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(54) **HIGH-FREQUENCY HEATING DEVICE WITH VAPOR GENERATING FUNCTION**

(57) Right and left sidewalls (29) of a metallic heating chamber (23) which accommodates an object to be heated and a bottom wall (31) of the heating chamber (23) are unitarily configured without seams. Since there are no joint sections between the sidewalls (29) and the bottom wall (31), sealing is unnecessary. This facilitates manufacturing. Further, since there are no joint sections, even when water overflows from the evaporation tray (27), or when water or oil is generated from the object to be heated, the water or the oil is not leaked into the power feeding chamber (25) so that failure can be prevented.

FIG. 3A

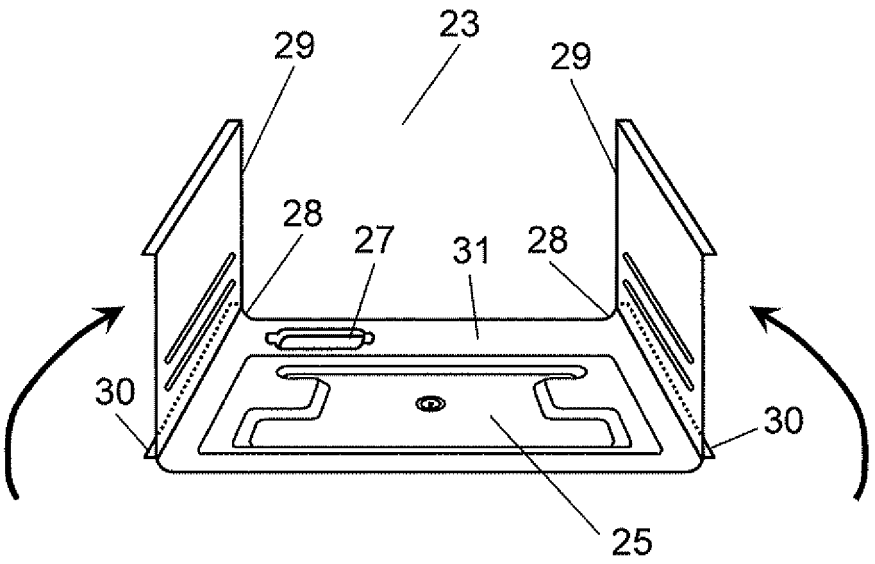

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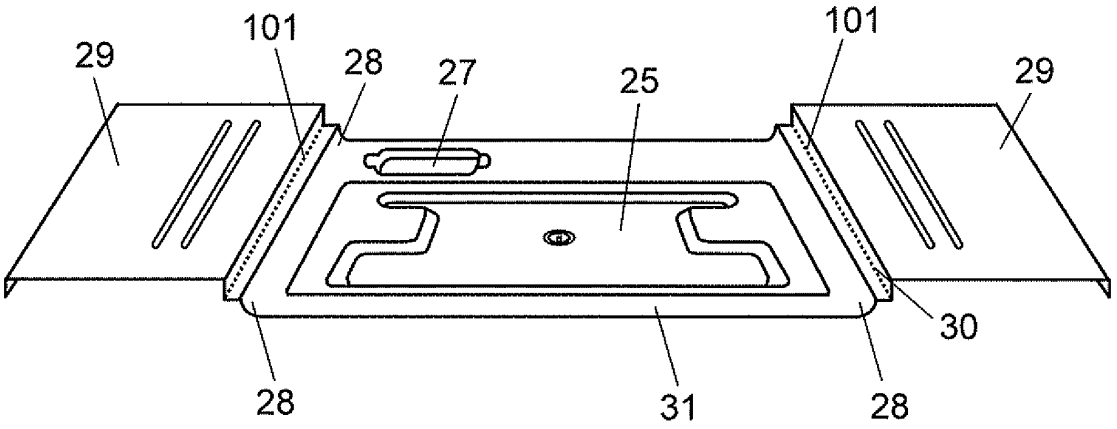
FIG. 3B



Description

TECHNICAL FIELD

[0001] The present invention relates to a high-frequency heating device with a vapor generating function.

BACKGROUND ART

[0002] An example of a conventional high-frequency heating device with a vapor generating function is shown in FIGS. 7 and 8. In FIGS. 7 and 8, microwave oven 1 serving as a high-frequency heating device has: chassis 2 in a substantially rectangular parallelepiped shape made of a metal plate; heating chamber 3 having an opening on its front face; and door 4 opening and closing the opening.

[0003] In heating chamber 3, five wall faces excluding the opening are made up of metal plates. On a bottom wall of heating chamber 3, a depressed section (not shown) is formed. A space in the depressed section is power feeding chamber 5. Partition plate 6 is installed on an opening of power feeding chamber 5, namely an opening of the depressed section formed on the bottom wall of heating chamber 3. That is, heating chamber 3 and power feeding chamber 5 provided below and adjacent to heating chamber 3 are partitioned by partition plate 6. Partition plate 6 is formed of a material which allows high-frequency energy to pass therethrough. Partition plate 6 is formed, for example, of glass or ceramic.

[0004] In power feeding chamber 5, a metallic stirring blade (not shown) is rotatably pivotally supported by a motor (not shown). The stirring blade functions as a high-frequency antenna, and uniformly distributes high-frequency energy. Microwave oven 1 has a magnetron (not shown) constituting the high-frequency generator, outside the sidewall face of heating chamber 3. Further, microwave oven 1 has a cooling fan (not shown) for cooling heat generated during operations of the magnetron or power supply circuit components which supply the magnetron with electric power.

[0005] Next, an operation of microwave oven 1 is described. First, a user of microwave oven 1 places an object to be heated on partition plate 6 in heating chamber 3, and then operates an operation panel (not shown) provided in a lower section of door 4. Herewith, a high frequency electromagnetic wave is generated from the magnetron. The high frequency electromagnetic wave propagates through a waveguide (not shown), to be introduced into power feeding chamber 5. The high-frequency electromagnetic wave introduced into power feeding chamber 5 is dispersed by the stirring blade (antenna), and passes through partition plate 6, to be absorbed into the object to be heated and converted to heat.

[0006] On a bottom face of heating chamber 3, partition plate 6 is provided on the opening side while steam generating section 11 is provided on the back side, both being provided in contact with each other. Steam generating section 11 is provided with evaporation tray 8 which heats water fed from the outside of heating chamber 3 for evaporation.

[0007] Joint section 9 of power feeding chamber 5 with right and left sidewalls 7 and evaporation tray 8 of heating chamber 3 is located at a position identical to or lower than partition plate 6. Therefore, at the time of the user of microwave oven 1 taking the object to be heated into or out of heating chamber 3 or during heating of the object to be heated, water or oil in the object to be heated may overflow or spatter. When the water or the oil flows from a gap between partition plate 6 and the wall faces of heating chamber 3 downward, namely into power feeding chamber 5, a component such as the stirring blade (antenna) or the motor may fail.

[0008] In order to avoid such an inconvenience, there has been a configuration where the gap between partition plate 6 and the wall faces of heating chamber 3 is watertightly sealed (e.g. see Patent Document 1). Describing this by use of FIG. 8, there has been a configuration where partition plate 6 is placed on heating chamber 3, and thereafter, a gap of joint section 9 all around partition plate 6 is filled with sealant 10 having adhesion properties, such as silicone rubber, to fix partition plate 6. However, in such a configuration where the gap between partition plate 6 and the wall faces of heating chamber 3 is filled with sealant 10 to fix partition plate 6, the partition plate 6 cannot be removed. Therefore, in the case of performing repairing, partition plate 6 needs to be destroyed or sealant 10 be cut out. That is, for repairing, a replacement component is required, and a long time is required for a repairing operation.

[0009] Further, since power feeding chamber 5 and evaporation tray 8 are made up of different components, a gap tends to be generated in joint section 9 between a component constituting power feeding chamber 5 and a component constituting evaporation tray 8. For this reason, in the case of feeding water until completion of cooking or in the case of performing an operation to cancel cooking using steam immediately after the start of this cooking and then restarting the cooking using steam, water may be excessively fed to evaporation tray 8 and water may overflow from evaporation tray 8. The water having overflowed from evaporation tray 8 passes through joint section 9 between evaporation tray 8 and partition plate 6 and enters into power feeding chamber 5. When a spark is generated for this reason from the component such as the stirring blade (antenna) or the motor, it may cause a failure.

[0010] In order to avoid such an inconvenience, it has been necessary to provide sealing to joint section 9. However, providing the sealing makes the configuration complicated. That is, the workability in assembly deteriorates, or the number of steps of an assembly operation and cost of components increase due to the increased number of components.

RELATED ART DOCUMENT

[Patent Document]

[0011] [Patent Document 1] Unexamined Japanese Patent Publication No. 2008-224078

DISCLOSURE OF THE INVENTION

[0012] The present invention provides a high-frequency heating device with a vapor generating function, which is easy to manufacture and capable of preventing failure due to leakage of water or oil from an evaporation tray or an object to be heated.

[0013] The high-frequency heating device with the vapor generating function in the present invention is provided with: a metallic heating chamber having an opening in its front face and accommodating an object to be heated; and door for opening and closing the opening of the heating chamber. Further, the high-frequency heating device with the vapor generating function in the present invention is provided with: a power feeding chamber provided below and adjacent to the heating chamber and having an opening in its upper portion; and a partition plate closing the opening of the power feeding chamber and partitioning between the heating chamber and the power feeding chamber, and for supporting the object to be heated. Moreover, the high-frequency heating device with the vapor generating function in the present invention is provided with: an evaporation tray formed in the heating chamber; and a high-frequency generator generating a high-frequency electromagnetic wave. Furthermore, in the high-frequency heating device with the vapor generating function, right and left sidewalls and a bottom wall of the heating chamber are unitarily configured without seams.

[0014] With this configuration, there are no joint sections between the right and left sidewall and the bottom wall of the heating chamber, and sealing is unnecessary. This facilitates manufacturing. Further, since there are no joint sections, even when water overflows from the evaporation tray, or when water or oil is generated from the object to be heated, the water or the oil is not leaked into the power feeding chamber so that failure can be prevented.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015]

FIG. 1 is a front perspective view of a high-frequency heating device with a vapor generating function in Embodiment 1 of the present invention.

FIG. 2 is a front perspective view of the high-frequency heating device with the vapor generating function in the embodiment, installed with a partition plate.

FIG. 3A is a perspective view showing an assembled state of right and left sidewalls of a heating chamber and a bottom wall of the heating chamber.

FIG. 3B is a perspective view showing the assembled state of the right and left sidewalls of the heating chamber and the bottom wall of the heating chamber.

FIG. 4A is a perspective view showing an assembled state of right and left sidewalls of a heating chamber and a bottom wall of the heating chamber in a high-frequency heating device with a vapor generating function in Embodiment 2 of the present invention.

FIG. 4B is a perspective view showing the assembled state of the right and left sidewalls of the heating chamber and the bottom wall of the heating chamber in the high-frequency heating device with the vapor generating function in Embodiment 2 of the present invention.

FIG. 5 is an expanded perspective view of a section A in FIG. 4B.

FIG. 6 is an exploded perspective view of the heating chamber.

FIG. 7 is a front perspective view of a conventional high-frequency heating device with a vapor generating function.

FIG. 8 is a perspective view of a bottom wall of a heating chamber in the conventional high-frequency heating device with the vapor generating function.

PREFERRED EMBODIMENTS FOR CARRYING OUT OF THE INVENTION

Embodiment 1

[0016] FIG. 1 is a front perspective view of a high-frequency heating device with a vapor generating function in Embodiment 1 of the present invention. FIG. 2 is a front perspective view of the high-frequency heating device with the vapor generating function in the embodiment, installed with a partition plate. FIGS. 3A and 3B are perspective views showing an assembled state of right and left sidewalls of a heating chamber and a bottom wall of the heating chamber.

[0017] In FIGS. 1 and 2, a body of microwave oven 21 as the high-frequency heating device with the vapor generating function is made up of chassis 22. In chassis 22, metallic heating chamber 23 is formed. Heating chamber 23 has an opening on its front face, and door 24 is pivotally supported thereon in an openable/closable manner. On bottom wall 31 of heating chamber 23, a depressed section (not shown) is formed. A space in the depressed section is power feeding chamber 25. That is, power feeding chamber 25 is provided adjacent to heating chamber 23.

[0018] Being in the depressed shape, power feeding chamber 25 has a bottom face and side faces. Partition plate 26 is removably installed so as to close the opening of power feeding chamber 25. In other words, partition plate 26 partitions power feeding chamber 25 and heating chamber 23 which are provided adjacent to each other. Partition plate 26 is formed of a material which allows

high-frequency energy to pass therethrough, such as glass or ceramic.

[0019] On the bottom face of power feeding chamber 25, a depressed section is formed having a substantially H shape in a planar view. The H-shaped depressed section is symmetrical. Making the shape of power feeding chamber 25 symmetrical can render favorable distributions of high-frequency electromagnetic waves in power feeding chamber 25 and heating chamber 23. Meanwhile, magnetron 100 constituting the high-frequency generator is installed below power feeding chamber 25, namely outside the bottom face of power feeding chamber 25. Herein, the H-shaped depressed section on the bottom face of power feeding chamber 25 is configured to protrude downward from power feeding chamber 25. Arranging a component such as magnetron 100 in a portion below power feeding chamber 25 and other than the H-shaped depressed section can reduce a height of the bottom face of heating chamber 23. Further, this can suppress a total height of microwave oven 21

[0020] In power feeding chamber 25, a metallic stirring blade (not shown) is rotatably pivotally supported by a motor (not shown). The stirring blade functions as a high-frequency antenna, and uniformly distributes high-frequency energy. The high frequency electromagnetic wave generated from magnetron 100 propagates through a waveguide (not shown), to be introduced into power feeding chamber 25. The high-frequency electromagnetic wave introduced into power feeding chamber 25 is dispersed by the stirring blade (antenna), and passes through partition plate 26, to be absorbed into the object to be heated and converted to heat. The object to be heated is thereby heated.

[0021] Evaporation tray 27 which heats water supplied from the outside of heating chamber 23 for evaporation is formed on the bottom face of heating chamber 23 and on the back side of power feeding chamber 25. Evaporation tray 27 has a depressed shape for pooling water, and formed on bottom wall 31 of heating chamber 23.

[0022] Right and left sidewalls 29 and bottom wall 3 lof heating chamber 23 are formed by processing one metal plate as shown in FIGS. 3A and 3B. Thereby, an edge portion of the opening of power feeding chamber 25 and an edge portion of evaporation tray 27 are unitarily provided without seams. Both right and left side portions of bottom wall 31 of heating chamber 23 are bent and extend upward from curved face sections 28 formed in corner portions in the vicinities of right and left sidewalls 29 of heating chamber 23, to be connected with right and left sidewalls 29 of heating chamber 23. Curved face section 28 has an arc shape, for example.

[0023] Right and left sidewalls 29 and bottom wall 31 of heating chamber 23 shown in FIG. 3A are formed by bending the right and left of one metal plate shown in FIG. 3B. An arrow in FIG. 3A shows a bending direction. The metal plate is, for example, a precoated steel plate. The precoated steel plate is processed by being bent by pressing. Hence right and left sidewalls 29 of heating chamber 23 and bottom wall 31 of heating chamber 23 are unitarily formed without seams via curved face sections 28. It is to be noted that perforation 101 extending in a direction toward the back of heating chamber 23 is provided on the top of curved face section 28, namely bent section 30 as a bent line. The precoated steel plate is bent along perforation 101. That is, right and left sidewalls 29 and bottom wall 31 of heating chamber 23 are connected via bent section 30.

[0024] Herein, right and left sidewalls 29 of heating chamber 23 and bottom wall 31 of heating chamber 23 are formed via curved face sections 28. With curved face section 28 for example having the arc shape, bent sections 30 between right and left sidewalls 29 of heating chamber 23 and bottom wall 31 of heating chamber 23 are provided at higher positions than evaporation tray 27.

[0025] A ceiling wall (not shown) constituting a ceiling of heating chamber 23 and a back wall (not shown) thereof are unitarily formed in a similar manner to sidewalls 29 and bottom wall 31 described above. That is, a steel plate constituting the ceiling wall and the back wall is squeezed by pressing, cut off, punched, and installed with an ancillary component such as a cover for a heater, which is coated so as to have a self-cleaning effect and then bent. In this manner, the ceiling wall and the back wall are unitarily formed. Unitarily formed sidewalls 29 and bottom wall 31 and the unitarily formed ceiling wall and back wall are joined, to constitute heating chamber 23. It should be noted that, although the case has been described where the steel plate unitarily forming the ceiling wall and the back wall is coated after pressing, the precoated steel plate can be used as in the case of sidewalls 29 and bottom wall 31.

[0026] An operation and a function of the high-frequency heating device with the vapor generating function as thus been configured are described.

[0027] A user of microwave oven 21 places an object to be heated on partition plate 26 in heating chamber 23, and then operates an operation panel (not shown) provided in a lower section of door 24. Herewith, a high frequency electromagnetic wave is generated from magnetron 100. The high frequency electromagnetic wave propagates through a waveguide (not shown), to be introduced into power feeding chamber 25. The high-frequency electromagnetic wave introduced into power feeding chamber 25 is dispersed by the stirring blade (antenna), passes through partition plate 26 and is absorbed into the object to be heated. The object to be heated is thereby heated, and then cooked.

[0028] Herein, when cooking using steam is started, water is fed from the outside of heating chamber 23 to evaporation tray 27 of heating chamber 23. Water pooled in evaporation tray 27 is heated by a heater (not shown) or the high-frequency electromagnetic wave, to turns to steam. In addition, water is dielectrically heated by use of a high-frequency electromagnetic wave in a band of 2450 MHz, to generate steam.

[0029] In the case of feeding water until completion of

cooking or in the case of performing an operation to cancel cooking using steam immediately after the start of this cooking and then restarting the cooking using steam, water may be excessively fed to evaporation tray 27 and water may overflow from evaporation tray 27. Herein, microwave oven 21 of the present embodiment does not have a joint section between evaporation tray 27 and partition plate 26 nor joint sections between right and left sidewalls 29 of heating chamber 23 and bottom wall 31 of heating chamber 23. That is, even in the case of overflow of water from evaporation tray 27, water does not enter into power feeding chamber 25. Similarly, water or oil having spattered from the object to be heated does not enter into power feeding chamber 25. For this reason, a spark generated from a component such as the stirring blade (antenna) or the motor is suppressed, to reduce the possibility for a failure.

[0030] Further, bent sections 30 between right and left sidewalls 29 of heating chamber 23 and power feeding chamber 25 are provided at higher positions than evaporation tray 27. Herewith, even when water pooled in evaporation tray 27 overflows, or when water or oil flows out in large amount from the object to be heated, the water or the oil is unlikely to be leaked from the perforated line of bent section 30.

[0031] Moreover, corner portions in the vicinities of bent sections 30 between right and left sidewalls 29 of heating chamber 23 and power feeding chamber 25 are arc-shaped curved face sections 28. This allows curved face section 28 to resist accumulation of dust. Further, even in the case of accumulation of dust in curved face section 28, removal of the dust is easy due to curved face section 28 having the arc shape. That is, heating chamber 23 is easy to clean, and the inside of heating chamber 23 can thus be kept clean.

[0032] As thus described, microwave oven 21 of the present embodiment does not have joint sections between right and left sidewalls 29 of heating chamber 23 and bottom wall 31 of heating chamber 23 nor a joint section between evaporation tray 27 and power feeding chamber 25. That is, right and left sidewalls 29 of heating chamber 23 and bottom wall 31 of heating chamber 23 are unitarily formed without seams. Further, an edge of evaporation tray 27 and an edge of power feeding chamber 25 are unitarily configured without seams. Thereby, in microwave oven 21 of the present embodiment, a sealing component and a sealing operation, having been required in the conventional microwave oven, are not required. This can simplify the configuration, and also facilitate manufacturing due to reduction in number of components. That is, the productivity increases. Moreover, in microwave oven 21 of the present embodiment, water or oil is prevented from entering into power feeding chamber 25 and below power feeding chamber 25. This prevents failure of the component such as the stirring blade or the motor in microwave oven 21 of the present embodiment.

[0033] As described above, eliminating the joint sections of heating chamber 23 can prevent electromagnetic wave leakage and hot air leakage from the joint section. Further, unitarily constituting heating chamber 23 without seams as thus described leads to improvement in strength of heating chamber 23 and improvement in reliability.

Embodiment 2

[0034] FIGS. 4A and 4B are perspective views showing an assembled state of right and left sidewalls of a heating chamber and a bottom wall of the heating chamber in a high-frequency heating device with a vapor generating function in Embodiment 2 of the present invention. FIG. 5 is an expanded perspective view of a section A in FIG. 4B. FIG. 6 is an exploded perspective view of the heating chamber. It is to be noted that the same constitutional component as in Embodiment 1 is provided with the same numeral, and its detailed description is omitted.

[0035] Right and left sidewalls 42 and bottom wall 45 of heating chamber 23 shown in FIG. 4A is formed by bending the right and left of one metal plate shown in FIG. 4B. An arrow in FIG. 4A shows a bending direction. That is, lower sides 44 of sidewalls 42 and right and left sides 46 of bottom wall 45 are folded to form heating chamber 23. This folded portion is folded section 40.

[0036] As shown in FIG. 5, bent section 49 is formed with a plurality of slits 48 at predetermined intervals. Slit 48 has a substantially isosceles trapezoid shape, and is formed by pressing. A longitudinal size of slit 48 and an interval between adjacent slits 48 are decided based on the easiness of manual folding processing at the time of producing folded section 40.

[0037] That is, when the longitudinal size of slit 48 is made long, or when the interval between slits 48 is made short, the folding processing can be performed by small force at the time of producing folded section 40. On the contrary, when the longitudinal size of slit 48 is made short, or when the interval between slits 48 is made long, large force is required for the folding processing. In short, force required for formation of folded section 40 can be adjusted by adjusting the longitudinal size of slit 48 and the interval between slits 48.

[0038] However, when the longitudinal size of slit 48 is made excessively long, or when the interval between slits 48 is made excessively short, the strength of folded section 40 decreases. This may cause folded section 40 to be cut off. Further, a gap may be formed even when it does not go so far as to be cut off. There are chances where steam, juice from food or the like in heating chamber 23 may gain entry through this gap, to generate rust. It is thus necessary to appropriately decide the longitudinal size of slit 48 and the interval between slits 48. For example, in the case of using a precoated steel plate with a plate thickness of 0.5 mm, the size of slit 48 having the substantially isosceles trapezoid shape can be set to an upper base of 7 to 20 mm, a lower base of 2 mm 9 to 22

mm (the lower base is set longer than upper base by 2 mm), a height of 1.5 mm, and an interval of 3.7 mm.

[0039] A manufacturing method for the high-frequency heating device with the vapor generating function as thus been configured is described. First, from one precoated steel plate, right and left sidewalls 42 of heating chamber 23 and bottom wall 45 of heating chamber 23 are unitarily formed by pressing, without seams. Further, slits 48 in the isosceles trapezoid shape are formed in bent section 49 between sidewalls 42 and bottom wall 45. Slit 48 is formed in alignment such that its long side is along a folded direction. The precoated steel plate is bent to substantially 90 degrees, with the long sides of slits 48 as a bent line.

[0040] As shown in FIG. 6, ceiling wall 50 of heating chamber 23 and back wall 51 of heating chamber 23 are unitarily formed without seams as in the case of sidewalls 42 and bottom wall 45. A folded portion formed in folding of ceiling wall 50 and back wall 51 is folded section 52. Sidewalls 42 and bottom wall 45 as thus formed are combined with ceiling wall 50 and back wall 51 as thus formed, to produce heating chamber 23 having an opening on its front.

[0041] As described above, according to the present embodiment, lower sides 44 of right and left sidewalls 42 of heating chamber 23 and right and left sides 46 of bottom wall 45 of heating chamber 23 are folded, to improve the strength of heating chamber 23. Further, lower sides 44 of right and left sidewalls 42 of heating chamber 23 and right and left sides 46 of bottom wall 45 of heating chamber 23 are respectively connected via bent sections 49. Bent section 49 is formed with a plurality of slits 48 at predetermined intervals. It is thereby possible to manually perform bending processing without using a jig. In this manner, it is possible to manually produce heating chamber 23. That is, the production is possible without using a pressing machine, thereby to improve the productivity.

[0042] Further, folded sections 40 of lower sides 44 of right and left sidewalls 42 of heating chamber 23 and right and left sides 46 of bottom wall 45 of heating chamber 23 are formed by caulking. Herewith, the strength of heating chamber 23 improves, and leakage of an electromagnetic wave and hot air from slit 48 are prevented. That is, the reliability and the cooking performance of microwave oven 21 are improved.

[0043] Moreover, with right and left sidewalls 42 and bottom wall 45 being made up of one component, a material loss is reduced as compared with the case of performing pressing on right and left sidewalls 42 and bottom wall 45 as separate components. Furthermore, with right and left sidewalls 42 and bottom wall 45 being connected via bent sections 49, the strengths between right and left sidewalls 42 and bottom wall 45 are improved, and leakage of electromagnetic waves from between right and left sidewalls 42 and bottom wall 45 is reduced.

[0044] It is to be noted that, although slit 48 having the substantially isosceles trapezoid shape has been used in the present embodiment, slit 48 having a rectangular shape may also be used. Slit 48 having the rectangular shape is used in a place where the accuracy of bending may be allowed to be low. For example, folded section 52 between ceiling wall 50 and back wall 51 of heating chamber 23 is difficult to see from the user using microwave oven 21. Therefore, slit 48 having the rectangular shape can be used. For example in the case of using a precoated steel plate with a plate thickness of 0.5 mm, the size of slit 48 having the rectangular shape can be set to a short side of 1.5 mm and a long side of 4.5 to 11 mm.

INDUSTRIAL APPLICABILITY

[0045] As described above, the present invention is capable of preventing, with a simple configuration, leakage of water or oil from a heating chamber. Accordingly, it is applicable to a heating cooker in which water or oil is generated from an object to be heated.

REFERENCE MARKS IN THE DRAWINGS

[0046]

21	microwave oven (high-frequency heating device with vapor generating function)
22	chassis
23	heating chamber
24	door
25	power feeding chamber
26	partition plate
27	evaporation tray
28	curved face section
29, 42	sidewall
30,49	bent section
31,45	bottom wall
40,52	folded section
44	lower side
46	side
48	slit
50	ceiling wall
51	back wall
100	magnetron (high-frequency generator)
101	perforation

Claims

1. A high-frequency heating device with a vapor generating function, comprising:

   a metallic heating chamber, having an opening in a front face and accommodating an object to be heated;
   a door for opening and closing the opening of the heating chamber;
   a power feeding chamber, provided below and

adjacent to the heating chamber and having an opening in an upper portion;
a partition plate closing the opening of the power feeding chamber and partitioning between the heating chamber and the power feeding chamber, and for supporting the object to be heated;
an evaporation tray formed in the heating chamber; and
a high-frequency generator provided outside the heating chamber for generating a high-frequency electromagnetic wave, wherein
right and left sidewalls and a bottom wall of the heating chamber are unitarily configured without seams.

2. The high-frequency heating device with the vapor generating function according to claim 1, wherein the sidewall and the bottom wall are continually connected via a bent section having perforations.

3. The high-frequency heating device with the vapor generating function according to claim 1, wherein a curved face section is formed in corner portion between the sidewall and the bottom wall.

4. The high-frequency heating device with the vapor generating function according to claim 1, wherein an edge of the evaporation tray and an edge of the opening of the power feeding chamber are unitarily configured without seams.

5. The high-frequency heating device with the vapor generating function according to claim 1 having folded sections formed between lower sides of the sidewalls and corresponding ones of right and left sides of the bottom wall.

6. The high-frequency heating device with the vapor generating function according to claim 5, wherein the lower sides of the sidewalls and the corresponding ones of right and left sides of the bottom wall are continually connected with respective bent sections, and slits are formed in the bent section at predetermined intervals.

7. The high-frequency heating device with the vapor generating function according to claim 5, wherein the folded sections between the lower sides of the sidewalls and the right and left sides of the bottom wall are formed by caulking.

FIG. 1

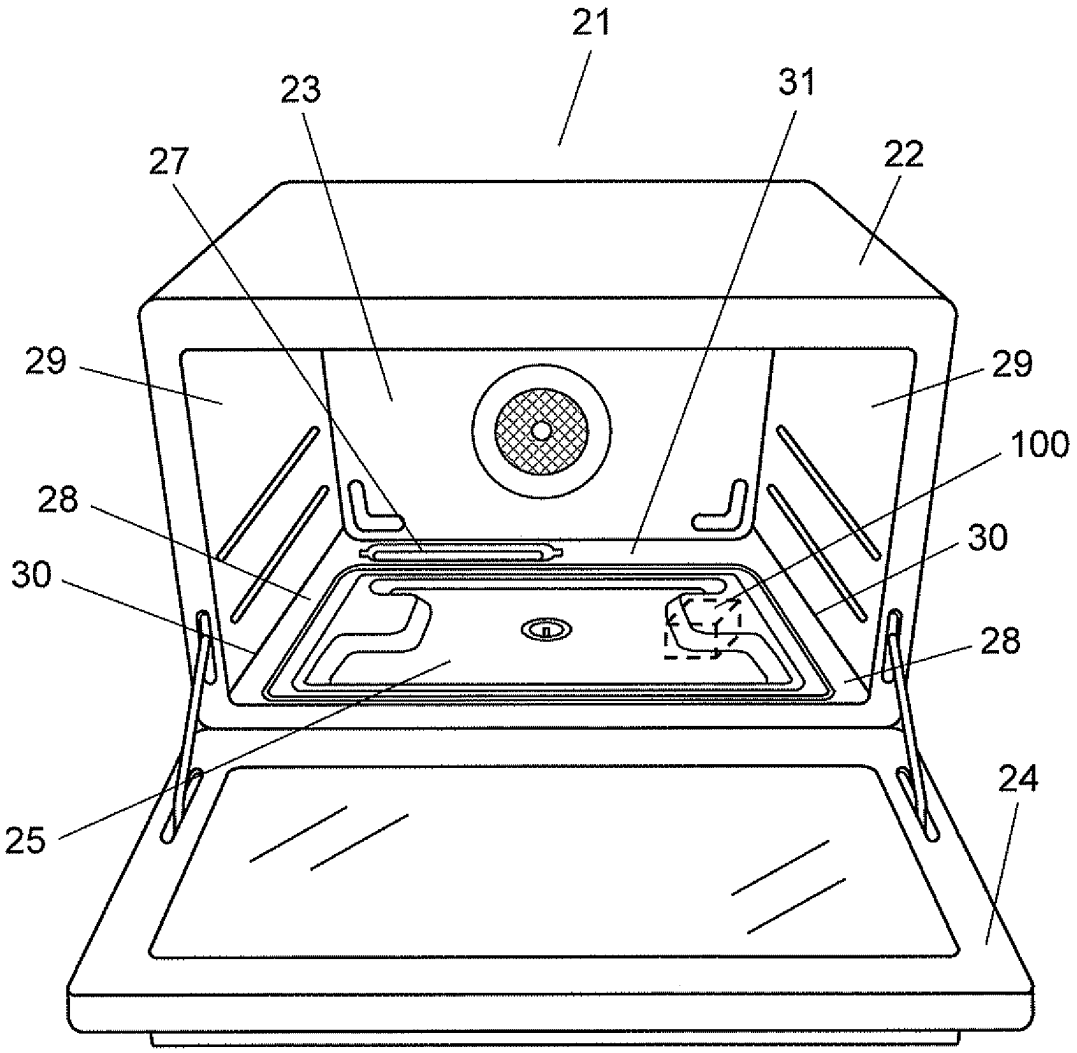


FIG. 2

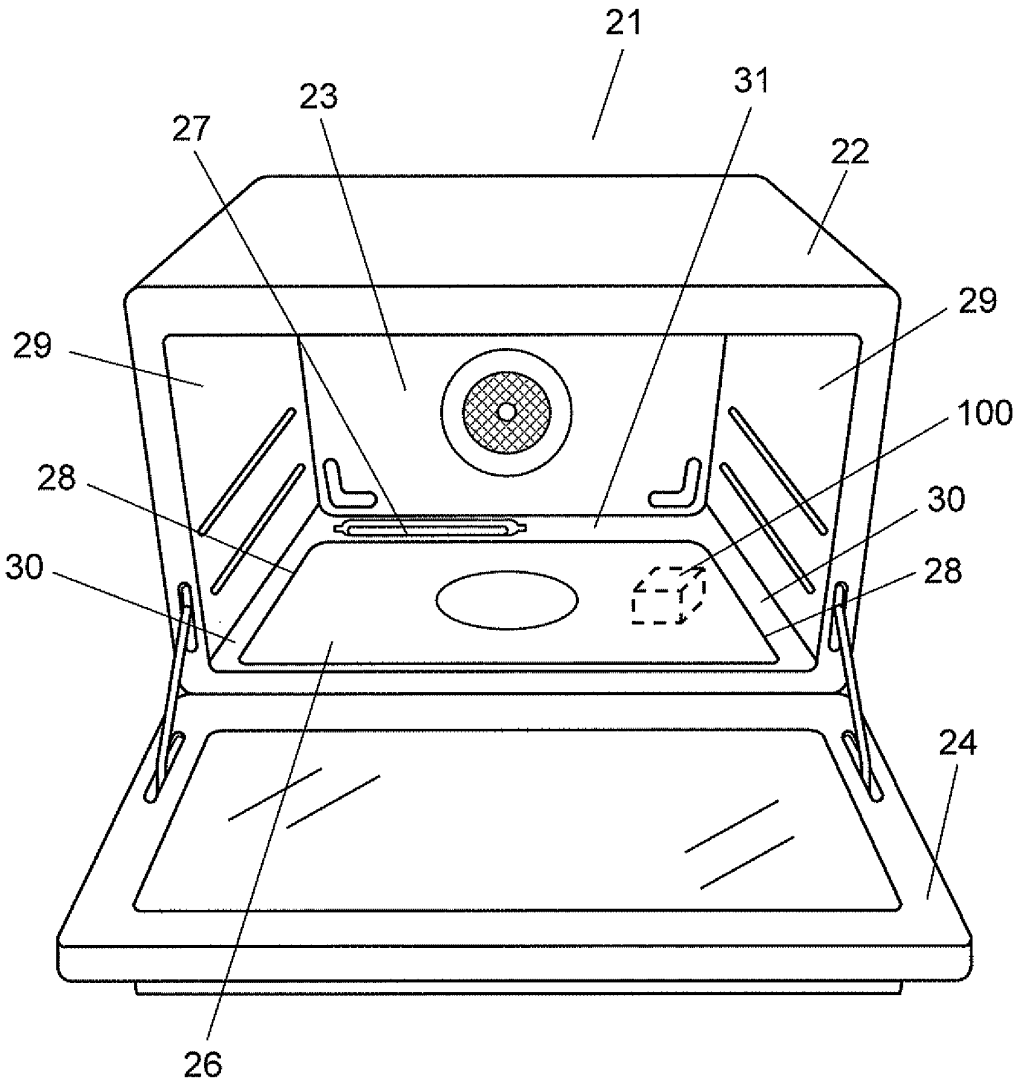


FIG. 3A

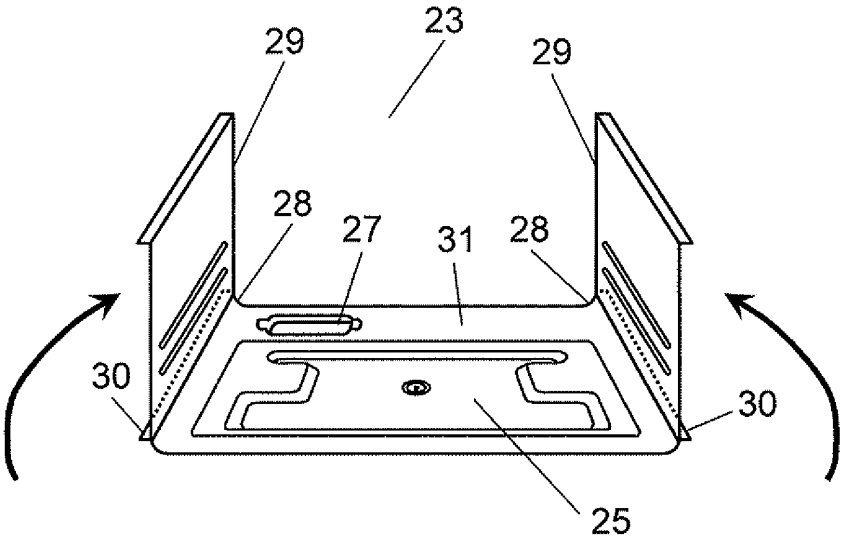


FIG. 3B

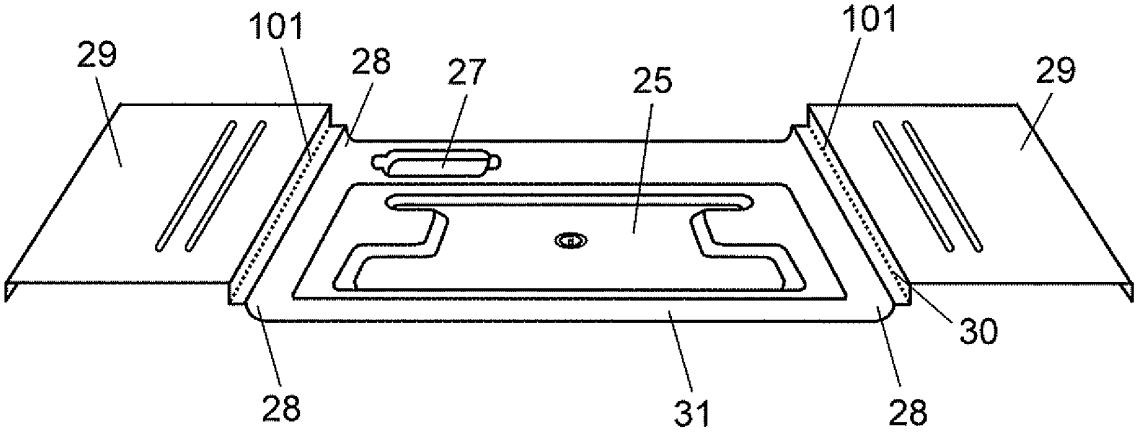


FIG. 4A

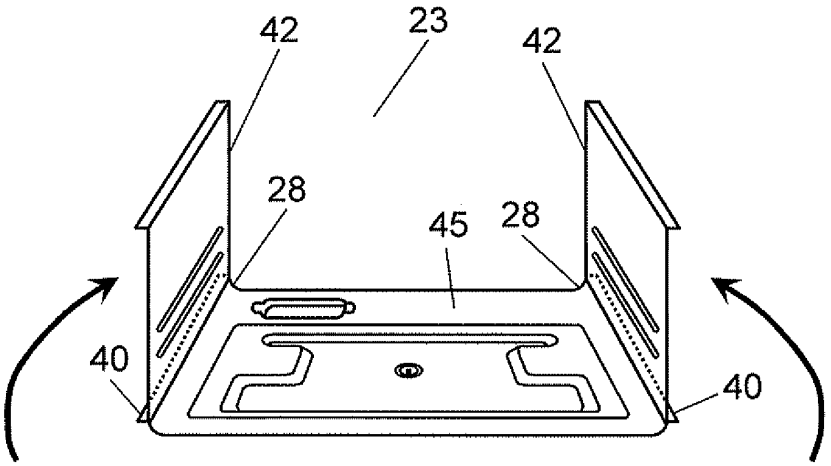


FIG. 4B

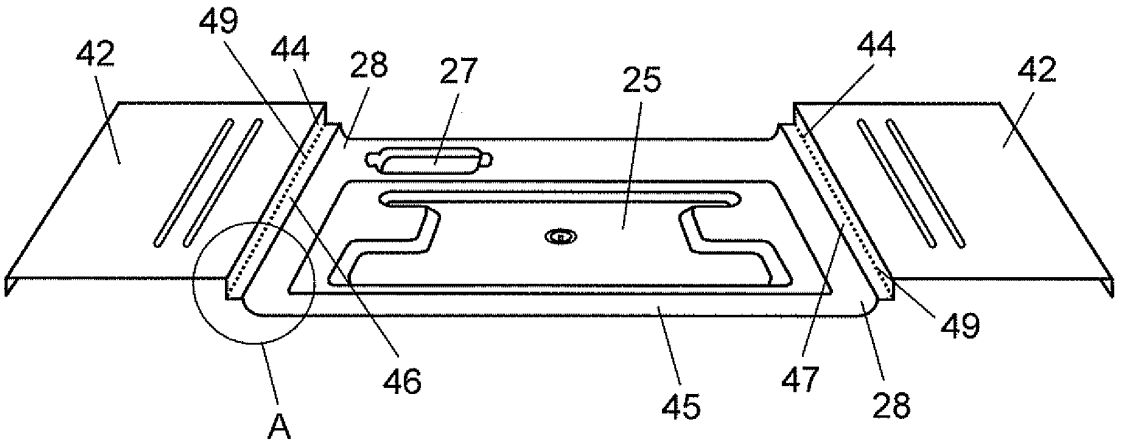


FIG. 5

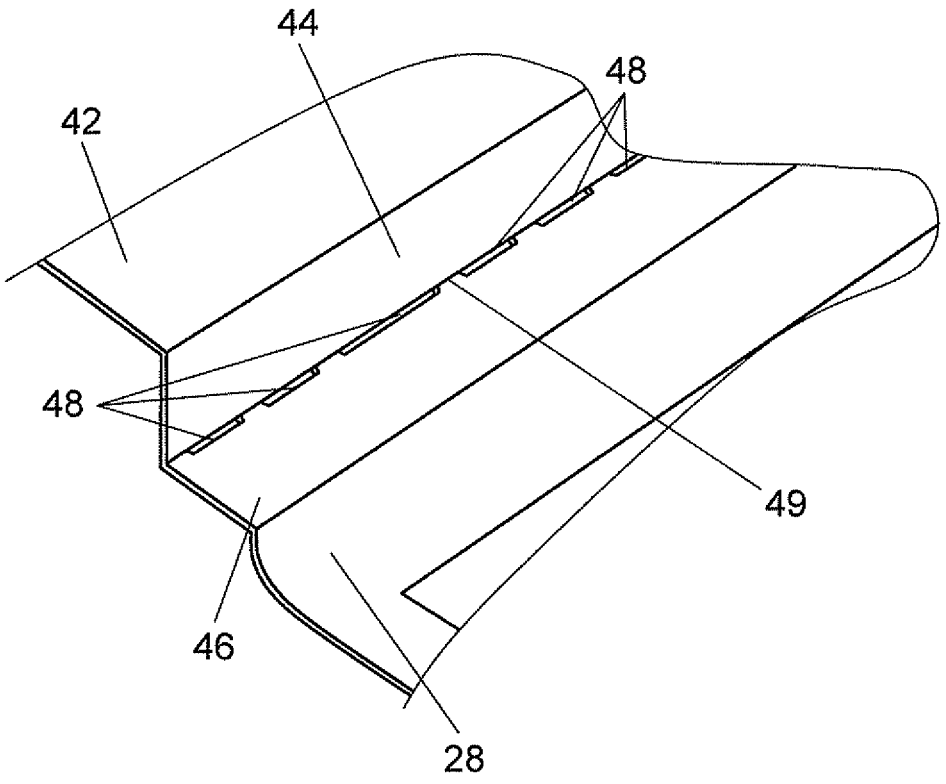


FIG. 6

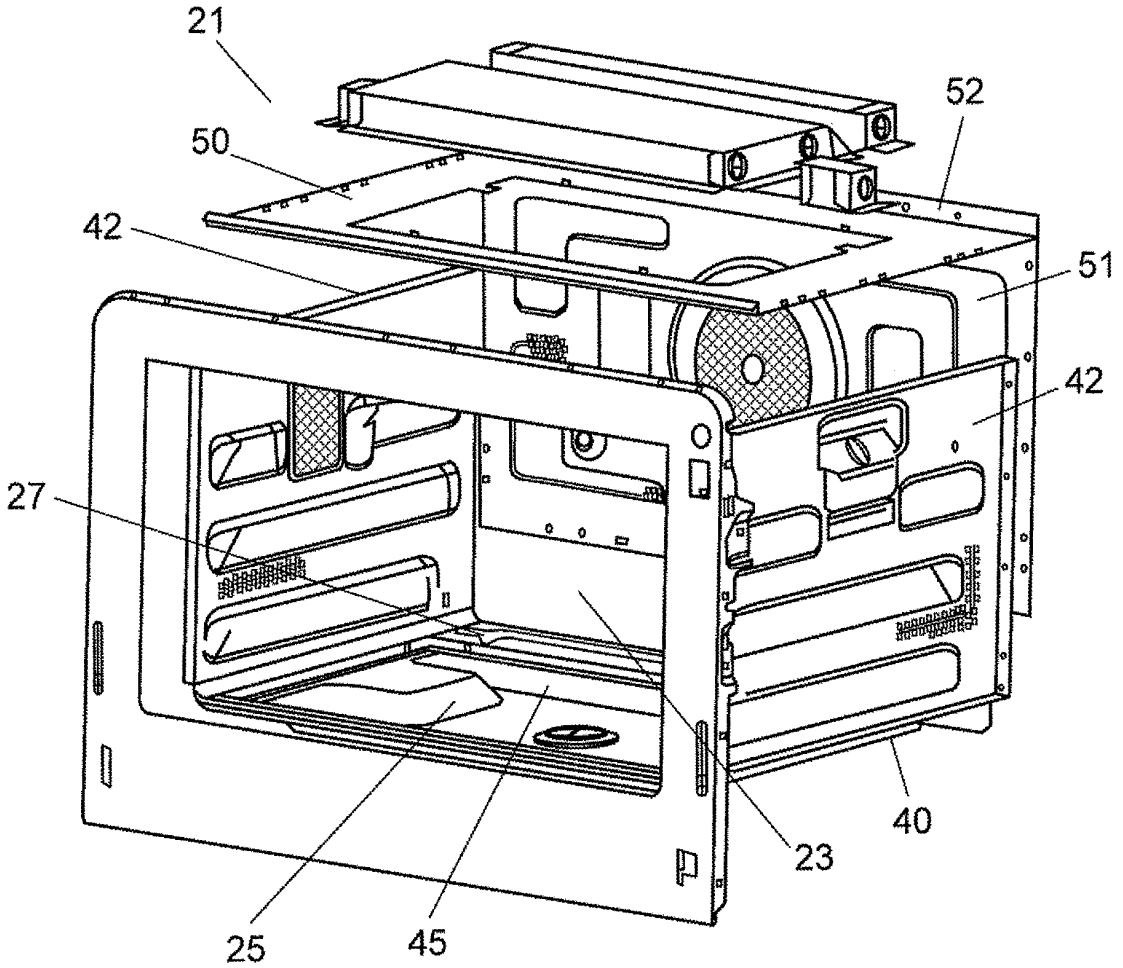


FIG. 7

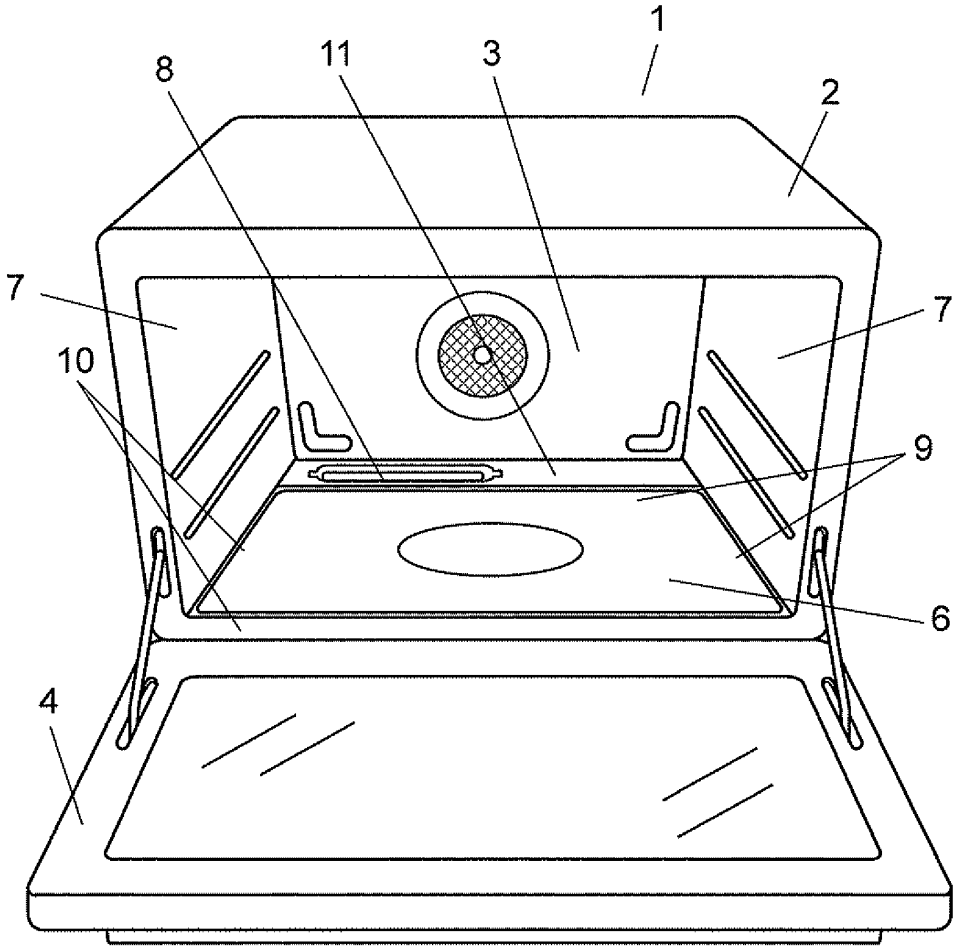
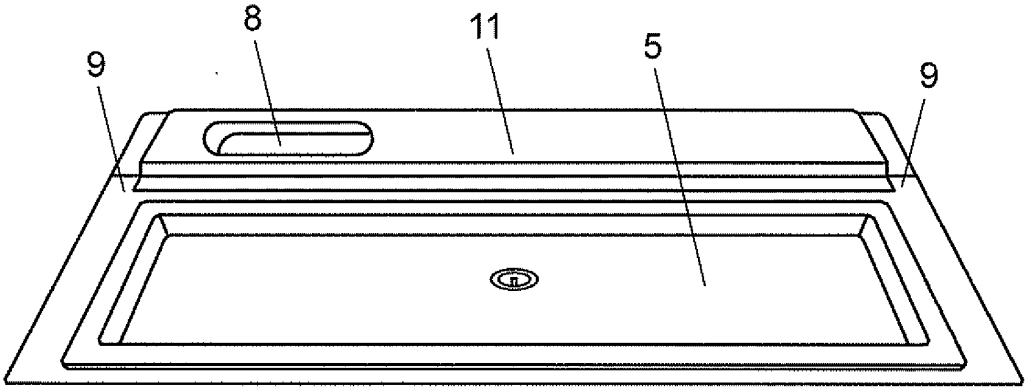


FIG. 8



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2010/002500

A. CLASSIFICATION OF SUBJECT MATTER
F24C7/02(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)
F24C7/02

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 1996-2010
Kokai Jitsuyo Shinan Koho 1971-2010 Toroku Jitsuyo Shinan Koho 1994-2010

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.
Y	JP 2008-224078 A (Matsushita Electric Industrial Co., Ltd.), 25 September 2008 (25.09.2008), paragraphs [0008] to [0016]; fig. 1 to 8 (Family: none)	1-7
Y	JP 11-37478 A (Sharp Corp.), 12 February 1999 (12.02.1999), paragraphs [0041], [0044]; fig. 14, 15 (Family: none)	1-7
Y	JP 2001-304577 A (Matsushita Electric Industrial Co., Ltd.), 31 October 2001 (31.10.2001), claim 1; paragraphs [0012] to [0017]; fig. 1 to 3 (Family: none)	2,5-7

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

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Date of the actual completion of the international search	Date of mailing of the international search report
13 May, 2010 (13.05.10)	25 May, 2010 (25.05.10)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2010/002500

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 2006-177661 A (Matsushita Electric Industrial Co., Ltd.), 06 July 2006 (06.07.2006), paragraph [0041]; fig. 2 to 4 (Family: none)	4
Y	JP 2002-327926 A (Sanyo Electric Co., Ltd.), 15 November 2002 (15.11.2002), paragraph [0004]; fig. 2 (Family: none)	7

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2008224078 A **[0011]**