surface in the closed position.

[0012] In an embodiment of the present invention, the oven comprises a hidden tray which is disposed under the lower plate and which collects the liquids that may flow from the jet nozzles.

[0013] In an embodiment of the present invention, the oven comprises a large number of fins which are positioned on the plate in a gradual order and which has a monolithic structure with the plate.

[0014] In an embodiment of the present invention, the oven comprises the fins each having an angle of 0 de-

grees with respect to the plate when in the closed position and an angle of 180 degrees with respect to the plate when in the open position.

[0015] In an embodiment of the present invention, the oven comprises at least one hinge which is positioned at least one lower edge of the door and which aligns with the lower side of at least one of the side walls and which triggers the fins so as to enable the same from shifting from the open position to the closed position or from the closed position to the open position; and a hinge system which can move forwards and backwards on the lower side of at least one of the side walls.

[0016] In an embodiment of the present invention, the oven comprises the hinge which is disposed at the lower edge of the door aligning with the lower side of the first side wall or at the lower edge of the door aligning with the lower side of the second side wall or at both lower edges of the door; and a hinge system which is connected to said hinge and which can move forwards and backwards on the lower side of the first side wall or on the lower side of the second side wall or on the lower side of both side walls.

[0017] In another embodiment of the present invention, the oven comprises a display which has automatic menus for enabling the user to select the type of foodstuff to be cooked and also enabling the user to enter a desired cooking temperature and cooking time; at least one sensor which is disposed in the oven compartment and which measures the humidity in the oven; and at least one circuit board which receives humidity information from said sensor and which adjusts an air flow according to said information.

[0018] In another embodiment of the present invention, the oven comprises a control panel; at least one motor which moves the fins to bring the same to a certain position according to the information received from said electronic card; and at least two fins which are activated by being triggered by the motor.

[0019] In another embodiment of the present invention, the oven comprises an oven compartment which is defined by side walls, a rear wall, an upper wall, a lower wall and a door and wherein the foodstuffs to be cooked are placed by means of a cooking member; a lower plate which is provided on the lower wall; and a plurality of jet nozzles which are arranged on said lower plate. The oven of the present invention comprises holes as many as the number of jet nozzles, which are arranged under the lower plate, which have a diameter equal to that of the jet nozzles on the lower plate and which are positioned such that each corresponds to the bottom of one jet nozzle.

[0020] In another embodiment of the present invention, the oven comprises a hidden tray which is disposed under the sheet and which collects the liquids that may flow from the holes.

[0021] In another embodiment of the present invention, the oven comprises a sheet where the holes thereon have the same dimensions or different dimensions according to the diameter of the jet nozzles.

[0022] In another embodiment of the present invention, the oven comprises a sheet having at least one connection component which is positioned at at least one edge of the sheet so as to trigger the sheet to enable the sheet to move forwards and backwards; and at least one hinge which is connected to the at least one connection component and which is positioned at at least one lower edge of the door.

[0023] In another embodiment of the present invention, the oven comprises at least one knob which is positioned on the door; a circuit board which detects the mode selected by the knob and a motor which detects the mode and which enables the sheet to move forwards and backwards.

[0024] Said figures are:

Figure 1: is the front perspective view of the oven when the door is in the open position.

Figure 2: is the perspective view of the interior of the oven when the door is in the closed position.

Figure 3: is the front perspective view of the oven when the door is in the closed position.

Figure 4: is the front perspective view of the hidden tray.

Figure 5: is the front perspective view of the oven door.

Figure 6: is the front perspective view of the interior of the oven.

Figure 7: is the assembly view of the lower plate and the fan sheet metal.

Figure 8: is the assembly view of the lower plate and the hidden tray.

Figure 9: is the perspective view of the placement of the lower plate and the sheet.

Figure 10: is the front perspective view of the lower plate hinge system.

[0025] The following numerals are referred to in the description of the present invention:

1. Oven
2. First side wall
3. Second side wall
4. Rear wall
5. Upper wall
6. Lower wall
7. Door

7.1 Control panel

- 7.2 Knob
- 7.3 Display
- 7.4 Circuit board
- 7.5 Switch
- 7.6 Hinge
- 8. Fan
- 9. Motor
- 10. Fan sheet metal
- 10.1 Mounting housing
- 11. Oven compartment
- 12. Oven shelf
- 13. Upper plate
- 14. Lower plate
 - 14.1 Claw
 - 14.2 Catch
- 15. Jet nozzle
- 16. Fin
 - 16.1 Fin inner surface
 - 16.2 Fin back surface
- 17. Plate
- 18. Hidden tray
- 18.1 Connection member
- 19. Sheet
 - 19.1 Hole
 - 19.2 Connection component
- 20. Hinge assembly
- 21. Sensor
 - h1: tray front height
 - h2: tray back height

Detailed Description of the Invention

[0026] The oven (1) of the present invention comprises a first and second side wall (2, 3); a rear wall (4); an upper wall (5); a lower wall (6); and a door (7). A control panel is provided, which can be placed above, below or next to the door (7). An arm (not shown in the figures) is positioned on the door (7) so as to open the door (7) from top to bottom, from left to right or from right to left. The oven (1) comprises at least one fan (8) which is positioned on the rear wall (4), a circular heater which is disposed around the fan (8) and at least one motor (9). A fan sheet metal (10) which is mounted on the rear wall (4) by being screwed at the corners is provided in front of said fan (8) and the heater.

[0027] The oven (1) comprises an oven compartment (11) which is defined by the side walls (2, 3), a rear wall (4), an upper wall (5), a lower wall (6) and a door (7). The oven (1) further comprises at least one sensor (21) which is disposed in said oven compartment (11) and which

measures the humidity value in the oven (1). An oven shelf (12) is supported by any support member so as to be placed in the oven compartment (11). In an embodiment of the present invention, the oven shelf (12) is a standard oven grill. In an embodiment of the present invention, support members are positioned on the side walls (2, 3) so as to align with each other and face each other. The oven shelf (12) is placed on said support members and is positioned in the oven compartment (11). In different embodiments of the present invention, a large number of oven shelves (12) can be placed in the oven compartment (11) parallel to each other in the horizontal plane with a certain space therebetween.

[0028] The oven (1) comprises an upper plate (13) which is placed under the upper wall (5) and a lower plate (14) which is placed on the lower wall (6). Said upper plate (13) and lower plate (14) comprise a plurality of jet nozzles (15) arranged thereon in rows and columns. Said jet nozzles (15) are configured to transmit hot or cold impingement air towards the oven shelf (12) at a high speed. Relatively hot air entering the middle region of the fan sheet metal (10) passes through the fan (8) and the heater so as to be accelerated after passing through the upper plate (13) and the lower plate (14) to be directed onto the foodstuff surface. In the present invention, the jet nozzles (15) are shaped so as to form a flow pattern which enhances heat transfer on the surface of the foodstuff. Thus, a more homogeneous and high heat transfer distribution is obtained, which enables the foodstuffs to be cooked homogeneously and more quickly in the oven (1).

[0029] In an embodiment of the present invention, the oven is an oven (1) having the air impingement jet technology.

[0030] In an embodiment of the present invention, the oven (1) comprises a plate (17) which is positioned over the jet nozzles (15) on the lower plate (14) so as to cover the entire surface of the jet nozzles (15), which has a movable mechanism that can be opened/closed over the jet nozzles (15) and which has at least two guiding fins (16) that are positioned at an angle with respect to each other in the open position such that the inner surface (16.1) of the one faces the back surface (16.2) of the other and that form a flat surface in the closed position.

[0031] In an embodiment of the present invention, the oven (1) comprises a plurality of fins (16) which are successively positioned on the plate (17) so as to cover the surface of all the nozzles (15) on the lower plate (14). Said fins (16) have a monolithic structure with the plate (17) whereon the former are positioned.

[0032] In an embodiment of the present invention, the oven (1) comprises at least one hinge which is positioned at at least one lower side of the side walls (2, 3) and which corresponds to the lower side of at least one of the side walls (2, 3); and a hinge system (20) which can move forwards and backwards along the y axis at the lower side of at least one of the side walls (2, 3).

[0033] In an embodiment of the present invention, the

oven (1) comprises the hinge (7.6) which is disposed at the lower edge of the door (7) aligning with the lower side of the first side wall (2) of the oven (1) or at the lower edge of the door (7) aligning with the lower side of the second side wall (3) thereof or at both lower edges of the door (7); and a hinge system (20) which can move forwards and backwards on the lower side of said first side wall (2) of the oven (1) or on the lower side of the second side wall (3) thereof or on the lower side of both side walls (2, 3). Said hinge (7.6) and hinge system (20) are connected to each other.

[0034] In an embodiment of the present invention, the hinge system (20) moves forwards and backwards along the y axis at the lower side of the first side wall (2) of the oven (1), or at the lower side of the second side wall (3) thereof or at the lower side of both side walls (2, 3) thereof.

[0035] In an embodiment of the present invention, with the opening movement of the oven (1) door (7), the hinge system (20) is triggered from the hinge (7.6) on the door (7), thus enabling the fins (16) to be closed and forming a flat surface on the jet nozzles (15). When the fins (16) are in the closed position on the jet nozzles (15), the angle between the fins (16) and the surface of the jet nozzles (15) is 0 degree. Thus, liquids which may spill while placing foodstuffs in the oven (1) remain on the surface of the fins (16) and cannot reach the lower wall (6) of the oven (1). With the closing movement of the oven (1) door (7), the hinge system (20) is triggered from the hinge (7.6) on the door (7), thus enabling the fins (16) to open. Thus, the fins (16) switch to the open position to form an angle with the surface of the jet nozzles (15). The angle of said fins (16) when switching from the closed position to the open position is in the range of 0 to 180 degrees. When the door (7) is closed, the fins (16) are opened and the hot air outlet is provided from the jet nozzles (15) such that the air outlet speed is not affected.

[0036] In another embodiment of the present invention, the oven (1) comprises at least one motor (9) which provides the automatic control of the opening and closing movements of the fins (16) on the jet nozzles (15).

[0037] In an embodiment of the present invention, the door (7) comprises a control panel (7.1) having at least one knob (7.2) positioned thereon and a display (7.3) having automatic menus for selecting the foodstuffs to be cooked and a timer and at least one circuit board (7.4) receiving the humidity value from the sensor (21) and accordingly adjusting an air flow; and a switch (7.5) which is disposed at the inner side of the door (7) and which can detect whether the door (7) is open or closed.

[0038] In an embodiment of the present invention, the oven (1) comprises a sensor (21) which measures the humidity content in the oven (1) and records said data; a control panel (7.1) which has a display (7.3) having menus where the user can select the type of foodstuff to be cooked and the temperature is automatically adjusted depending on said foodstuff type and where the user can enter a cooking time as per his/her preference and at least one circuit board (7.4) which receives humidity in-

formation from the at least one sensor (21) and adjusts an air flow according to this information; at least one motor (9) which enables the fins (16) to be move to a certain position depending on the information received from said circuit board (7.4); and at least two fins (16) which are activated by being triggered by the motor (9), which can be opened or closed on the jet nozzles (15) as required or which can be positioned at a certain angle to provide the necessary air flow according to the needs of the cooked foodstuff.

[0039] In another embodiment of the present invention, the movement of the fins (16) on the jet nozzles (15) is automatically provided according to the foodstuff selection in the menus, the cooking function or the data of the sensor (21) in the oven (1), and the air flow balance is provided by changing the angle of the fins (16) according to the need. The jet nozzles (15) on the upper plate (13) and the jet nozzles (15) on the lower plate (14) are both active until a certain cooking level. After reaching a certain cooking level, the extra air flow required to better cook the top or bottom of the foodstuff to be cooked is directed by adjusting the angle of the fins (16). Surprisingly, it has been determined that only by this manner, the optimum internal cooking balance and the brownness of the bottom/top surface can be achieved for foodstuffs such as bread and pizza. For example, when a better brownness is desired while cooking pizza, halfway through the cooking time, the fins (16) move counter-clockwise to direct the air towards the bottom, at a predetermined degree of n such that the bottom of the pizza is better cooked. In another example, when it is desired to better fry the top of the chicken while cooking chicken, the fins (16) provide an m -degree movement clockwise at a determined moment t of the cooking time, thus directing the air to the upper side this time.

[0040] In an embodiment of the present invention, the oven (1) comprises a hidden tray (18) which is positioned under the lower plate (14) and which allows the collection of liquids flowing from the plurality of jet nozzles (15). There is a gap between said hidden tray (18) and the lower plate (14) through which hot air passes. The grease and foodstuff liquids flowing from said jet nozzles (15) are collected in the hidden tray (18) disposed under the lower plate (14). Thus, since grease and foodstuff liquids do not come into direct contact with the hidden heater on the lower wall (6), the problem of said liquids being burnt or being difficult to clean is prevented.

[0041] In an embodiment of the present invention, in the oven (1) with the air impingement jet technology, when viewed from the front wall (7), the lower plate (14) has an inclination towards the rear wall (4). Thus, air flow is provided at the same time, and a homogeneous distribution of hot air is achieved while the weak air flow region between the jet nozzles (15) is strengthened.

[0042] In the present invention, the height of the hidden tray (18) disposed under the lower plate (14) has a decreasing height from the rear wall (4) part towards the front wall (7) part depending on the placement. The ratio

of the front height (h1) of the hidden tray (18) to the rear height (h2) thereof is between 0.3 and 0.8. Thus, the flow of hot air passing between the hidden tray (18) and the lower plate (14) increases towards the front wall (7) and offers a more homogeneous air distribution. Consequently, the air flow difference between the rear wall (4) and the front wall (7) of the oven (1) is reduced. This ensures that the foodstuff in the tray or cooking member is cooked evenly.

[0043] The hidden tray (18) and the lower plate (14) are required to be removed and cleaned periodically. In an embodiment of the present invention, the hidden tray (18) and the lower plate (14) are removed and cleaned separately. There is at least one mounting housing (10.1) on the surface of the fan sheet metal (10) which is in contact with the edge of the lower plate (14). On the surface of the lower plate (14) in contact with the fan sheet metal (10), there is at least one claw (14.1) to be fitted into said at least one mounting housing (10.1). When the lower plate (14) having the jet nozzles (15) is desired to be cleaned, the claw (14.1) on the lower plate (14) is removed from the mounting housing (10.1) on the fan sheet metal (10), and the lower plate (14) is cleaned separately. On the part of the hidden tray (18) facing the front wall (7), there is a connection member (18.1) which enables the hidden tray (18) to be gripped and pulled out of the oven compartment (11) by being pulled. Thus, the hidden tray (18) is taken out of the oven compartment (11) and cleaned by means of this sliding structure.

[0044] In another embodiment of the present invention, the hidden tray (18) and the lower plate (14) are removed and cleaned together. As seen in Figure 8, the bottom plate (14) is mounted to the hidden tray (18) by engaging a catch (14.2), which is positioned on the part of the lower plate (14) facing the front wall (7), with the connection member (18.1) positioned on the part of the hidden tray (18) facing the front wall (7) so as to correspond to the catch (14.2). In an embodiment of the present invention, the connection of said catch (14.2) is provided by a spring mechanism. Said spring mechanism has a structure which can be gripped by the user by hand. The user takes out the hidden tray (18) and the lower plate (14) by holding this spring mechanism. Then, he/she separates the hidden tray (18) and the lower plate (14) from each other by lifting the catch (14.2). After being cleaned, the hidden tray (18) and the lower plate (14) are connected to each other outside and placed in the oven compartment (11).

[0045] In another embodiment of the present invention, the mounting of the lower plate (14) and the fan sheet metal (10) to each other by means of at least one claw (14.1) fitted into at least one mounting housing (10.1) as well as the mounting of the lower plate (14) to the hidden tray (18) by means of a catch (14.2) engaging with the connection member (18.1) can be used together in the same embodiment without changing the above-described embodiments.

[0046] In another embodiment of the present invention, the oven (1) comprises a sheet (19) which has at least

one hole (19.1) positioned thereon, which has at least one connection component (19.2) and which is positioned between the lower plate (14) and the hidden tray (18). On said sheet (19), there are holes (19.1) as many as the number of jet nozzles (15) on the lower plate (14) and with the diameter equal to that of the jet nozzles (15). Said holes (19.1) are positioned on the sheet (19) so as to exactly align with the bottom side of each jet nozzle (15). Said connection component (19.2) is positioned on the sheet (19) so as to be connected to the hinge (7.3) on one lower edge of the door (7) or to the hinge (7.3) on the other lower edge thereof or the hinges (7.3) positioned on both lower edges thereof.

[0047] In another embodiment of the present invention, with the opening movement of the oven (1) door (7), the connection component (19.2) is triggered by the hinge (7.3), thus enabling the sheet (19) to move. During this movement, the sheet (19) moves forward as much as the diameter of one jet nozzle (15), and the closed part on the sheet (19) without holes (19.1) aligns with the jet nozzles (15), thus closing the jet nozzles (15). When the door (7) is closed, the sheet (19) moves in the opposite direction as much as the diameter of one jet nozzle (15). The holes (19.1) on the sheet (19) align with the bottom side of the jet nozzles (15), allowing the jet nozzles (15) to be opened. Thus, the air is directed into the oven (1) through the jet nozzles (15).

[0048] In an embodiment of the present invention, the sheet (19) is triggered by the hinge (7.3) and moves forwards and backwards along a y axis.

[0049] In another embodiment of the present invention, the jet nozzles (15) through which the air exits may have the same or different dimensions. In this case, the dimensions of the holes (19.1) on the sheet (19) are also designed to have the same or different dimensions depending on the diameter of the jet nozzles (15). The dimensions of the jet nozzles (15) can also be adjusted to provide a homogeneous distribution of hot air. In another embodiment of the present invention, the oven (1) comprises a sheet (19) where the holes (19.1) thereon exactly align with the bottom side of each jet nozzle (15) or the closed parts without the holes (19.1) thereon align with the jet nozzles (15); and at least one motor (9) which enables the sheet (19) to move along the y axis such that the jet nozzles (15) are in the open or closed position.

[0050] In another embodiment of the present invention, a switch (7.5) which can detect whether the door (7) is open or closed triggers the motor (9), which, when the door (7) is open, moves the sheet such that the parts thereof without holes (19.1) exactly align with the jet nozzles (15) so as to close the bottom side of the jet nozzles (15). Thus, any liquid flow which may pass through the jet nozzles (15) is prevented. Likewise, the switch (7.5), which detects the information that the door (7) is closed, triggers the motor (9), which moves the sheet (19) such that the holes (19.1) thereon exactly align with the bottom side of the jet nozzles (15), thereby opening the bottom side of the jet nozzles (15) and providing air flow.

[0051] In another embodiment of the present invention, when the static mode is selected with the knob (7.2) during the cooking process, the circuit board (7.4) detects this mode and triggers the motor (9). The motor (9) moves the sheet (19) and with the movement of the sheet (19) in the y axis in the static cooking mode, the parts without holes (19.1) exactly align with the bottom side of the jet nozzles (15), thus closing the bottom side of the jet nozzles (15). Thus, any liquid flow which may pass through the jet nozzles (15) is prevented. Likewise, when the fan cooking mode is selected with the knob (7.2), the circuit board (7.4) triggers the motor (9), which moves the sheet (19) such that the holes (19.1) thereon exactly align with the bottom side of the jet nozzles (15), thereby opening the bottom side of the jet nozzles (15) and providing air flow.

Claims

1. An oven (1) **comprising** an oven compartment (11) defined by the side walls (2, 3), a rear wall (4), an upper wall (5), a lower wall (6) and a door (7), a lower plate (14) provided on the lower wall (6); and a plurality of jet nozzles (15) arranged on said lower plate (14), **characterized by** a plate (17) positioned over the jet nozzles (15) on the lower plate (14) so as to cover the entire surface of the jet nozzles (15), which has a movable mechanism that can be opened/closed over the jet nozzles (15) and which has at least two guiding fins (16) that are positioned at an angle with respect to each other in the open position such that the inner surface (16.1) of the one faces the back surface (16.2) of the other and that form a flat surface in the closed position.
2. An oven (1) according to Claim 1, **characterized by** a hidden tray (18) which is disposed under the lower plate (14) and which collects the liquids that may flow from the jet nozzles (15).
3. An oven (1) according to Claim 1 or 2, **characterized by** a large number of fins (16) which are positioned on the plate (17) in a gradual order and which has a monolithic structure with the plate (17).
4. An oven (1) according to any one of Claims 1 to 3, **characterized by** the fins (16) each having an angle of 0 degrees with respect to the plate (17) when in the closed position and an angle of 180 degrees with respect to the plate (17) when in the open position.
5. An oven (1) according to any of Claims 1 to 4, **characterized by** at least one hinge (7.6) which is positioned at least one lower edge of the door (7) and which aligns with the lower side of at least one of the side walls (2, 3) and which triggers the fins (16) so as to enable the same from shifting from the open

position to the closed position or from the closed position to the open position; and a hinge system (20) which can move forwards and backwards on the lower side of at least one of the side walls (2, 3).

6. An oven (1) according to Claim 5, **characterized by** the hinge (7.6) which is disposed at the lower edge of the door (7) aligning with the lower side of the first side wall (2) or at the lower edge of the door (7) aligning with the lower side of the second side wall (3) or at both lower edges of the door (7); and a hinge system (20) which is connected to said hinge (7.6) and which can move forwards and backwards on the lower side of the first side wall (2) or on the lower side of the second side wall (3) or on the lower side of both side walls (2, 3).
7. An oven (1) according to any one of Claims 1 to 4, **characterized by** at least one sensor (21) disposed in the oven compartment (11) and measures the humidity in the oven (1), a control panel (7.1) having a display (7.3) which has automatic menus for enabling the user to select the type of foodstuff to be cooked and also enabling the user to enter a cooking temperature and cooking time and at least one circuit board (7.4) which adjusts an air flow according to the information received from the sensor (21), at least one motor (9) which moves the fins (16) to bring the same to a certain position according to the information received from said electronic card (7.4), and at least two fins (16) which are activated by being triggered by the motor (9).
8. An oven (1) comprising an oven compartment (11) defined by the side walls (2, 3), a rear wall (4), an upper wall (5), a lower wall (6) and a door (7) and a lower plate (14) which is provided on the lower wall (6); and a plurality of jet nozzles (15) which are arranged on said lower plate (14), **characterized by** a sheet (19) which is disposed under the lower plate (14) and which has holes (19.1) as many as the number of jet nozzles (15) on the lower plate (14) and with the diameter equal to that of the jet nozzles (15), which are positioned so as to align with the bottom side of each jet nozzle (15).
9. An oven (1) according to Claim 8, **characterized by** a sheet (19) where the holes (19.1) thereon have the same dimensions or different dimensions according to the diameter of the jet nozzles (15).
10. An oven (1) according to Claim 8 or 9, **characterized by** a hidden tray (18) which is disposed under the sheet (19) and which collects the liquids that may flow from the holes (19.1).
11. An oven (1) according to any one of Claims 8 to 10, **characterized by** a sheet (19) having at least one

connection component (19.2) which is positioned at at least one edge of the sheet (19) so as to trigger the sheet (19) to enable the sheet (19) to move forwards and backwards; and at least one hinge (7.6) which is connected to the at least one connection component (19.2) and which is positioned at at least one lower edge of the door (7).

12. An oven (1) according to any one of Claims 8 to 10, **characterized by** at least one knob (7.2) which is positioned on the door (7); a circuit board (7.4) which detects the mode selected by the knob (7.2) and a motor (9) which detects the mode and which enables the sheet (19) to move forwards and backwards.
13. An oven (1) according to any one of the above claims, **characterized by** the air impingement jet technology.

5

10

15

20

25

30

35

40

45

50

55

Figure 1

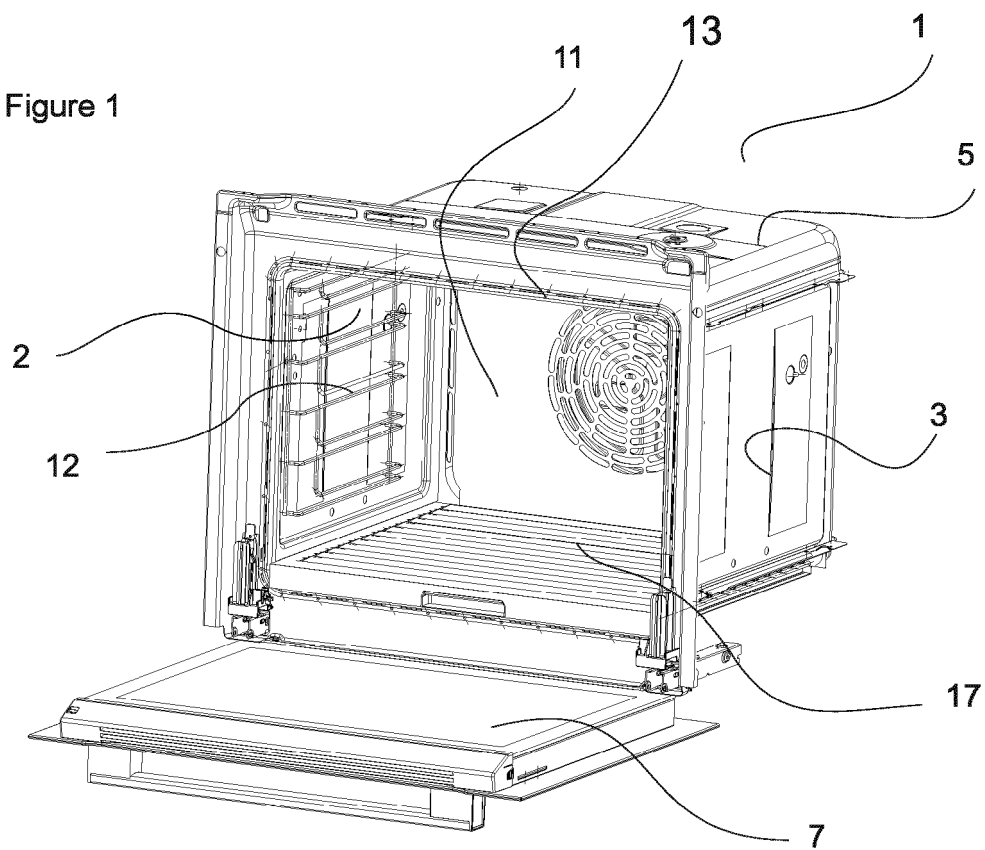


Figure 2

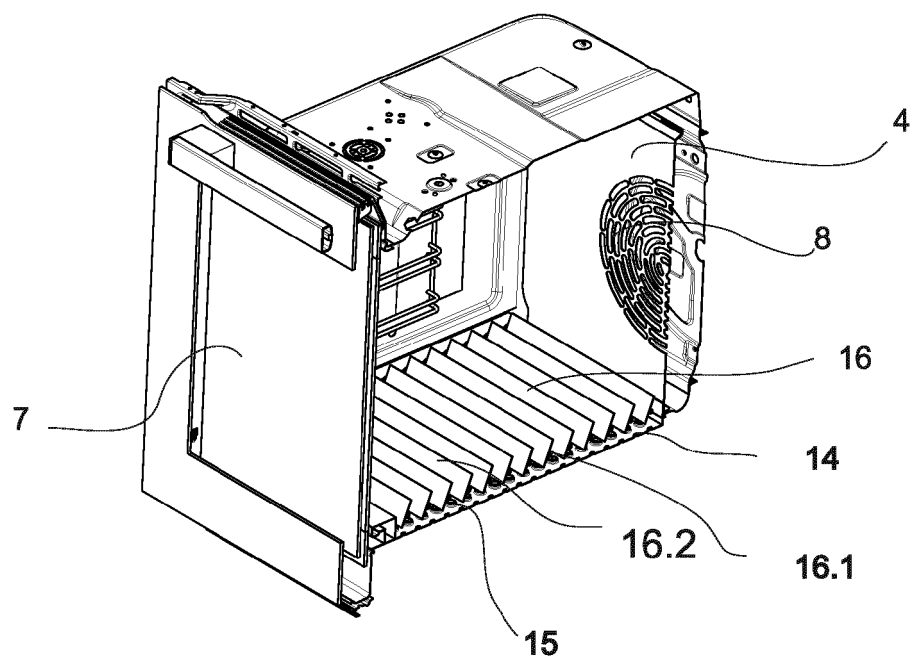


Figure 3

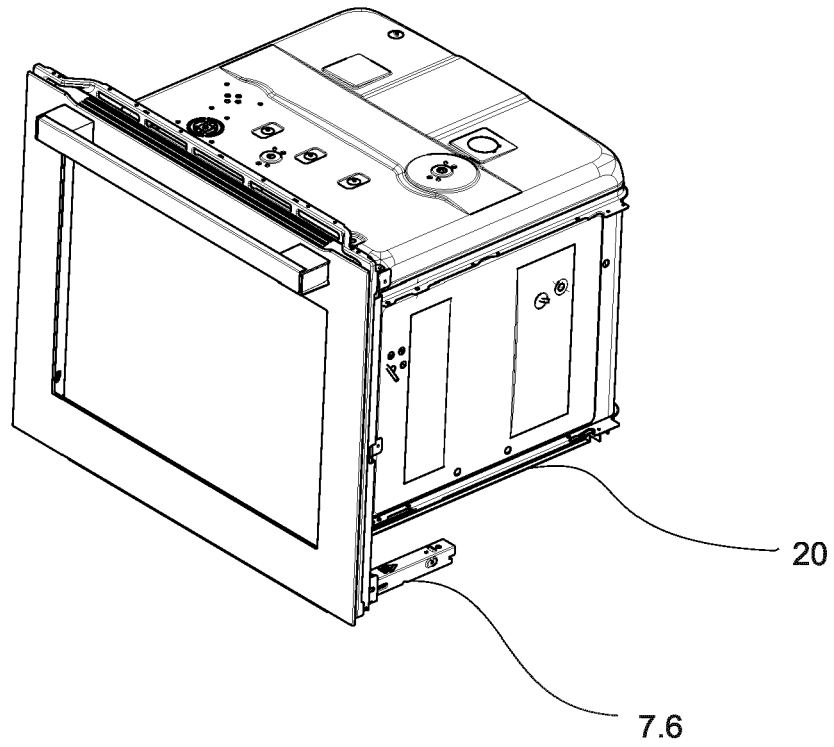


Figure 4

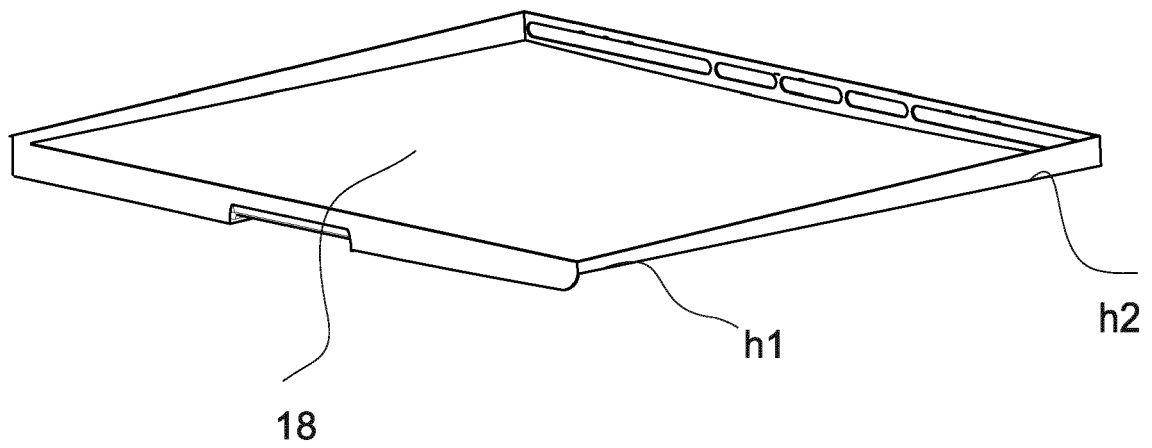


Figure 5

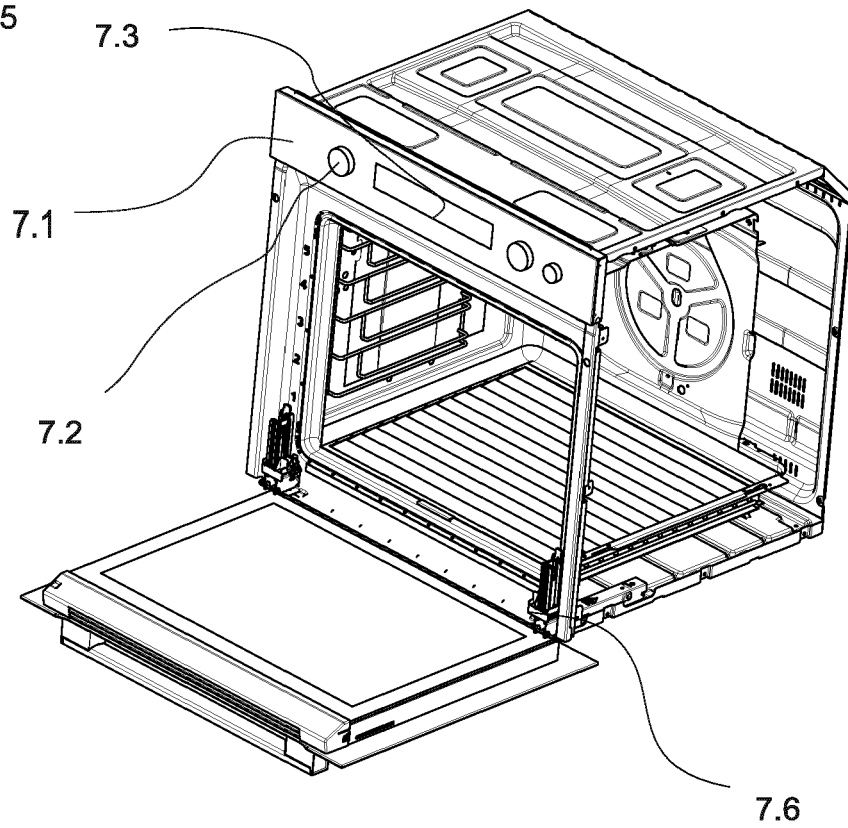


Figure 6

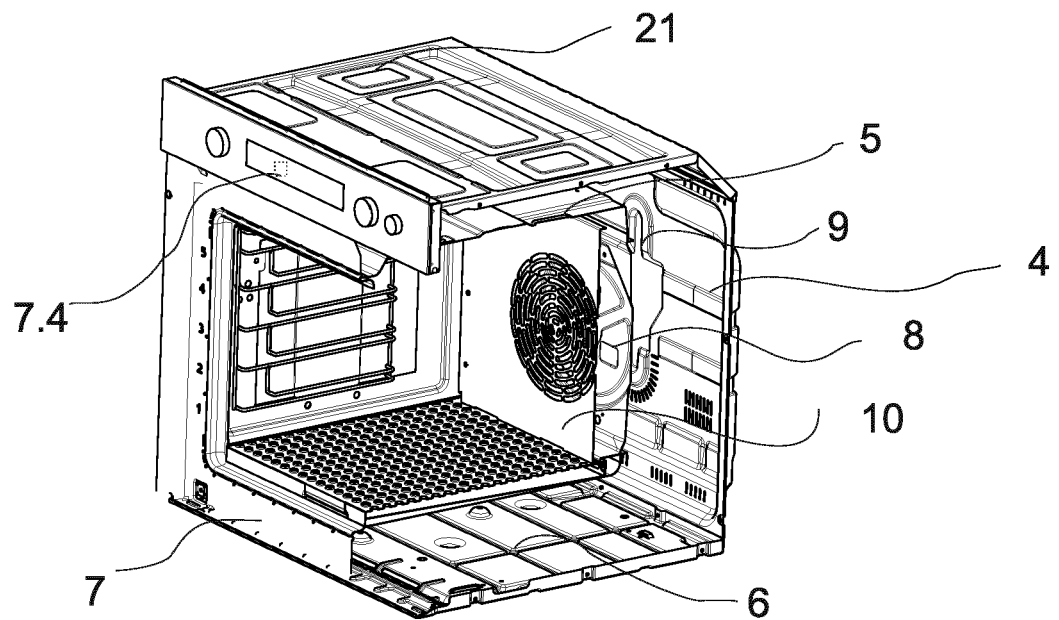


Figure 7

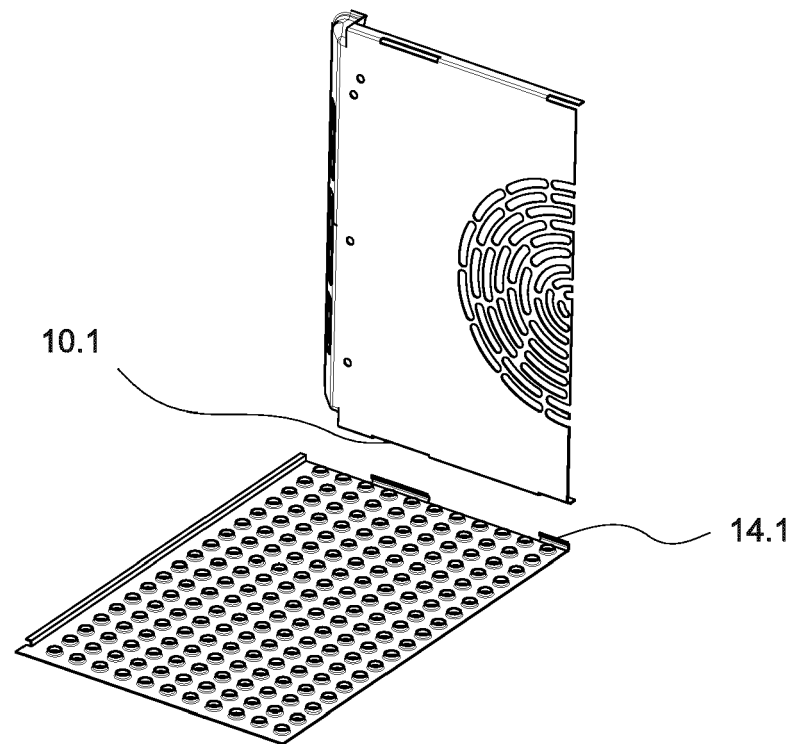


Figure 8

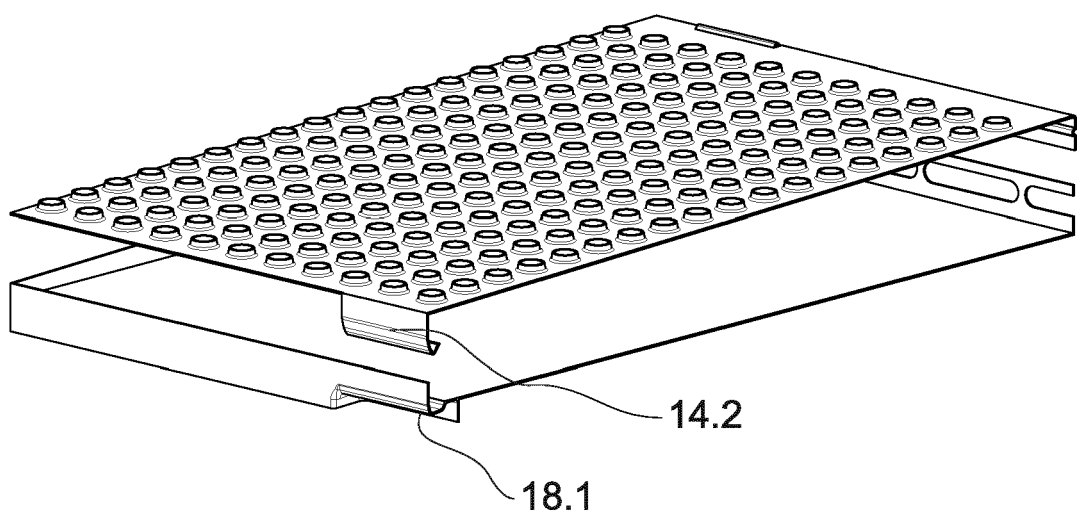


Figure 9

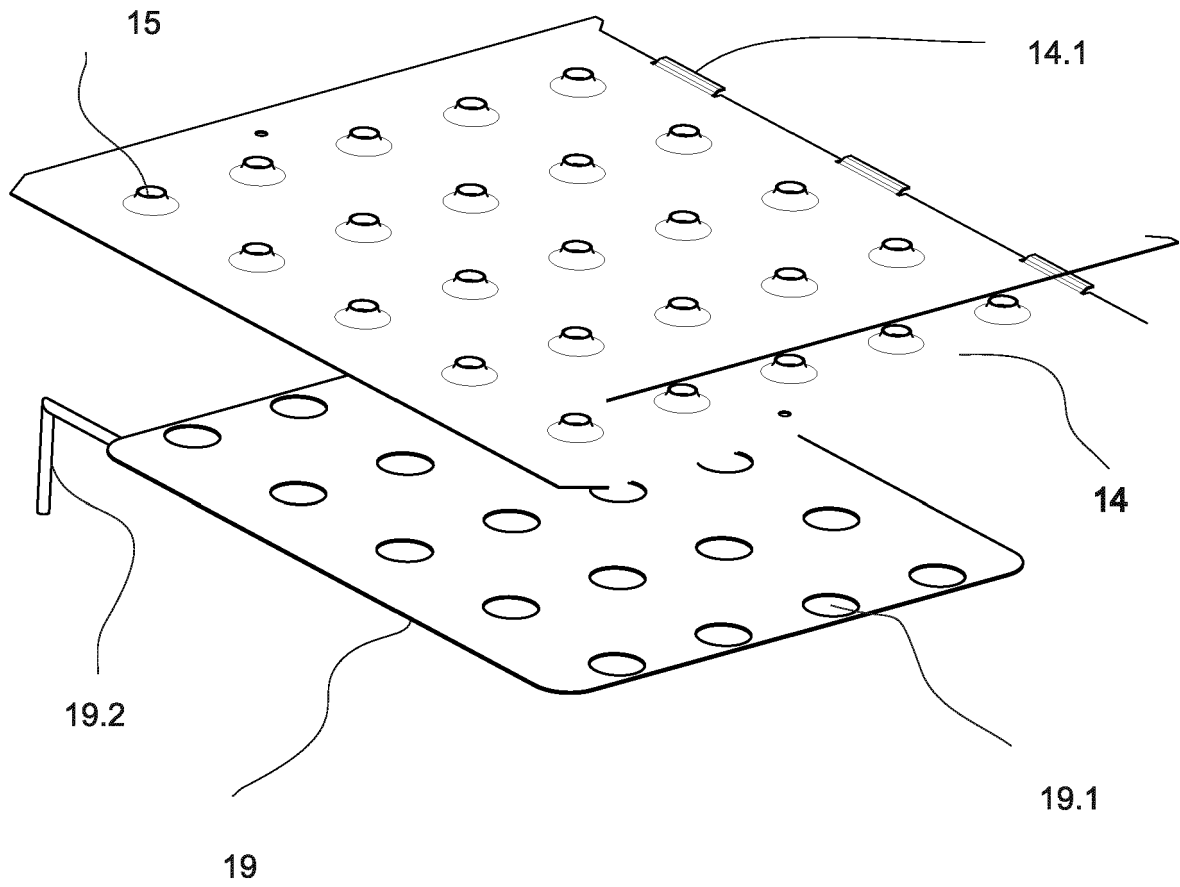
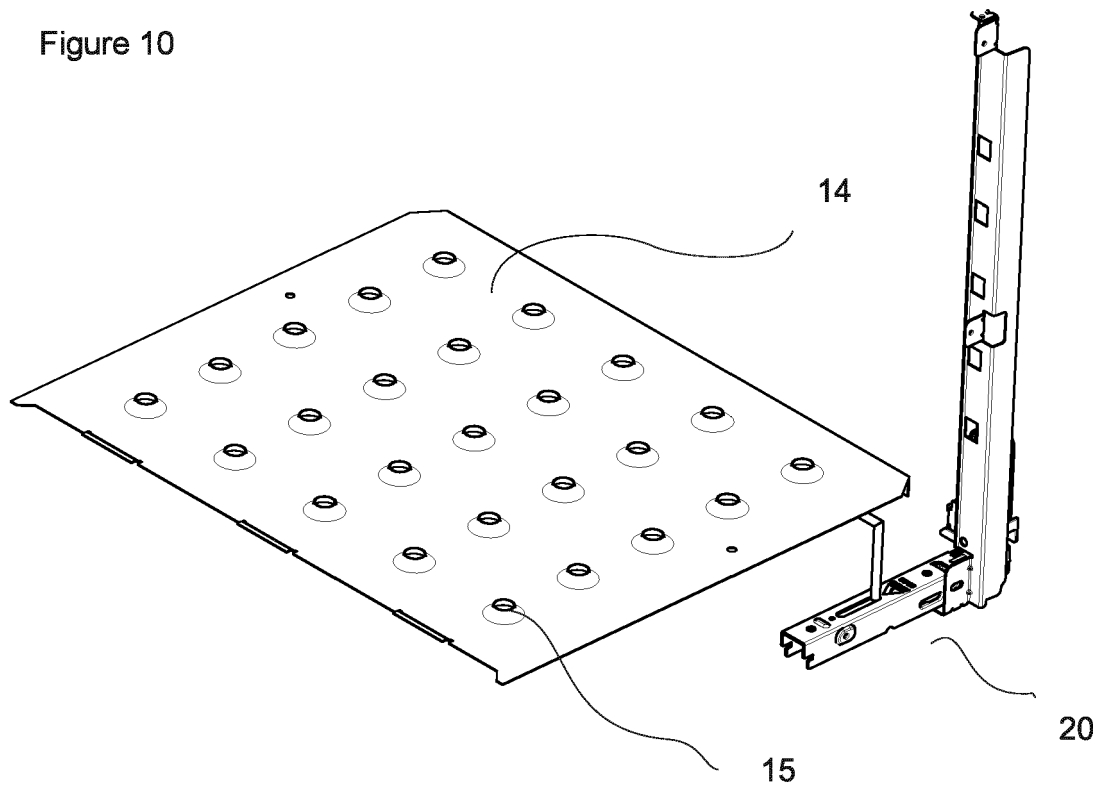


Figure 10





EUROPEAN SEARCH REPORT

Application Number

EP 23 18 8643

5

10

15

20

25

30

35

40

45

50

55

2

EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	JP 2016 128745 A (MITSUBISHI ELECTRIC CORP; MITSUBISHI ELECTRIC HOME APPLIANCE CO LTD) 14 July 2016 (2016-07-14)	1-4, 7-10, 12, 13	INV. F24C15/32 F24C15/14
A	* figures 1-11 *	5, 6, 11	
Y	JP 2005 233467 A (MATSUSHITA ELECTRIC IND CO LTD) 2 September 2005 (2005-09-02)	1-4, 7-10, 12, 13	
A	* paragraphs [0009] - [0012], [0031], [0036] - [0037]; figures 1-8 *	5, 6, 11	
A	US 2007/295322 A1 (DOBIE MICHAEL J [US] ET AL) 27 December 2007 (2007-12-27)	1-13	
A	US 4 829 158 A (BURNHAM LOWELL C [US]) 9 May 1989 (1989-05-09)	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			F24C A21B
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		18 December 2023	Verdoodt, Luk
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			

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

EP 23 18 8643

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.

18-12-2023

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 2016128745 A	14-07-2016	JP 6143901 B2	07-06-2017
		JP 2016128745 A	14-07-2016

JP 2005233467 A	02-09-2005	NONE	

US 2007295322 A1	27-12-2007	AU 2005311599 A1	08-06-2006
		AU 2008249242 A1	18-12-2008
		BR PI0515751 A	29-07-2008
		CA 2589319 A1	08-06-2006
		EP 1825198 A2	29-08-2007
		JP 5134969 B2	30-01-2013
		JP 2008522135 A	26-06-2008
		KR 20070091635 A	11-09-2007
		US 2007295322 A1	27-12-2007
		WO 2006060751 A2	08-06-2006

US 4829158 A	09-05-1989	NONE	

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- WO 2010135693 A1 [0005]