(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 336 646 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
22.06.2011 Bulletin 2011/25

(21) Application number: **09814513.9**

(22) Date of filing: **10.09.2009**

(51) Int Cl.:
F24C 15/02 *(2006.01)* ***A47J 37/06*** *(2006.01)*
F24C 7/04 *(2006.01)*

(86) International application number:
PCT/JP2009/065805

(87) International publication number:
WO 2010/032668 (25.03.2010 Gazette 2010/12)

(84) Designated Contracting States:
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 SE SI SK SM TR
Designated Extension States:
AL BA RS

(30) Priority: **17.09.2008 JP 2008237631**

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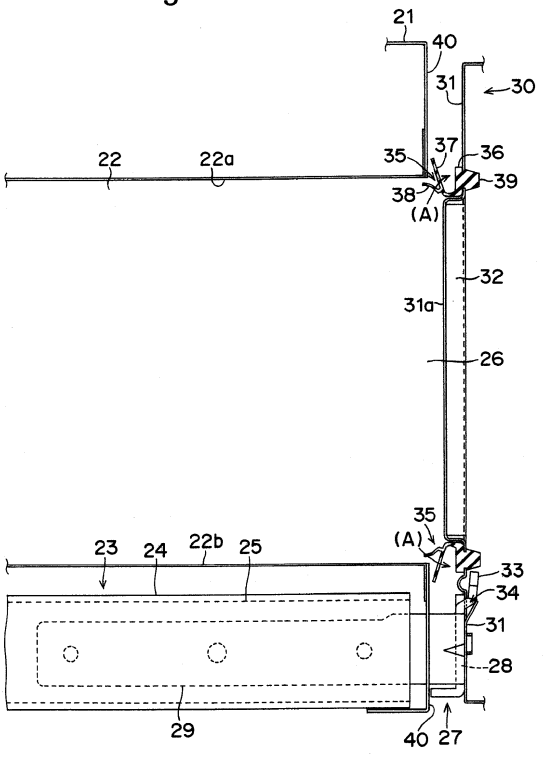
(54) COOKING DEVICE

(57) Door packing (35) having a base (36), a first lip (37), and a second lip (38) is stretched around periphery of a back surface cover (31) of a door (30). When the door (30) is closed, the second lip (38) is inserted into a heating chamber (22), the first lip (37) pivots in directions of arrows (A) once an extremity of the first lip (37) comes into contact with a front face panel (40), and an extremity of the second lip (38) is then brought into close contact with inner wall surfaces of the heating chamber (22). Thus both the front face panel (40) and the inner wall surfaces of the heating chamber (22) are sealed, so that smoke, steam and the like produced by objects to be heated are reliably prevented from leaking out of the heating chamber (22). Besides, condensed water is prevented from accumulating in a groove formed on a border between the front face panel (40) and the first lip (37) while the front face panel (40) is sealed by the first lip (37), and thus the condensed water in the groove is prevented from falling down out of the heating chamber (22) when the door (30) is opened.

Fig.1



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Description

TECHNICAL FIELD

[0001] The present invention relates to a cooking device that performs heat cooking by heat from a heat source with respect to objects to be heated placed in a heating chamber.

BACKGROUND ART

[0002] There has been a conventional cooking device disclosed in JP 11-83037 A (Patent Literature 1). In the cooking device disclosed in Patent Literature 1, as shown in Fig. 6, a heater 2 is mounted in a cooking chamber 1 having an opening on a front face thereof, a handle 4 is mounted on a lower front face of a door 3 for opening and closing the opening of the cooking chamber 1, and a receiving tray 6 is connected to a rear face of the door 3 by a connection part 5. A grill 7 on which objects to be cooked are to be placed is placed in the receiving tray 6. That is, the door 3 is a drawer-type door to which the receiving tray 6 is connected.

[0003] A pad surface 9 is formed around the opening 8 of the cooking chamber 1, and door packing 10 is provided on the pad surface 9 so as to surround the opening 8. The door packing 10 is composed of elastic material such as rubber and has a thick part 11 and a thin part 12.

[0004] Bosses 13 shaped like arrowheads are provided in the thick part 11 of the door packing 10, so that the door packing 10 is mounted on and fixed to the pad surface 9 by insertion of the bosses 13 into holes bored through the pad surface 9. The thin part 12 is cantilevered by the thick part 11 and is formed of a convex curved surface extending outward. In this configuration, a height of the convex curved surface from the pad surface 9 is set at a height such that an extremity of the thin part 12 collides with an inside wall of the door 3 sooner than an extremity of the thick part 11 does when the door 3 is closed.

[0005] When objects to be cooked such as fishes are placed on the receiving tray 6 through medium of the grill 7 and are heated by energization of the heater 2, in an above configuration, smoke, steam and the like are produced from the objects to be cooked. The smoke, steam and the like are prevented from leaking out of the door 3 because the opening 8 of the cooking chamber 1 is covered with the door packing 10.

[0006] The conventional cooking device disclosed in Patent Literature 1, however, has problems as follows.

[0007] The objects to be cooked having comparatively little moisture, such as fishes, as described above, cause no problem because a quantity of steam produced from the objects to be cooked is small, whereas a large quantity of steam is produced when the objects to be cooked having much moisture, such as vegetables, are heated. Recently, use of steam as heat source has been increasing. In the use, a large quantity of steam is supplied in the cooking chamber 1. The steam that comes into contact with the door 3 having a low temperature becomes condensed water by being condensed and, in course of time, the condensed water flows downward along the inside wall of the door 3.

[0008] The door packing 10 is mounted on the pad surface 9 provided around the opening 8 on the front face of the cooking chamber 1 so that the thin part 12 formed of the convex curved surface is brought into contact with the inside wall of the door 3. Accordingly, the thin part 12 of the door packing 10 that is positioned on lower side on the opening 8 of the cooking chamber 1 extends downward and outward from the thick part 11, and contact thereof with the inside wall of the door 3 forms a groove 14 that is defined by the door 3 and the thin part 12 of the door packing 10.

[0009] Thus a problem is caused in that the condensed water having flowed down along the inside wall of the door 3 accumulates in the groove 14 and in that the condensed water having accumulated in the groove 14 falls down out of the cooking chamber 1 and wets a floor surface when the opening 8 is opened with the door 3 drawn out. There is another problem in that a drip pan (not shown) is required to be provided under the door packing 10 positioned on the lower side, in order to prevent the floor surface from being wetted.

CITATION LIST

PATENT LITERATURE

[0010] PATENT LITERATURE 1: JP 11-83037 A

SUMMARY OF INVENTION

TECHNICAL PROBLEM

[0011] An object of the invention is to provide a cooking device that prevents condensed water from falling down out of a heating chamber when a door of the heating chamber is opened.

SOLUTION TO PROBLEM

[0012] In order to solve above problems, a cooking device of the invention comprises:

a heating chamber which has an opening and in which objects to be heated inserted through the opening are heated by heat from a heat source,
a door for opening and closing the opening of the heating chamber, and
door packing which is provided in a position on the door that faces an edge of the opening of the heating chamber and which seals at least inner wall surfaces of the heating chamber.

[0013] According to an above configuration, the inner

wall surfaces of the heating chamber are sealed by the door packing provided in the position on the door that faces the edge of the opening of the heating chamber. Accordingly, condensed water produced in the heating chamber can be prevented from accumulating in a groove formed on a border between a front face panel around periphery of the opening of the heating chamber and the door packing when the opening of the heating chamber is closed by the door, so that the condensed water that might accumulate in the groove can be prevented from falling down out of the heating chamber and wetting a floor surface when the door is opened.

[0014] In an embodiment, the door packing is provided at least in a position below a horizontal plane passing through a center of the opening.

[0015] According to the embodiment, condensed water that has been produced in the heating chamber and that has accumulated in lower side in the heating chamber can be sealed by the door packing provided at least in the position that is below the horizontal plane passing through the center of the opening. Accordingly, the door packing does not have to be provided on overall periphery of the door and thus cost reduction can be attained.

[0016] In an embodiment, the door packing includes:

a first sealing part for sealing a front face panel around periphery of the opening of the heating chamber in conjunction with an operation of closing the opening by the door, and

a second sealing part for sealing the inner wall surfaces of the heating chamber in conjunction with an operation of sealing the periphery of the opening by the first sealing part.

[0017] According to the embodiment, the sealing operation by the second sealing part is not started until the sealing operation by the first sealing part is started because the periphery of the opening of the heating chamber is sealed by the first sealing part in conjunction with the operation of closing the opening by the door and because the inner wall surfaces of the heating chamber are sealed by the second sealing part in conjunction with the operation of sealing the periphery of the opening by the first sealing part. Accordingly, an extremity of the second sealing part can be prevented from being nipped between the door and the edge of the opening of the heating chamber even if a variation is caused in a mounting position of the door relative to the opening of the heating chamber.

[0018] In an embodiment, the door packing seals both the front face panel around the periphery of the opening of the heating chamber and the inner wall surfaces of the heating chamber when the opening is completely closed by the door.

[0019] According to the embodiment, the door packing seals both the front face panel around the periphery of the opening of the heating chamber and the inner wall surfaces of the heating chamber when the opening is completely closed by the door, and thus smoke, steam and the like produced from the objects to be heated or steam as the heat source can reliably be prevented from leaking out of the heating chamber when the objects to be heated in the heating chamber is heated by heat from the heat source.

[0020] In an embodiment, a depression for accumulating condensed water produced in the heating chamber and preventing the condensed water from flowing out of the heating chamber upon opening of the door is provided on a side opposite to the opening with respect to a position of sealing by the door packing on the bottom wall surface of the heating chamber.

[0021] According to the embodiment, the depression for accumulating the condensed water produced in the heating chamber is provided on the bottom wall surface of the heating chamber. As a result, the condensed water can be prevented from flowing out of the heating chamber even if a surface on which the cooking device is placed is slightly inclined so as to face the opening and/or even if a large quantity of the condensed water has been formed.

ADVANTAGEOUS EFFECTS OF INVENTION

[0022] As apparent from the above description, according to the cooking device of the invention, the inner wall surfaces of the heating chamber are sealed by the door packing provided in the position on the door that faces the edge of the opening of the heating chamber. Accordingly, condensed water produced in the heating chamber can be prevented from accumulating in a groove formed on a border between a front face panel around periphery of the opening of the heating chamber and the door packing when the opening of the heating chamber is closed by the door, so that the condensed water that might accumulate in the groove can be prevented from falling down out of the heating chamber and wetting a floor surface when the door is opened.

[0023] According to the invention, consequently, a drip pan does not have to be provided under the opening of the heating chamber and thus users can be released from troublesomeness of washing and attachment of the drip pan.

BRIEF DESCRIPTION OF DRAWINGS

[0024]

Fig. 1 is a vertical section of vicinity of a door in a cooking device of the invention;

Fig. 2 is a section showing a state in which the door is closed in Fig. 1;

Fig. 3 is a diagram showing a shape of a section of door packing different from door packing of Figs. 1 and 2;

Fig. 4A is a diagram showing a shape of a section of door packing (in a state in which an extremity part thereof is in contact with a front face panel) different

from the door packing of Figs. 1, 2 and 3;

Fig. 4B is a diagram showing a state in which the extremity part of the door packing shown in Fig. 4A is in close contact with inner wall surfaces of a heating chamber;

Fig. 5 is a section of a bottom wall surface different from a bottom wall surface of the heating chamber of Figs. 1 and 2; and

Fig. 6 is a vertical section of vicinity of a door in a conventional cooking device.

DESCRIPTION OF EMBODIMENTS

[0025] Hereinbelow, the invention will be described in detail with reference to embodiments shown in the drawings. Fig. 1 is a vertical section of vicinity of a door in a cooking device of the embodiment. The cooking device may have a configuration that has an upper heater unit for heating objects to be heated such as pot, on top of a main body, and that is incorporated in a cabinet of a built-in kitchen or may have a configuration that is used as a sole device.

[0026] In Fig. 1, a heating chamber 22 in which objects to be heated are put inside and heated by heat from a heat source (not shown) is provided in a housing (cabinet) 21 which forms a main body. Under the heating chamber 22 is provided a pair of rail units 23 on both sides for smoothly taking the objects to be heated in and out of the heating chamber 22. The heat source is not especially limitative, and there may be used a sheath heater using nichrome wires, a gas burner, a superheated steam supplying device or the like.

[0027] The rail units 23 are composed of fixed rails 24 that are mounted on a bottom surface of the housing 21 on both sides of the heating chamber 22 so as to extend in front-to-back directions and movable rails 25 that are slidably inserted into the fixed rails 24 so as to move in the front-to-back directions. Herein, the term "front" in the "front-to-back directions" refers to a side of the opening 26 in the heating chamber 22, and the term "back" refers to a side opposite to the side of the opening 26.

[0028] Front end parts of the movable rails 25 in the pair of rail units 23 are connected to each other by a rail connecting part 27 on front side of the housing 21. The rail connecting part 27 is formed by a metal plate bent into shape of a square bracket and is composed of a planar door mounting member 28 in an intermediate position and rail mounting members 29 that are positioned on both sides of the door mounting member 28, that extend in a direction generally perpendicular to the door mounting member 28, and that are fixed to the movable rails 25 after being inserted into the front end parts of the movable rails 25.

[0029] Though not described in detail, the door of drawer type to which a receiving tray is connected can be built in the embodiment also, as in the conventional cooking device disclosed in Patent Literature 1, provided that the receiving tray is connected by a connecting part to a back surface of the door 30 detachably mounted on the door mounting member 28 of the rail connecting part 27 or to the rail connecting part 27.

[0030] The door 30 is detachably mounted on the door mounting member 28 of the rail connecting part 27 as follows. That is, the door 30 is configured so as to include a metallic back surface cover 31 having a viewing window (not shown) and a glass plate 32 fitted in a recess 31a formed in a position corresponding to the viewing window on the back surface cover 31. An engagement hole 34 into which a door engagement part 33 of the rail connecting part 27 is to be inserted is formed at width-wise center part under the recess 31a on the back surface cover 31. The door engagement part 33 protruding upward from width-wise center part of the door mounting member 28 of the rail connecting part 27 is inserted into the engagement hole 34 on the back surface cover 31, so that the door engagement part 33 is engaged with the engagement hole 34, and the door 30 is detachably attached to the door mounting member 28 of the rail connecting part 27 by the engagement.

[0031] Around the recess 31a of the back surface cover 31, door packing 35 is stretched along intersections with extension planes of a top wall surface 22a, a bottom wall surface 22b, and both side wall surfaces (not shown in Fig. 1) of the heating chamber 22 which planes extend toward the front side.

[0032] The door packing 35 has a configuration as follows. That is, the door packing 35 is composed of elastic material such as rubber and has a base 36 composed of a thick part and lips 37, 38 composed of thin parts. Bosses 39 shaped like arrowheads are provided at intervals on the base 36, so that the door packing 35 is mounted on and fixed to the back surface cover 31 by insertion of the bosses 39 into holes bored through the back surface cover 31. The lips 37, 38 are cantilevered by the base 36 and are generally composed of a first lip 37 as the first sealing part extending outward, obliquely backward and radially toward a side of the front face panel 40 of the housing 21 and a second lip 38 as the second sealing part branching from the first lip 37 and extending obliquely backward and radially toward the top wall surface 22a, the bottom wall surface 22b, and both the side wall surfaces of the heating chamber 22.

[0033] In a state in which the door 30 is opened as shown in Fig. 1, a distance between an extremity of the first lip 37 of the door packing 35 mounted on top side of the door 30 and the extremity of the first lip 37 of the door packing 35 mounted on bottom side of the door 30 is set larger than a distance between the top wall surface 22a and the bottom wall surface 22b of the heating chamber 22. A distance between an extremity of the second lip 38 of the door packing 35 mounted on the top side of the door 30 and the extremity of the second lip 38 of the door packing 35 mounted on the bottom side of the door 30 is set smaller than the distance between the top wall surface 22a and the bottom wall surface 22b of the heating chamber 22.

[0034] In the state in which the door 30 is opened, similarly, a distance between the extremity of the first lip 37 of the door packing 35 mounted on both lateral sides of the door 30 is set larger than a distance between both the side wall surfaces of the heating chamber 22. A distance between the extremity of the second lip 38 of the door packing 35 mounted on both the lateral sides of the door 30 is set smaller than the distance between both the side wall surfaces of the heating chamber 22.

[0035] The second lip 38 is configured so that the extremity of the second lip 38 is positioned in the heating chamber 22 at a point in time when the extremity of the first lip 37 comes into contact with the front face panel 40.

[0036] The cooking device having above configurations operates as follows. In order that objects to be heated may be put in the heating chamber 22, the door 30 is drawn out toward the front side so as to open the opening 26 of the heating chamber 22. In this state, as shown in Fig. 1, the door packing 35 is spaced from the front face panel 40 of the housing 21 and from inner wall surfaces composed of the top wall surface 22a, the bottom wall surface 22b, and both the side wall surfaces of the heating chamber 22. Accordingly, the extremity of the first lip 37 is then in a position in front of the front face panel 40 and the extremity of the second lip 38 is in a position on inner side of the inner wall surfaces of the heating chamber 22. In this state, the objects to be heated are put in the heating chamber 22, and the door 30 is pushed back toward the back side so as to close the opening 26 of the heating chamber 22, as shown in Fig. 2. In that process, the second lip 38 is inserted into the heating chamber 22, as seen from Fig. 1, because the extremity of the second lip 38 is in the position on the inner side of the inner wall surfaces of the heating chamber 22. Once the extremity of the first lip 37 comes into contact with the front face panel 40, the first lip 37 is bent, owing to elasticity thereof, with retreat of the door 30 and generally pivots in directions of arrows (A) on positions of connection thereof to the base 36. The extremity of the second lip 38 moves toward the inner wall surfaces of the heating chamber 22, as the first lip 37 pivots, and complete closure of the door 30 as shown in Fig. 2 brings a seal surface of the first lip 37 into close contact with the front face panel 40 of the housing 21 and brings the extremity of the second lip 38 into close contact with the inner wall surfaces of the heating chamber 22.

[0037] In the embodiment, in this manner, both the front face panel 40 and the inner wall surfaces of the heating chamber 22 that define periphery of the opening 26 of the heating chamber 22 can be sealed by the door packing 35 when the door 30 is pushed back toward the back side to close the opening 26 of the heating chamber 22. When the objects to be heated in the heating chamber 22 are heated by heat from the heat source, therefore, smoke, steam and the like produced from the objects to be heated or steam used as the heat source can reliably be prevented from leaking out of the heating chamber 22.

[0038] Herein, the door packing 35 is composed of the thick base 36 mounted on and fixed to the back surface cover 31 of the door 30, the thin first lip 37 cantilevered by the base 36 and extending outward and radially toward the side of the front face panel 40 of the housing 21, and the thin second lip 38 branching from the first lip 37 on the inner side of the extension planes of the inner wall surfaces of the heating chamber 22 and extending toward the inner wall surfaces of the heating chamber 22. Therefore, condensed water that has been made by the contact of steam in the heating chamber 22 with the back surface cover 31 of the door 30 and that has flowed down along the back surface cover 31 is made to flow back along the first lip 37 and the second lip 38 of the door packing 35 onto a part of the bottom wall surface 22b of the heating chamber 22 that is deeper than the extremity of the second lip 38.

[0039] As a result, the condensed water can be prevented from accumulating in the groove that is formed on a border between the front face panel 40 of the housing 21 and the first lip 37 when the first lip 37 of the door packing 35 seals the front face panel 40, so that the condensed water that might accumulate in the groove can be prevented from falling down out of the heating chamber 22 and wetting a floor surface when the door 30 is drawn out to open the heating chamber 22.

[0040] On this occasion, the extremity of the second lip 38 that seals the inner wall surfaces of the heating chamber 22 is required to be in contact with the inner wall surfaces in the heating chamber 22. This requires that the distance between the extremities of the second lips 38 which face each other should be smaller than the distance between the inner wall surfaces of the heating chamber 22 which face each other, when the door 30 is in the open state, and that the extremity of the second lip 38 should be in close contact with the inner wall surfaces of the heating chamber 22, when the door 30 is in a closed state.

[0041] In order to attain that, the door packing 35 of the embodiment is configured so as to cause the contact of the extremity of the first lip 37 with the front face panel 40 after the insertion of the second lip 38 into the heating chamber 22, the pivoting of the first lip 37 in the directions of the arrows (A), the concomitant movement of the extremity of the second lip 38 toward the inner wall surfaces of the heating chamber 22, and the close contact of the extremity of the second lip 38 with the inner wall surfaces of the heating chamber 22 upon the complete closure of the door 30. This has an effect of preventing the extremity of the second lip 38 from being nipped between the front face panel 40 and the door 30 with the closure of the door 30 even if a variation is caused in a mounting position of the door 30 relative to the opening 26 of the heating chamber 22.

[0042] A shape of the section of the door packing 35 is not limited to a shape shown in Figs. 1 and 2. In brief, the shape of the section has only to be designed so that at least the inner wall surfaces of the heating chamber 22 can be sealed. As shown in Fig. 3, for instance, the

seal of the inner wall surfaces of the heating chamber 22 can further be strengthened by a second lip 41 of which extremities are to be brought into close contact with the inner wall surfaces of the heating chamber 22 and which is composed of two lips.

[0043] As shown in Figs. 4A and 4B, alternatively, the first lip 37 is omitted and only a second lip 42 is provided. The second lip 42 is configured so as to be cantilevered by the base 36 and so as to extend outward and radially toward the side of the front face panel 40 of the housing 21. In this configuration, a distance between extremities of the second lips 42 that face each other is set larger than the distance between the inner wall surfaces of the heating chamber 22 that face each other. Accordingly, an extremity part of the second lip 42 of which the extremity has been brought into contact with the front face panel 40 with closure of the door 30 as shown in Fig. 4A is curved so as to protrude toward the back side as shown in Fig. 4B with movement of the door 30 and is inserted into the heating chamber 22 while being in close contact with the inner wall surfaces of the heating chamber 22.

[0044] In this configuration, there is no groove formed on a border between the front face panel 40 of the housing 21 and the door packing 35 because the door packing 35 does not seal the front face panel 40 when the door 30 is closed. As a result, the condensed water is prevented from accumulating on the front face panel 40 and is prevented from falling down out of the heating chamber 22 and wetting the floor surface when the door 30 is drawn out so as to open the heating chamber 22.

[0045] On condition that a surface on which the cooking device is placed is not horizontal but is slightly inclined so as to face the front side or on condition that a large quantity of the condensed water has been formed, in the configurations, there is a fear that the condensed water having accumulated on the bottom wall surface 22b of the heating chamber 22 may flow out of the heating chamber 22. As shown in Fig. 5, therefore, a bottom wall surface depression 43 for accumulating the condensed water is preferably provided at a site that is slightly deeper than the extremity of the second lip 38 of the door packing 35 on the bottom wall surface 22b of the heating chamber 22 in the state in which the door 30 is completely closed. This prevents the condensed water from flowing out of the heating chamber 22 even if the surface on which the cooking device is placed is slightly inclined so as to face the front side or even if a large quantity of the condensed water has been formed. The condensed water accumulating in the bottom wall surface depression 43 is evaporated by a high temperature in the heating chamber 22 during heat cooking.

[0046] In the configurations, the door packing 35 is stretched around overall periphery of the viewing window on the back surface cover 31 of the door 30. The condensed water, however, is formed and accumulated on a part of the back surface cover 31 of the door 30 that is below the heating chamber 22. Accordingly, the door packing 35 is not necessarily required to be stretched around the overall periphery of the viewing window on the back surface cover 31 but has only to be provided at least below a horizontal plane passing through a center of the opening 26.

[0047] In the embodiment, the door 30 is a drawer-type door with the rail units 23. The invention, however, is not limited thereto but may employ a hinge-type door.

REFERENCE SIGNS LIST

[0048]

21	housing (cabinet)
22	heating chamber
22a	top wall surface
22b	bottom wall surface
23	rail unit
24	fixed rail
25	movable rail
26	opening
27	rail connecting part
28	door mounting member
29	rail mounting member
30	door
31	back surface cover
31a	recess
32	glass plate
33	door engagement part
34	engagement hole
35	door packing
36	base
37	first lip
38, 41, 42	second lip
39	boss
40	front face panel
43	bottom wall surface depression

Claims

1. A cooking device comprising:

a heating chamber (22) which has an opening (26) and in which objects to be heated inserted through the opening (26) are heated by heat from a heat source,
a door (30) for opening and closing the opening (26) of the heating chamber (22), and
door packing (35) which is provided in a position on the door (30) that faces an edge of the opening (26) of the heating chamber (22) and which seals at least inner wall surfaces (22a, 22b) of the heating chamber (22).

2. The cooking device as claimed in Claim 1, wherein the door packing (35) is provided at least in a position below a horizontal plane passing through a center of the opening (26).

3. The cooking device as claimed in Claim 1, wherein the door packing (35) includes:

a first sealing part (37) for sealing a front face panel (40) around periphery of the opening (26) of the heating chamber (22) in conjunction with an operation of closing the opening (26) by the door (30), and
a second sealing part (38, 41) for sealing the inner wall surfaces (22a, 22b) of the heating chamber (22) in conjunction with an operation of sealing the periphery of the opening (26) by the first sealing part (37).

4. The cooking device as claimed in Claim 3, wherein the door packing (35) seals both the front face panel (40) around the periphery of the opening (26) of the heating chamber (22) and the inner wall surfaces (22a, 22b) of the heating chamber (22) when the opening (26) is completely closed by the door (30).

5. The cooking device as claimed in Claim 1, wherein a depression (43) for accumulating condensed water produced in the heating chamber (22) and preventing the condensed water from flowing out of the heating chamber (22) upon opening of the door (30) is provided on a side opposite to the opening (26) with respect to a position of sealing by the door packing (35) on the bottom wall surface (22b) of the heating chamber (22).

Fig.1

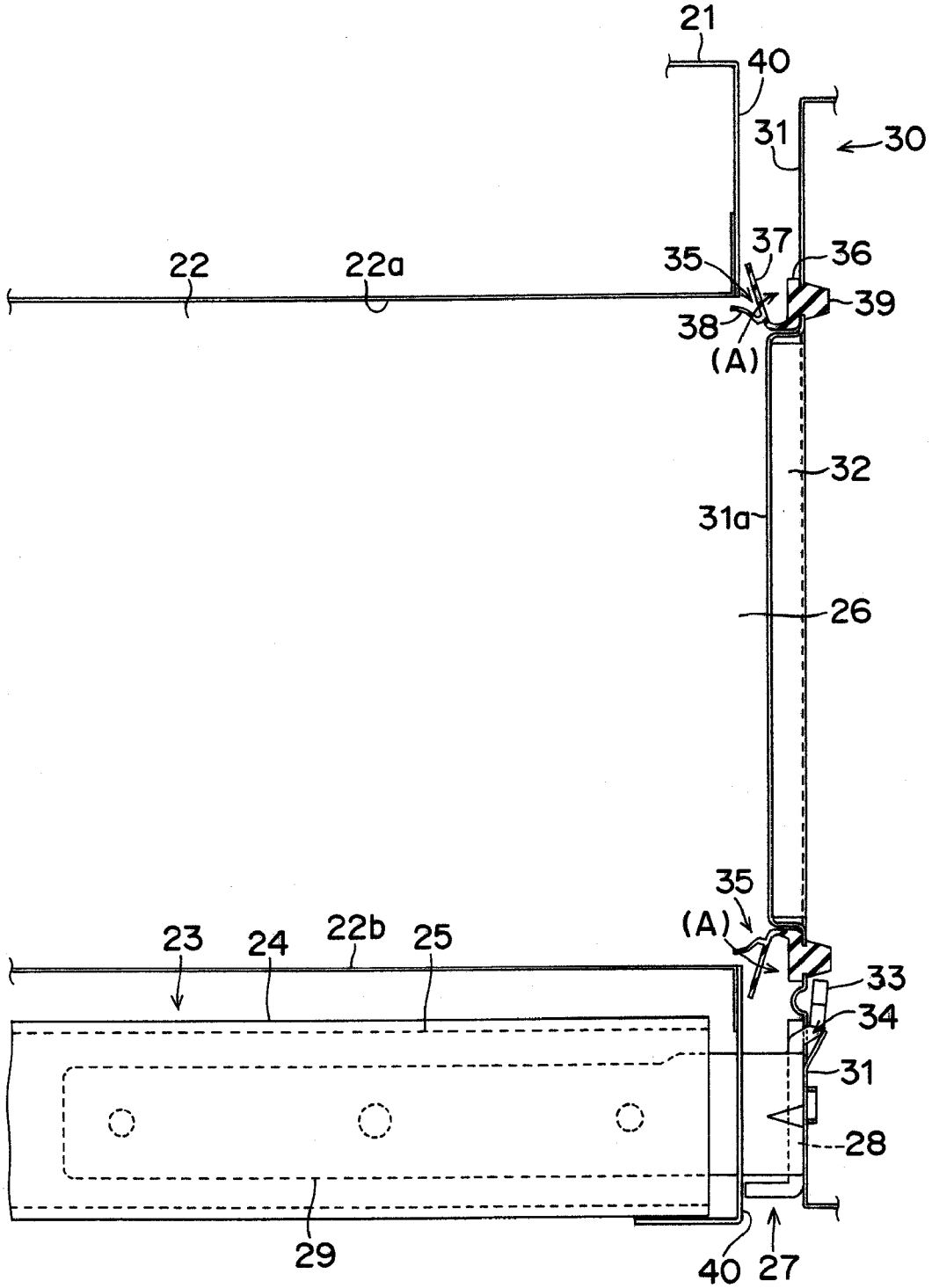
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Fig.2

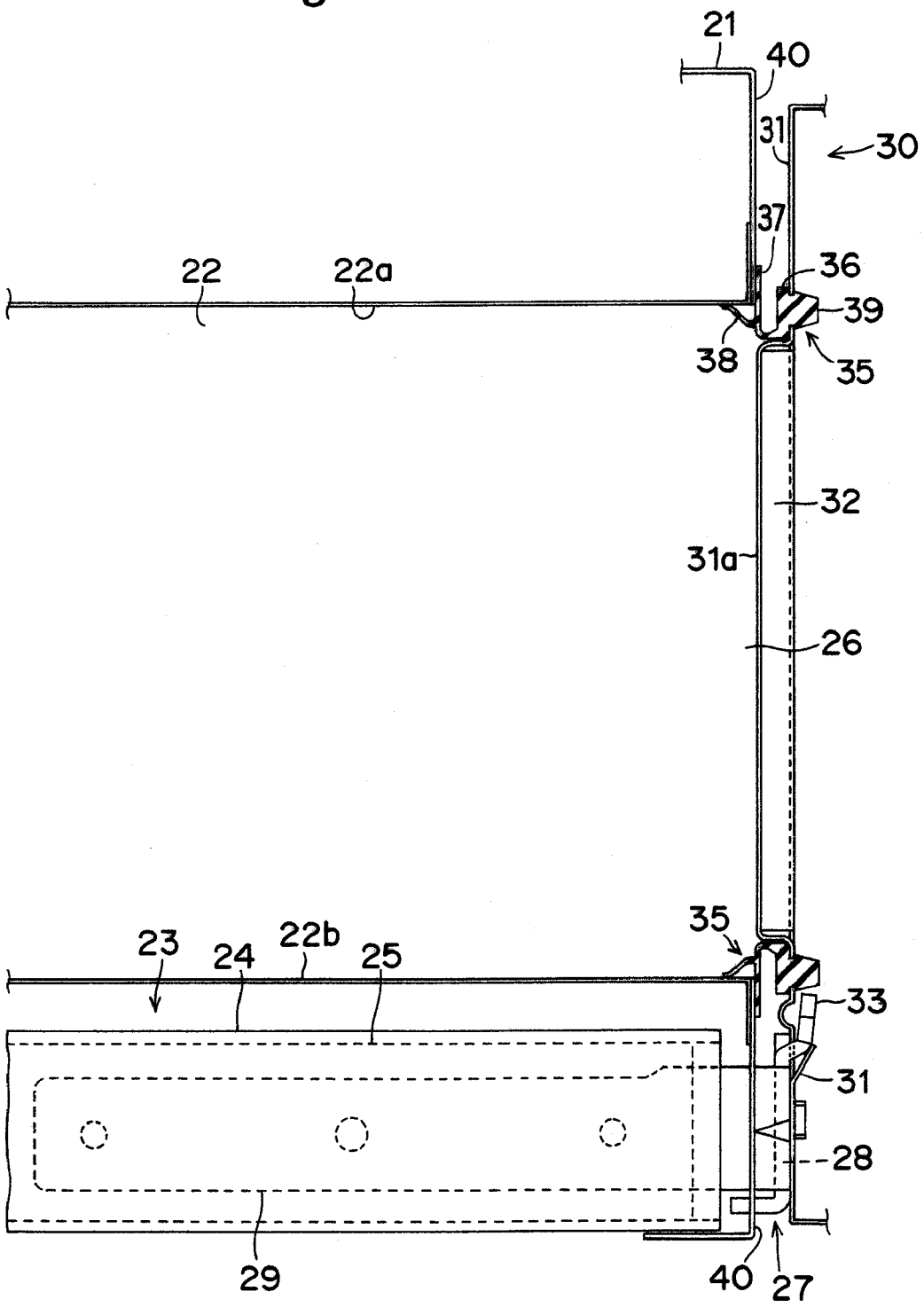
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Fig.3

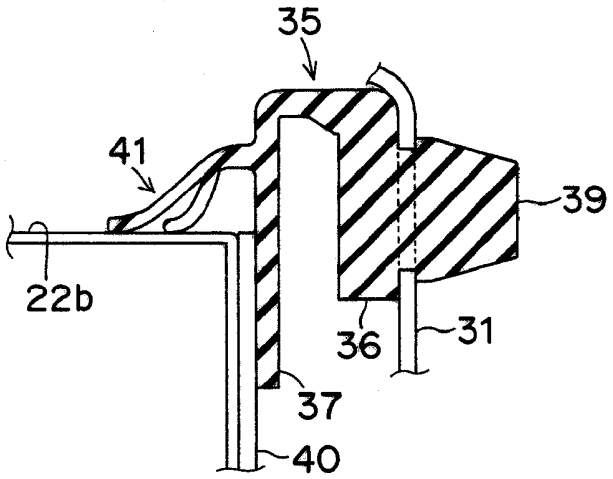


Fig.4A

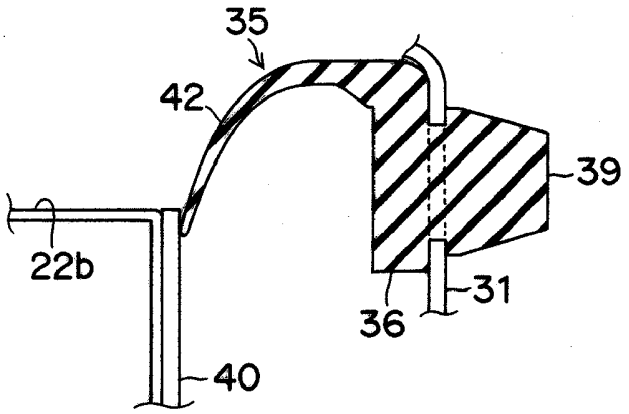


Fig.4B

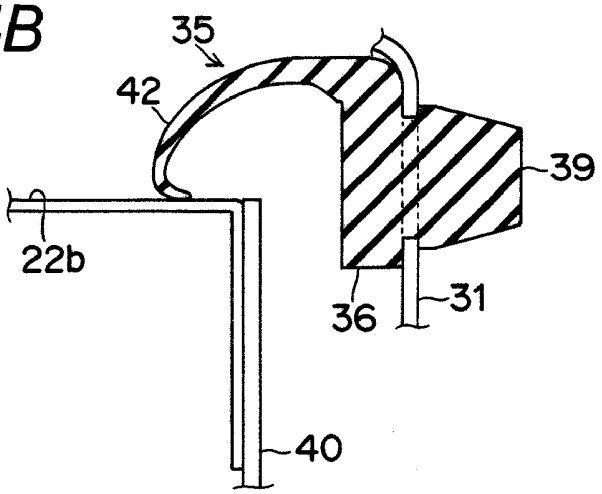


Fig.5

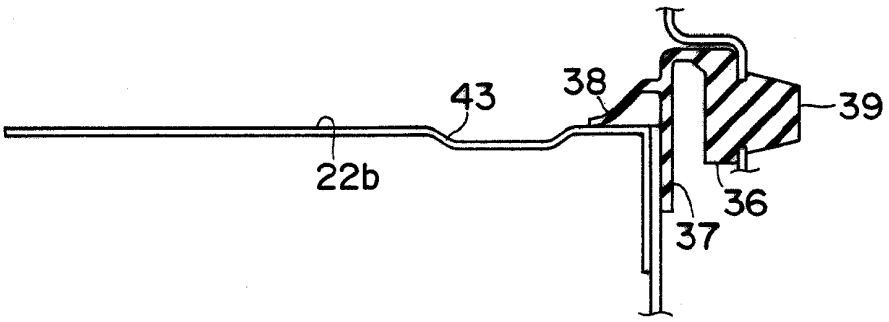
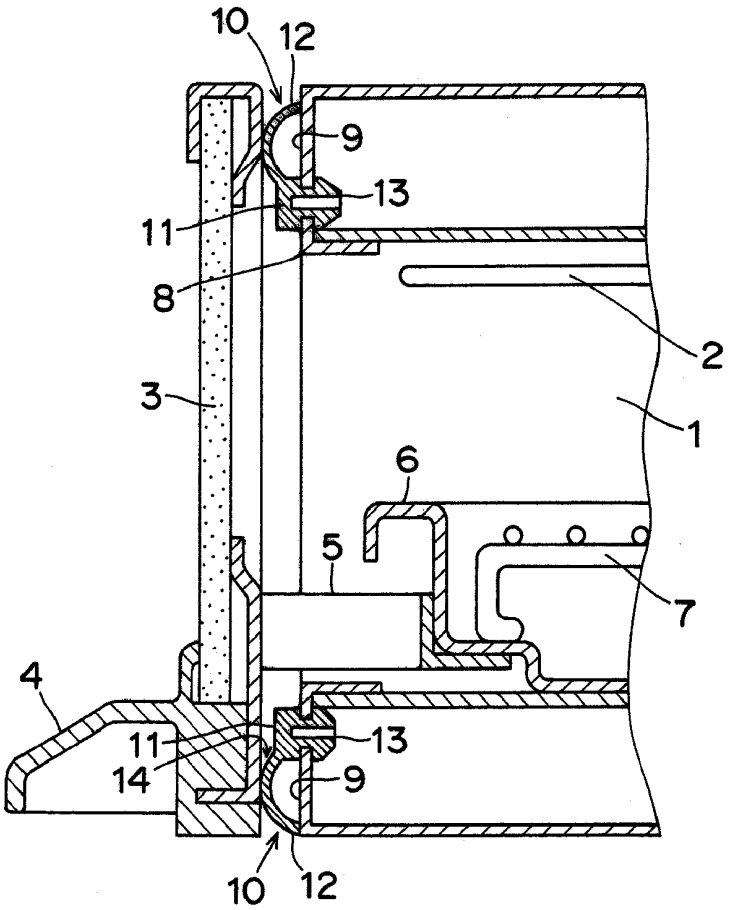


Fig.6 PRIOR ART



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2009/065805

A. CLASSIFICATION OF SUBJECT MATTER
F24C15/02(2006.01)i, *A47J37/06*(2006.01)i, *F24C7/04*(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
F24C15/02, A47J37/06, F24C7/04

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2009
Kokai Jitsuyo Shinan Koho 1971-2009 Toroku Jitsuyo Shinan Koho 1994-2009

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 2007-78199 A (Matsushita Electric Industrial Co., Ltd.), 29 March 2007 (29.03.2007), paragraph [0017]; fig. 2 & EP 1763286 A2 & CN 1981681 A	1,2
X	JP 2007-40602 A (Sharp Corp.), 15 February 2007 (15.02.2007), paragraph [0012]; fig. 2 & EP 1914480 A1 & WO 2007/015397 A1 & KR 10-2008-0031484 A & CN 101233369 A	1,2
X	JP 2008-167957 A (Mitsubishi Electric Corp.), 24 July 2008 (24.07.2008), paragraph [0025]; fig. 4 (Family: none)	1,2

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"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)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"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
"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
"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
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
24 December, 2009 (24.12.09)	12 January, 2010 (12.01.10)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (April 2007)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2009/065805

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

See extra sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: 1 and 2

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.

Form PCT/ISA/210 (continuation of first sheet (2)) (April 2007)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2009/065805

Continuation of Box No.III of continuation of first sheet(2)

The matter common to the inventions in claims 1-5 is "a cooking device comprising: a heating compartment (22) having an opening (26) and heating a material to be heated, which has been inserted from the opening (26), by heat from a heat source; a door (30) for opening and closing the opening (26) in the heating compartment (22); and door packing (35) provided to the door (30) at a position which faces the edge of the opening (26) in the heating compartment (22) and sealing at least inner wall surfaces (22a, 22b) of the heating compartment (22)."

However, the search has revealed that the common matter is disclosed in JP 2007-78199 A (Matsushita Electric Industrial Co., Ltd.), 29 March 2007 (29.03.2007), paragraph [0017], fig. 2, JP 2007-40602 A (Sharp Corp.), 15 February 2007 (15.02.2007), paragraph [0012], fig. 2, and JP 2008-167957 A (Mitsubishi Electric Corp.), 24 July 2008 (24.07.2008), paragraph [0025], fig. 4, and therefore the common matter is not novel.

Since the common matter makes no contribution over the prior art, the common matter is not a special technical feature within the meaning of PCT Rule 13.2, second sentence.

Accordingly, there is no matter common to the inventions in claims 1-5.

Since there is no other common matter that can be considered as a special technical feature within the meaning of PCT Rule 13.2, second sentence, no technical relationship, within the meaning of PCT Rule 13, between the different inventions can be seen.

Accordingly, the inventions in claims 1-5 obviously do not satisfy the requirement of unity of invention.

The International Searching Authority considers that the inventions of this application are as follows:

First invention: the inventions in claims 1 and 2

A cooking device "comprising: a heating compartment (22) having an opening (26) and heating a material to be heated, which has been inserted from the opening (26), by heat from a heat source; a door (30) for opening and closing the opening (26) in the heating compartment (22); and door packing (35) provided to the door (30) at a position which faces the edge of the opening (26) in the heating compartment (22) and sealing at least inner wall surfaces (22a, 22b) of the heating compartment (22)," "the door packing (35) being provided at a position below a horizontal plane passing through the center of at least the opening (26)."

Second invention: the inventions in claims 1, 3, and 4

A cooking device "comprising: a heating compartment (22) having an opening (26) and heating a material to be heated, which has been inserted from the opening (26), by heat from a heat source; a door (30) for opening and closing the opening (26) in the heating compartment (22); and door packing (35) provided to the door (30) at a position which faces the edge of the opening (26) in the heating compartment (22) and sealing at least inner wall surfaces (22a, 22b) of the heating compartment (22)," "the door packing (35) being provided with a first seal section (37) for sealing a front panel (40) around the opening (26) in the heating compartment (22) in association with closing operation of the door (30) performed to close the opening (26), the door packing (35) being also provided with second seal sections (38, 41) for sealing the inner wall surfaces (22a, 22b) of the heating compartment (22) in association with sealing operation of the first seal section (37) performed to close the periphery of the opening (26)."

(continued to next sheet)

INTERNATIONAL SEARCH REPORT

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Third invention: the inventions in claims 1 and 5

A cooking device "comprising: a heating compartment (22) having an opening (26) and heating a material to be heated, which has been inserted from the opening (26), by heat from a heat source; a door (30) for opening and closing the opening (26) in the heating compartment (22); and door packing (35) provided to the door (30) at a position which faces the edge of the opening (26) in the heating compartment (22) and sealing at least inner wall surfaces (22a, 22b) of the heating compartment (22)," "wherein the cooking device is provided with a recess (43) located opposite the opening (26) across that portion of the lower wall surface (22b) of the heating compartment (22) which is sealed by the door packing (35), the recess (43) being adapted to pool therein condensed water generated in the heating compartment (22) and to prevent the condensed water from flowing to the outside of the heating compartment (22) when the door (30) becomes opened."

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 11083037 A **[0002] [0010]**