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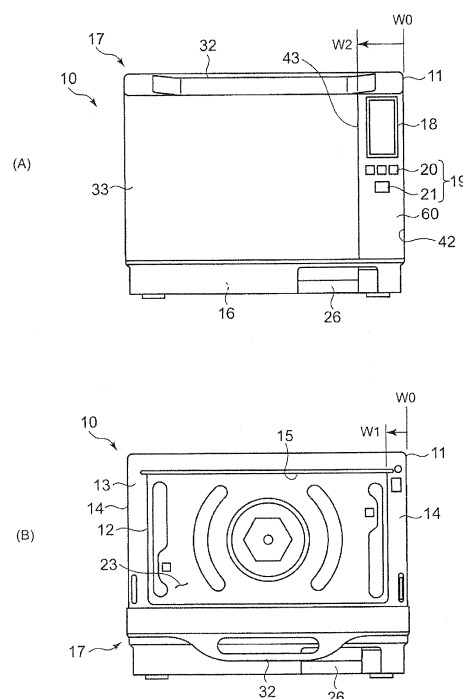
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(54) **HEATING COOKER**

(57) A heating cooker includes a casing having a heating chamber formed therein so as to open on a front surface, an electric chamber provided below the heating chamber, a door mounted on a front surface of the casing, and an operating panel having a display portion and an operating portion and mounted on the door. The operating panel has an end edge in a widthwise direction that extends along an outer edge of the door in the widthwise direction. The other end edge of the operating panel is located so as to overlap with the heating chamber as viewed from the front. This configuration makes it possible to locate the display portion and the operating portion high as compared with a case in which the operating panel is located below the door, thus enhancing the visibility and operability. Also, because the other end edge of the operating panel is located so as to overlap with the heating chamber as viewed from the front, an increase in size of the casing can be restrained.

Fig. 2



Description

Technical Field

[0001] The present invention relates to a heating cooker having a display portion and an operating portion both provided on a door for opening and closing a heating chamber.

Background Art

[0002] A known conventional heating cooker has an operating panel provided on a door (see, for example, Patent Document 1). A conventional heating cooker 100 shown in Fig. 8 is provided with a high-frequency heating device body 101 having a heating chamber 102 defined therein and delimited by side walls 103. The heating chamber 102 is open through a front opening 104 formed at the front of the high-frequency heating device body 101. A heating chamber front side wall 105 is disposed at one edge portion of the front opening 104 in the widthwise direction. A door 107 is mounted on the other edge portion of the front opening 104 so as to be opened and closed via hinges 106. The door 107 is provided with an operating panel 108 at a location overlapping with the heating chamber front side wall 105. A door key 110 that works with a door handle 109 is mounted on a rear surface of the operating panel 108 so as to protrude therefrom. The door key 110 is engageable with the heating chamber front side wall 105. The door handle 109, a display 111, operating switches 112, a cooking stop switch 113, and a cooking start switch 114 are mounted on the surface of the operating panel 108.

[0003] In the conventional heating cooker 100 of the above-described configuration, if the door 107 and the operating panel 108 are balanced in front-to-back, right-to-left and vertical positional relationship, color tone, gloss and the like, the external appearance quality can be enhanced and, also, the interlocking operation time of a cooking operation and a door opening and closing operation can be shortened to thereby enhance the usability.

[0004] Patent Document 1: JP 2011-169477 A (claim 1, fig. 1, paragraph 0012)

Summary of the Invention

Problems to be solved by the Invention

[0005] In the conventional heating cooker 100 referred to above, because an electric chamber 115 is formed behind the heating chamber front side wall 105, the heating chamber 102 cannot be enlarged. On the other hand, another conventional heating cooker 116 as shown in Fig. 9 is known, in which the electric chamber 115 is located below the heating chamber 102 in order to enlarge the heating chamber 102. In this conventional heating cooker 116, in order to avoid the influence of heat

from the heating chamber 102, the operating panel 108 is located below the door 107 so as not to confront the heating chamber 102.

[0006] However, if the operating panel 108 is located below the door 107, the visibility and operability of the operating panel 108 are lowered. In particular, if the heating cooker 116 is built into a lower portion of a kitchen countertop, a user must bend down to see the display 117 and operate the operating panel 108, thus considerably spoiling the usability.

[0007] The present invention has been developed in view of the above-described situations and, accordingly, an objective of the present invention is to provide a heating cooker capable of enhancing the visibility and operability of a display portion and an operating portion.

Means to Solve the Problems

[0008] A heating cooker embodying the present invention comprises a casing having a heating chamber formed therein so as to open on a front surface; an electric chamber provided below the heating chamber; a door mounted on the front surface of the casing; an operating panel having a display portion and an operating portion and mounted on the door; and the operating panel having an end edge in a widthwise direction that extends along an outer edge of the door in the widthwise direction, the operating panel also having another end edge that overlaps with the heating chamber as viewed from front.

Effects of the Invention

[0009] The heating cooker according to the present invention can enhance the visibility and operability of the display portion and the operating portion.

Brief Description of the Drawings

[0010]

Fig. 1(A) is a perspective view of a heating cooker according to a first embodiment of the present invention and Fig. 1(B) is a perspective view thereof with a door opened.

Fig. 2(A) is a front elevational view of the heating cooker shown in Fig. 1 and Fig. 2(B) is a front elevational view thereof with the door opened.

Fig. 3 is a sectional side view of the heating cooker shown in Fig. 1.

Fig. 4 is an exploded perspective view of the door of the heating cooker shown in Fig. 1.

Fig. 5(A) is a sectional side view of the door of the heating cooker shown in Fig. 1 and Fig. 5(B) is an enlarged view of an essential portion thereof.

Fig. 6 is an enlarged sectional view of an essential portion of a heating cooker according to a second embodiment of the present invention.

Fig. 7 is an enlarged sectional side view of an es-

sential portion of a heating cooker according to a third embodiment of the present invention.

Fig. 8 is a perspective view of a conventional heating cooker.

Fig. 9 is a perspective view of another conventional heating cooker.

Embodiments for Carrying out the Invention

[0011] A heating cooker according to the first invention comprises a casing having a heating chamber formed therein so as to open on a front surface; an electric chamber provided below the heating chamber; a door mounted on the front surface of the casing; an operating panel having a display portion and an operating portion and mounted on the door; and the operating panel having an end edge in a widthwise direction that extends along an outer edge of the door in the widthwise direction, the operating panel also having another end edge that overlaps with the heating chamber as viewed from front.

[0012] In this configuration, because the operating panel is disposed along the outer edge of the door in the widthwise direction, the display portion and the operating portion can be located high as compared with the case where the operating portion is located below the door. In particular, even if a cooker casing is built into a lower portion of a kitchen countertop, a user is not required to bend down to see and operate the operating panel, thus enhancing the visibility and operability. Also, the other end edge of the operating panel is located so as to overlap with the heating chamber as viewed from the front, thereby making it possible to restrain an increase in size of the casing.

[0013] In the heating cooker according to the first invention, the second invention is characterized in that a flow channel is formed to allow a gas to flow along the operating panel. This configuration causes the gas flowing through the flow channel to reduce heat transfer from the heating chamber to the operating panel to thereby restrain an increase in temperature of the operating panel while employing the configuration in which a portion of the operating panel overlaps with the heating chamber as viewed from the front.

[0014] In the heating cooker according to the second invention, the third invention is characterized in that the flow channel is formed so as to extend vertically along the operating panel and an opening is formed in an upper portion of the door to discharge the gas inside the flow channel therethrough. This configuration can create an ascending current within the flow channel by making use of the heat transfer from the heating chamber and, accordingly, heat transferred from the heating chamber can be discharged by the ascending current.

[0015] In the heating cooker according to the third invention, the fourth invention is characterized in that the heating cooker further comprises a flow channel fan to convey a gas outside the heating chamber to the flow channel. In this configuration, the volume of flow of the

gas passing through the flow channel can be increased or controlled by the flow channel fan.

[0016] In the heating cooker according to the third invention, the fifth invention is characterized in that the heating cooker further comprises a magnetron drive power source provided in the electric chamber to generate electromagnetic waves and a cooling fan provided in the electric chamber to cool the magnetron drive power source, wherein the cooling fan conveys a gas inside the electric chamber to the flow channel. In this configuration, the volume of flow of the gas passing through the flow channel can be increased or controlled by making use of the cooling fan provided in the electric chamber.

[0017] In the heating cooker according to the fourth or fifth invention, the sixth invention is characterized in that the heating cooker further comprises a water tank to generate steam that is sent to the heating chamber, wherein a gas that has passed through a tank surface of the water tank is sent into the flow channel. In this configuration, the temperature of the gas introduced into the flow channel can be reduced by making use of the water tank, thus making it possible to enhance the cooling effect of the operating panel.

[0018] Embodiments of the present invention are explained hereinafter with reference to the drawings. Like parts are designated by like reference numerals in the accompanying drawings. The present invention is not limited by the embodiments.

(Embodiment 1)

[0019] An embodiment of the present invention is explained hereinafter with reference to the drawings.

[0020] Fig. 1(A) is a perspective view of a heating cooker according to a first embodiment of the present invention and Fig. 1(B) is a perspective view thereof with a door opened. Fig. 2(A) is a front elevational view of the heating cooker shown in Fig. 1 and Fig. 2(B) is a front elevational view thereof with the door opened. Fig. 3 is a sectional side view of the heating cooker shown in Fig. 1. Fig. 4 is an exploded perspective view of the door shown in Fig. 1. Fig. 5(A) is a sectional side view of the door shown in Fig. 1 and Fig. 5(B) is an enlarged view of an essential portion thereof.

[0021] As shown in Figs. 1(A) and 1(B), the heating cooker 10 according to the first embodiment is provided with a casing 11 having a heating chamber 12 formed therein so as to open on a front surface, an electric chamber 16 formed below the heating chamber 12, and a door 17 mounted on a front surface 13 of the casing 11 so as to be opened and closed. The casing 11 is made up of a plurality of side walls 14 encircling the heating chamber 12 and has a front opening 15 formed in a front surface thereof (an opening and closing surface of the door 17) as an opening of the heating chamber 12. The door 17 is connected to a lower edge of the front opening 15 of the casing 11 so as to be opened and closed about a center of rotation in the horizontal direction. The door 17

has the same size and the same shape as, for example, an outline of the front surface 13 of the casing 11 and is mounted on the front surface 13 of the casing 11 so that an outline of the door 17 may coincide with the outline of the front surface 13 of the casing 11 when the door 17 is closed. The shape and size of the door 17 may not completely coincide with those of the front surface 13 of the casing 11 if the outline of the door 17 coincides substantially with that of the front surface 13 of the casing 11 when the door 17 is closed.

[0022] As shown in Fig. 2(A), an operating panel 60 having a display portion 18 and an operating portion 19 is disposed on a side portion of the door 17 as viewed from the front. As described later, a portion of the operating panel 60 is disposed so as to overlap with the heating chamber 12 as viewed from the front. In the operating panel 60, the operating portion 19 is provided with various operating switches 20 and a cooking switch 21, and various information associated with operations and cooking is displayed on the display portion 18. The operating panel 60 may be such that the display portion 18 combines an information displaying function and an operating function (for example, a touch panel).

[0023] As shown in Fig. 3, the electric chamber 16 provided below the heating chamber 12 includes a magnetron (not shown) for generating microwaves and a magnetron drive power source 22 for supplying electric power to the magnetron. The microwaves generated by the magnetron are used to perform microwave heating with respect to an object to be heated.

[0024] A heater (convection heater (not shown)), which is a heat source, is provided between a rear surface 23 of the heating chamber 12 and a rear plate 24. The convection heater is disposed in a closed space sandwiched between the rear surface 23 of the heating chamber 12 and the rear plate 24. A circulation fan 25 is provided on a central side of the convection heater. The rear surface 23 of the heating chamber 12 has a suction port and an exhaust port (both not shown) defined therein and air inside the heating chamber 12 is inhaled into the suction port through a rotational drive of the circulation fan 25 and subsequently heated by the convection heater before returning to the heating chamber 12 again through the exhaust port, thereby uniformly heating the object to be heated at high temperature.

[0025] A water tank 26 for accommodating water therein, which is used to generate steam to be sent to the heating chamber 12, is provided below the electric chamber 16. The water inside the water tank 26 is supplied to a steam generator (not shown) and turns into steam. The steam so generated is supplied to the heating chamber 12 through a steam pipe (not shown) that connects the steam generator with the heating chamber 12, thereby performing steam-heating with respect to the object to be heated.

[0026] An upper heater 27, which is another heat source, is provided on an upper side of the heating chamber 12. The upper heater 27 generates heat to heat the

object to be heated inside the heating chamber 12 by radiant heat. Although the heating cooker 10 according to this first embodiment is provided with all the heating means referred to above as an example, a heating cooker may be provided with only one of the heating means.

[0027] As shown in Fig. 4, the door 17 includes a door rear plate 29 having a transmissive window 28, a door frame 30, a handle 31, a handle cover 32 and a screen 33. The door frame 30 has a recess 34 defined in a side portion thereof and the operating panel 60 is assembled by making use of the recess 34.

[0028] More specifically, a first plate 35 is provided on a rear side of the recess 34, which accommodates therein a second plate 36, a support plate 37, a circuit board 38, a front side base plate 39 and a decorative plate 40, all stacked one on top of another in order from the bottom. A button unit 41 is incorporated into the front side base plate 39 to constitute the operating portion 19 (operating switches 20 and a cooking switch 21). Various electronic component parts and the display portion 18 having a display panel (for example, a liquid crystal panel) are mounted on the circuit board 38.

[0029] The operating panel 60, which is assembled by stacking a plurality of component parts one on top of another, is supported in the recess 34 by the support plate 37. In the operating panel 60, the support plate 37 supports the display portion 18 and the operating portion 19, and an end edge of the support plate 37 in the widthwise direction is located along a vertical side 42, i.e., an outer edge of the door 17 in the widthwise direction. In the operating panel 60, the decorative plate 40 and the support plate 37 are formed so as to have substantially the same outline.

[0030] As shown in Figs. 2(A) and 2(B), the thickness of the side wall 14 is indicated by W1 with an outer side surface of the casing 11 (an outer surface of the side wall 14) as a reference surface WO as viewed from the front. The support plate 37 of the operating panel 60 is disposed so that the end edge of the support plate 37 in the widthwise direction is located in line with the reference surface WO. The support plate 37 is formed so as to have a width W2 greater than the thickness W1 of the side wall 14. For this reason, the support plate 37 of the operating panel 60 is disposed so that the other end edge 43 (an end edge opposite to the vertical side 42) of the support plate 37 in the widthwise direction overlaps with the heating chamber 12 as viewed from the front. That is, a portion of the operating panel 60 is disposed on a side portion of the door 17 so as to overlap with an internal space of the heating chamber 12 as viewed from the front.

[0031] As shown in Figs. 5(A) and 5(B), the operating panel 60 has a flow channel 44 defined therein along the support plate 37. The flow channel 44 may be formed between the circuit board 38 and the support plate 37 or between the support plate 37 and the second plate 36. In this first embodiment, the flow channel 44 is formed between the circuit board 38 and the support plate 37 so as to extend vertically along the operating panel 60. The

recess 34 has a flow channel lower opening 45 defined on a lower side and a flow channel upper opening 46 defined on an upper side with the door 17 closed. Each of the flow channel lower opening 45 and the flow channel upper opening 46 communicates the flow channel 44 with the outside. When a gas inside the flow channel 44 is warmed, the flow channel 44 creates an ascending current and discharges it through the flow channel upper opening 46. As a result, external air enters the flow channel 44 through the flow channel lower opening 45.

[0032] The operation and effects of the heating cooker 10 of the above-described construction are explained hereinafter.

[0033] In the heating cooker 10 according to the first embodiment, as shown in Fig. 2(A), the operating panel 60 is disposed on a side portion of the door 17 and, hence, the display portion 18 and the operating portion 19 are located high as compared with a conventional construction in which the operating panel 60 is located below the door 17, thus enhancing the visibility and operability. In particular, if the casing 11 is built into a lower portion of a kitchen countertop, a user is not required to bend down to see the display portion 18 or operate the operating panel 19, thus exerting a striking effect in enhancing the visibility and operability.

[0034] Also, the support plate 37 of the operating panel 60 is disposed so that an end edge (the other end edge referred to above) 43 in the widthwise direction (see Fig. 2(A)) overlaps with the internal space of the heating chamber 12 as viewed from the front. Because of this, the thickness of the side wall 14 of the casing 11 need not be increased in conformity with the width dimension of the support plate 37. Further, if the end edge 43 of the support plate 37 in the widthwise direction does not overlap with the heating chamber 12 of the same size as viewed from the front, the support plate 37 protrudes outwardly from the vertical side 42 of the casing 11. If the wall thickness of the casing 11 is increased to accommodate the protruding length, the size of the casing 11 increases. In the construction according to the first embodiment, an increase in size of the casing 11 is avoided by overlapping a portion of the support plate 37 of the operating panel 60 with the internal space of the heating chamber 12 as viewed from the front.

[0035] Also, heat from the heating chamber 12 (that is, heat generated during cooking) is transferred to the portion of the support plate 37 of the operating panel 60 that overlaps with the heating chamber 12 as viewed from the front. However, such heat transfer is reduced in the presence of the flow channel 44 formed along the support plate 37 and between the heating chamber 12 and the support plate 37. That is, the heat from the heating chamber 12 is transferred through a gas that is present in the flow channel 44 and, accordingly, the gas temperature increases and an ascending current is created in the flow channel 44. Because most of the heat from the heating chamber 12 is carried by the ascending current and discharged through the flow channel upper opening 46, it is

unlikely that the heat from the heating chamber 12 is transferred to the support plate 37 of the operating panel 60. For this reason, it becomes possible to restrain the heat from the heating chamber 12 from being transferred to the display portion 18, the operating portion 19 and electric component parts of the circuit board 38 provided on or in the operating panel 60. In order to effectively create the ascending current, it is preferable that the flow channel 44 extends vertically. It is more preferable that the flow channel 44 extends vertically linearly. The flow channel 44 may extend vertically so as to meander from side to side instead of extending vertically linearly. In this case, heat removal can be enhanced by causing the air flowing through the flow channel 44 to contact with the wall surfaces of the flow channel 44. Each of the first plate 35 and the second plate 36 provided in the recess 34 acts in itself as a radiator plate to remove the heat from the heating chamber 12, thus making it possible to restrain the heat from the heating chamber 12 from being transferred to the operating panel 60.

[0036] As just described, the configuration in which a portion of the operating panel 60 overlaps with the internal space of the heating chamber 12 as viewed from the front can restrain the heat transfer from the heating chamber 12 to the operating panel 60 in the presence of the flow channel 44 while avoiding an increase in size of the casing 11.

(Embodiment 2)

[0037] A heating cooker 47 according to a second embodiment of the present invention is explained hereinafter.

[0038] Fig. 6 is an enlarged sectional view of an essential portion of the heating cooker 47 according to the second embodiment, which is provided with a flow channel fan 48 in a flow channel 44.

[0039] The heating cooker 47 according to the second embodiment has the flow channel fan 48 provided in the flow channel 44 to convey a gas of a temperature lower than the temperature of a heating chamber 12. The gas of a temperature lower than the temperature of the heating chamber 12 means a gas of a temperature lower than that of an atmosphere inside the heating chamber 12, which has been increased during cooking of an object to be heated. In this second embodiment, a gas outside the heating chamber 12, i.e., external air is used as such a low-temperature gas. The flow channel fan 48 is controlled so as to be driven simultaneously with the start of cooking by the heating cooker 47.

[0040] In this heating cooker 47, the volume of flow of the gas passing through the flow channel 44 is increased by the flow channel fan 48, thus resulting in an increase in the amount of exhaust heat through the flow channel 44. That is, forced cooling with the use of the flow channel fan 48 enhances the cooling effect (the effect of exhausting heat) to further restrain temperature increases of the display portion 18, the operating portion 19 and the elec-

tronic component parts of the circuit board 38 provided on or in the operating panel 60. Also, the volume of flow of the gas passing through the flow channel 44 can be controlled by controlling the start and stop of the flow channel fan 48.

(Embodiment 3)

[0041] A heating cooker 49 according to a third embodiment of the present invention is explained hereinafter.

[0042] Fig. 7 is an enlarged sectional side view of an essential portion of the heating cooker 49 according to the third embodiment in which a gas conveyed by a cooling fan 50 is introduced into a flow channel 44.

[0043] In the heating cooker 49 according to the third embodiment, the cooling fan 50 for cooling a magnetron drive power source 22 is provided in an electric chamber 16 or in the vicinity of the electric chamber 16. The cooling fan 50 conveys a gas of a temperature lower than the temperature of a heating chamber 12 to the flow channel 44. A gas inside the electric chamber 16 is discharged through an electric chamber exhaust port 51 by the cooling fan 12 and the gas so discharged is introduced into the flow channel 44 through a communication hole 52, which communicates the electric chamber 16 with the interior of the door 17, and through a gas suction hole 53. The gas introduced into the interior of the door 17 through the communication hole 52 may be taken into the flow channel 44 through the outside of the heating cooker 49. A gas guide member such as, for example, a guide piece for ready introduction of the gas may be provided in the gas suction hole 53 formed between a flow channel lower opening 45 of the flow channel 44 and the communication hole 52.

[0044] In this heating cooker 49, the volume of flow of the gas passing through the flow channel 44 is increased by the gas that is conveyed to the electric chamber 16 by the cooling fan 50, thus resulting in an increase in the amount of exhaust heat through the flow channel 44. That is, forced cooling enhances the cooling effect to further restrain temperature increases of the display portion 18, the operating portion 19 and the electronic component parts of the circuit board 38 provided on or in the operating panel 60. Also, a dedicated flow channel fan 48 is not required.

(Modified Form of Embodiments)

[0045] The present invention is not limited to the embodiments referred to above and can take on various forms. By way of example, a heating cooker according to a modified form of the above-described embodiments is explained.

[0046] In the heating cooker 10 according to the first embodiment or the heating cooker 47 according to the second embodiment, the gas entering the flow channel 44 through the flow channel lower opening 45 may pass

through a tank surface 54 of the water tank 26. Also, in the heating cooker 49 according to the third embodiment, the gas that has passed through the outside after being introduced into the door 17 through the communication hole 52 may be taken into the flow channel 44 after having passed through the tank surface 54 of the water tank 26.

[0047] In this modified form, the gas entering the flow channel 44 through the flow channel lower opening 45 is taken into the flow channel 44 after having contact with the surface of the water tank 26. Because of this, immediately before entering the flow channel 44, the gas is cooled by passing through the tank surface 54 of a temperature lower than the flow channel 44, thereby further enhancing the cooling effect in the flow channel 44.

[0048] As described above, the heating cookers according to the embodiments referred to above can enhance the visibility and operability of the display portion 18 and the operating portion 19 of the operating panel 60.

[0049] Any combination of the various embodiments referred to above can produce respective effects.

[0050] Although the present invention has been fully described by way of preferred embodiments with reference to the accompanying drawings, it is to be noted here that various changes and modifications will be apparent to those skilled in the art. Therefore, unless such changes and modifications otherwise depart from the scope of the present invention as set forth in the appended claims, they should be construed as being included therein.

Industrial Applicability

[0051] The present invention is suited to a heating cooker having a display portion and an operating portion provided on a door that is used to open and close a heating chamber.

Explanation of Reference Numerals

[0052]

- 10 heating cooker
- 11 casing
- 12 heating chamber
- 13 front surface
- 16 electric chamber
- 17 door
- 18 display portion
- 19 operating portion
- 22 magnetron drive power source
- 26 water tank
- 37 support plate
- 42 vertical side
- 43 end edge (other end edge)
- 44 flow channel
- 48 flow channel fan
- 50 cooling fan
- 60 operating panel

Claims

1. A heating cooker comprising:

a casing having a heating chamber formed therein so as to open on a front surface;
 an electric chamber provided below the heating chamber;
 a door mounted on the front surface of the casing;
 an operating panel having a display portion and an operating portion and mounted on the door; and
 the operating panel having an end edge in a widthwise direction that extends along an outer edge of the door in the widthwise direction, the operating panel also having another end edge that overlaps with the heating chamber as viewed from front.

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2. The heating cooker according to claim 1, wherein a flow channel is formed to allow a gas to flow along the operating panel.

3. The heating cooker according to claim 2, wherein the flow channel is formed so as to extend vertically along the operating panel and an opening is formed in an upper portion of the door to discharge the gas inside the flow channel therethrough.

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4. The heating cooker according to claim 3, further comprising a flow channel fan to convey a gas outside the heating chamber to the flow channel.

5. The heating cooker according to claim 3, further comprising a magnetron drive power source provided in the electric chamber to generate electromagnetic waves and a cooling fan provided in the electric chamber to cool the magnetron drive power source, wherein the cooling fan conveys a gas inside the electric chamber to the flow channel.

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6. The heating cooker according to claim 4 or 5, further comprising a water tank to generate steam that is sent to the heating chamber, wherein a gas that has passed through a tank surface of the water tank is sent into the flow channel.

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Fig. 1

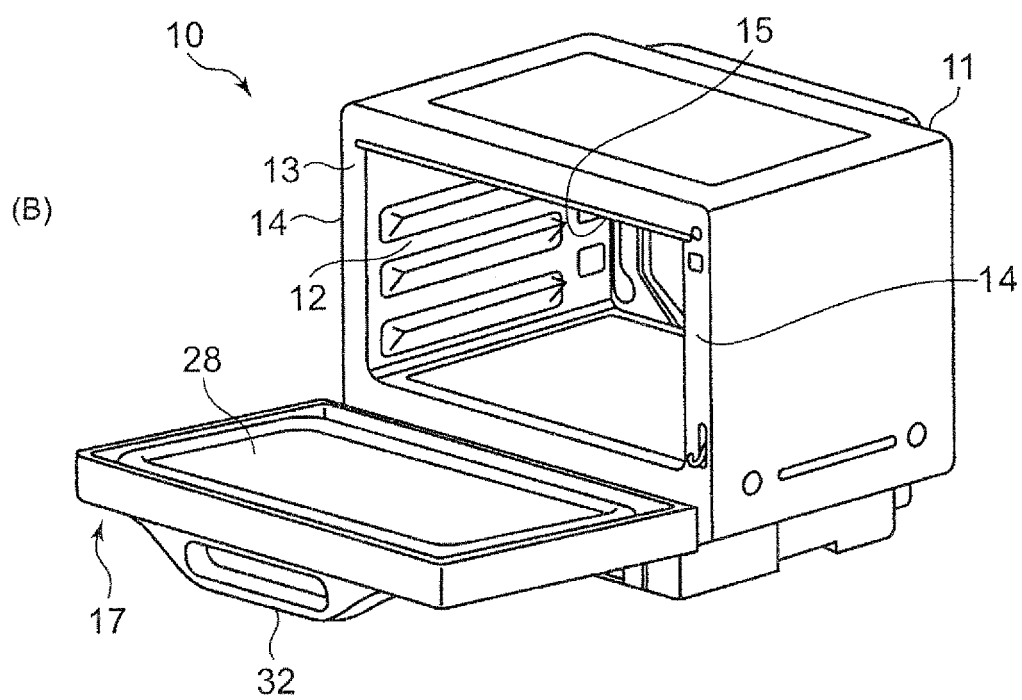
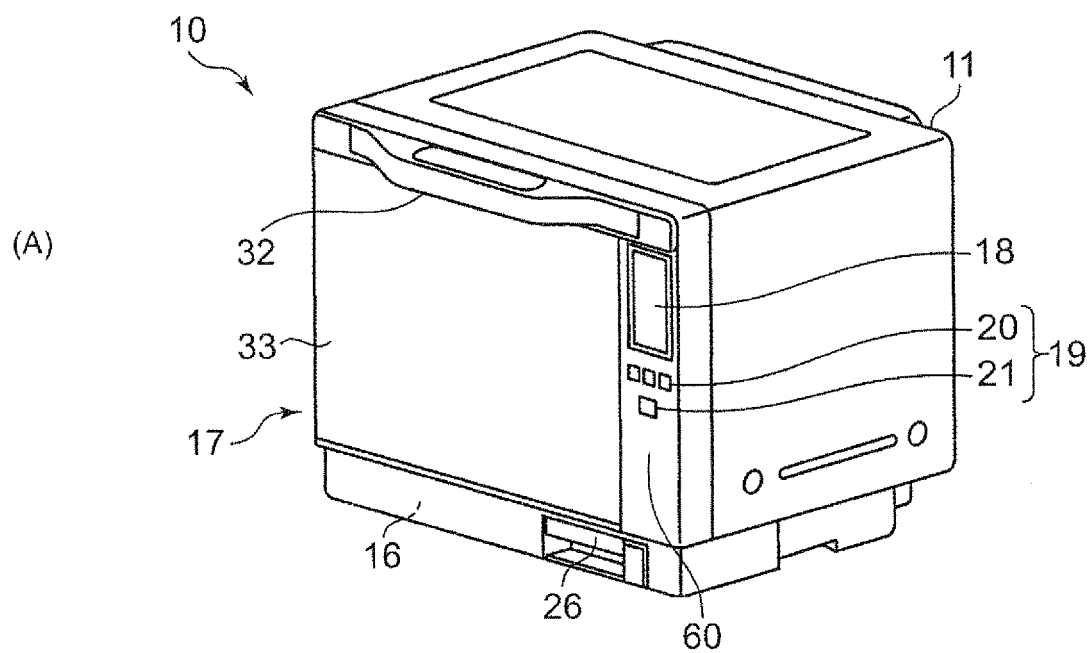


Fig. 2

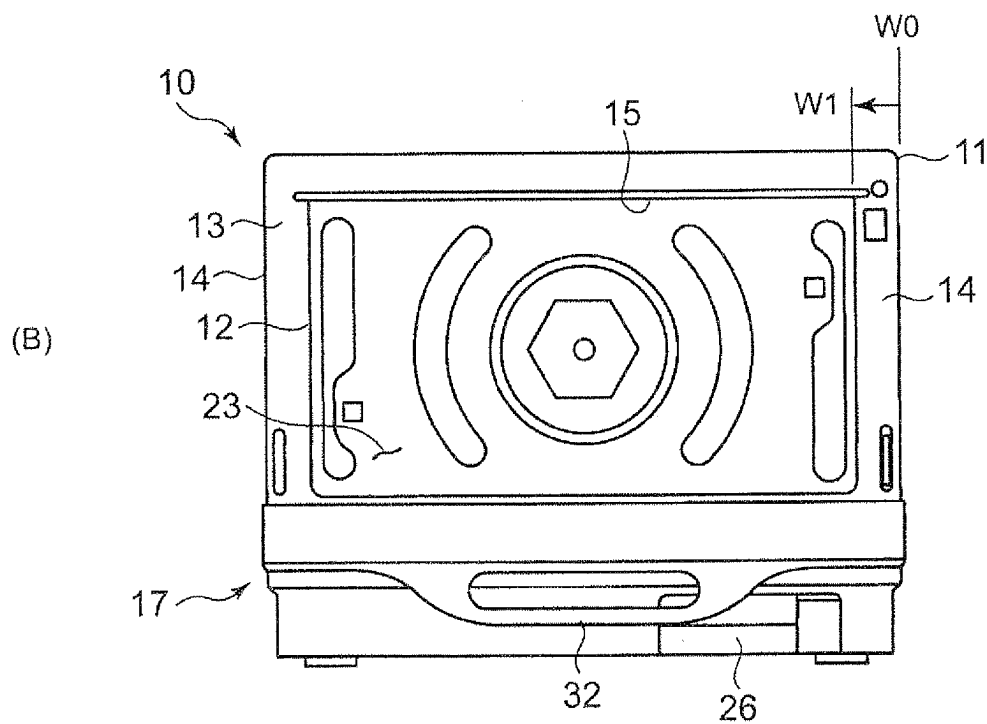
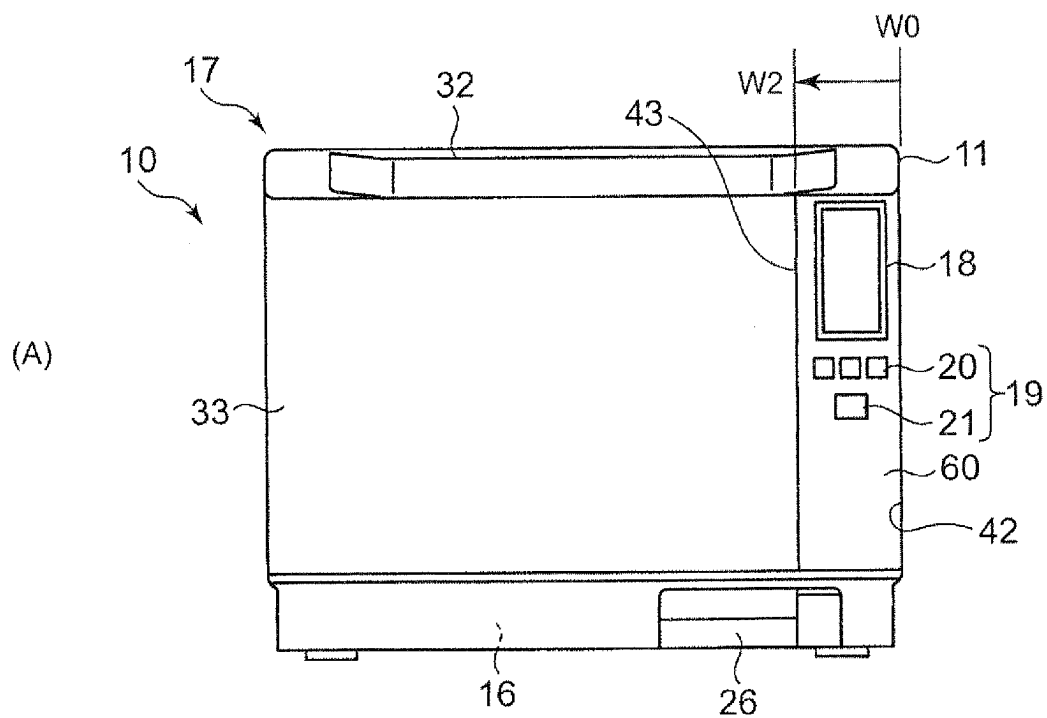


Fig. 3

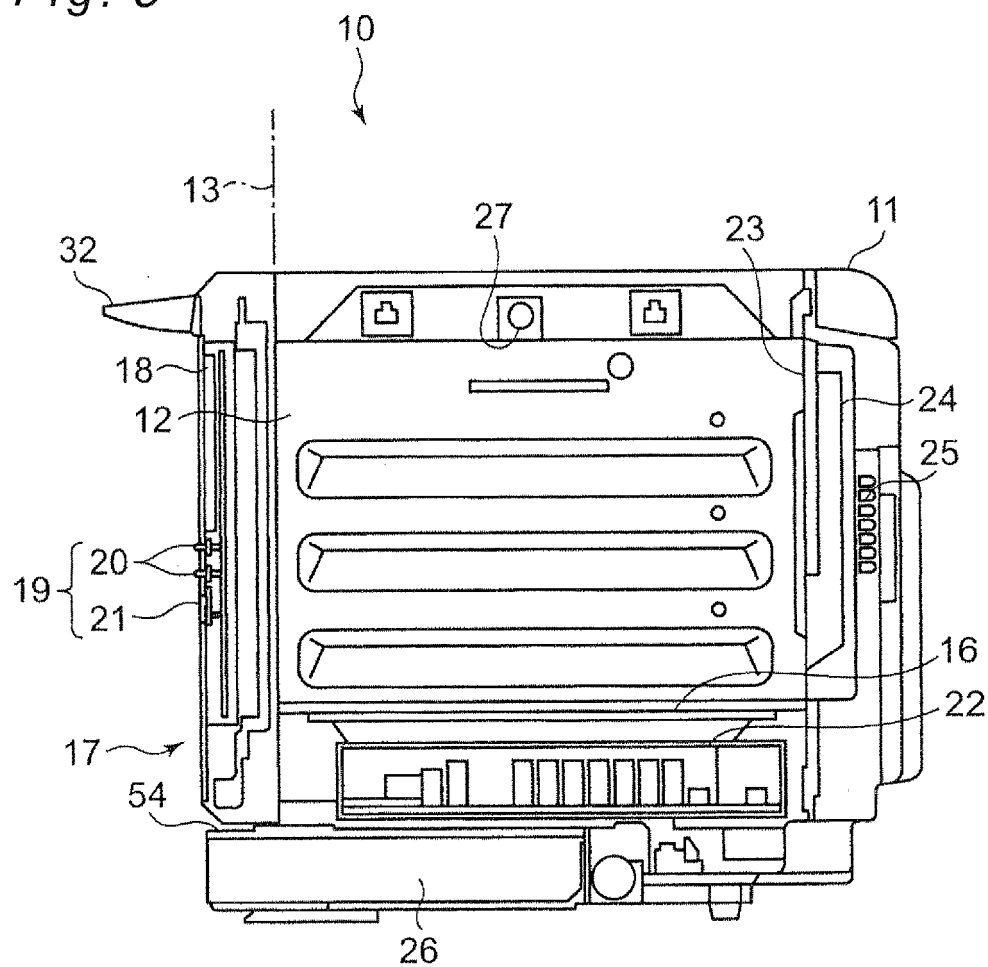


Fig. 4

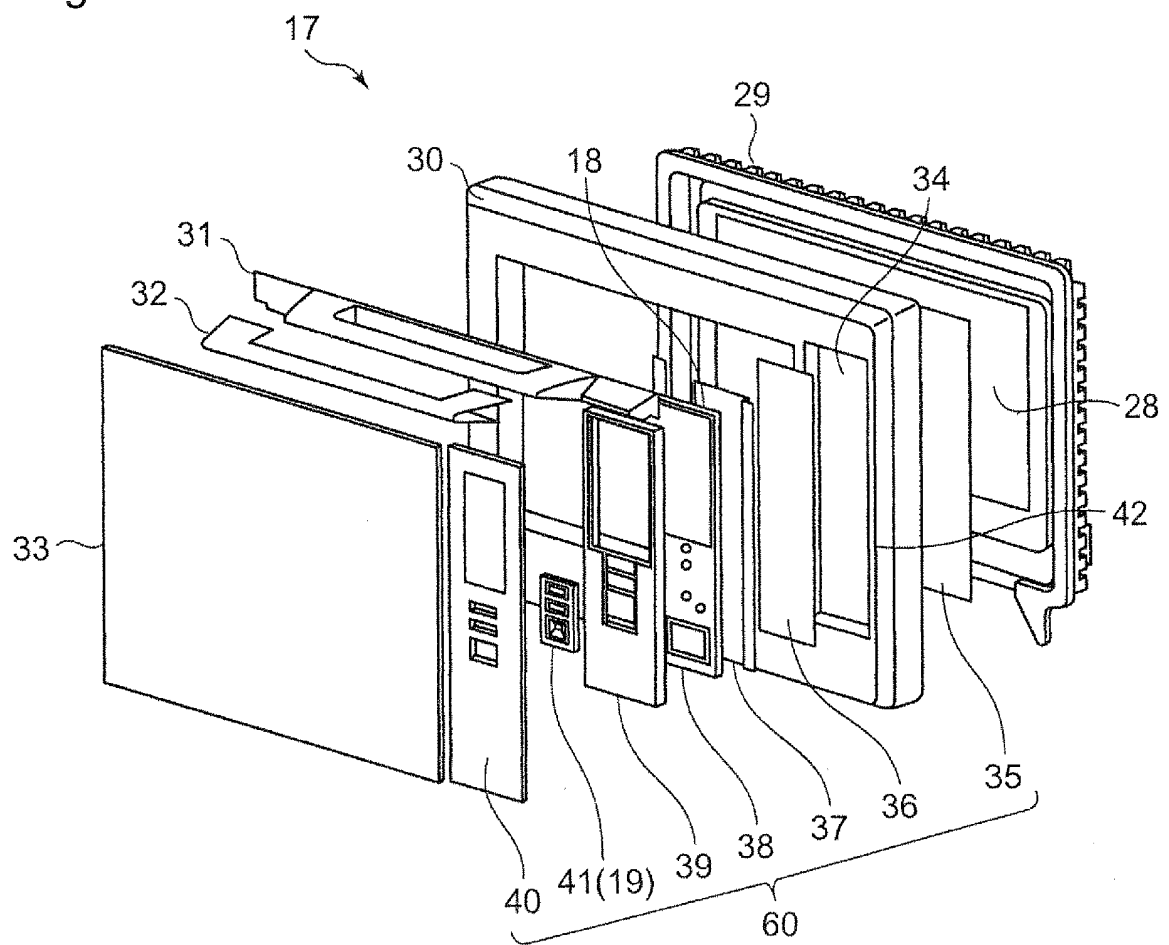


Fig.5

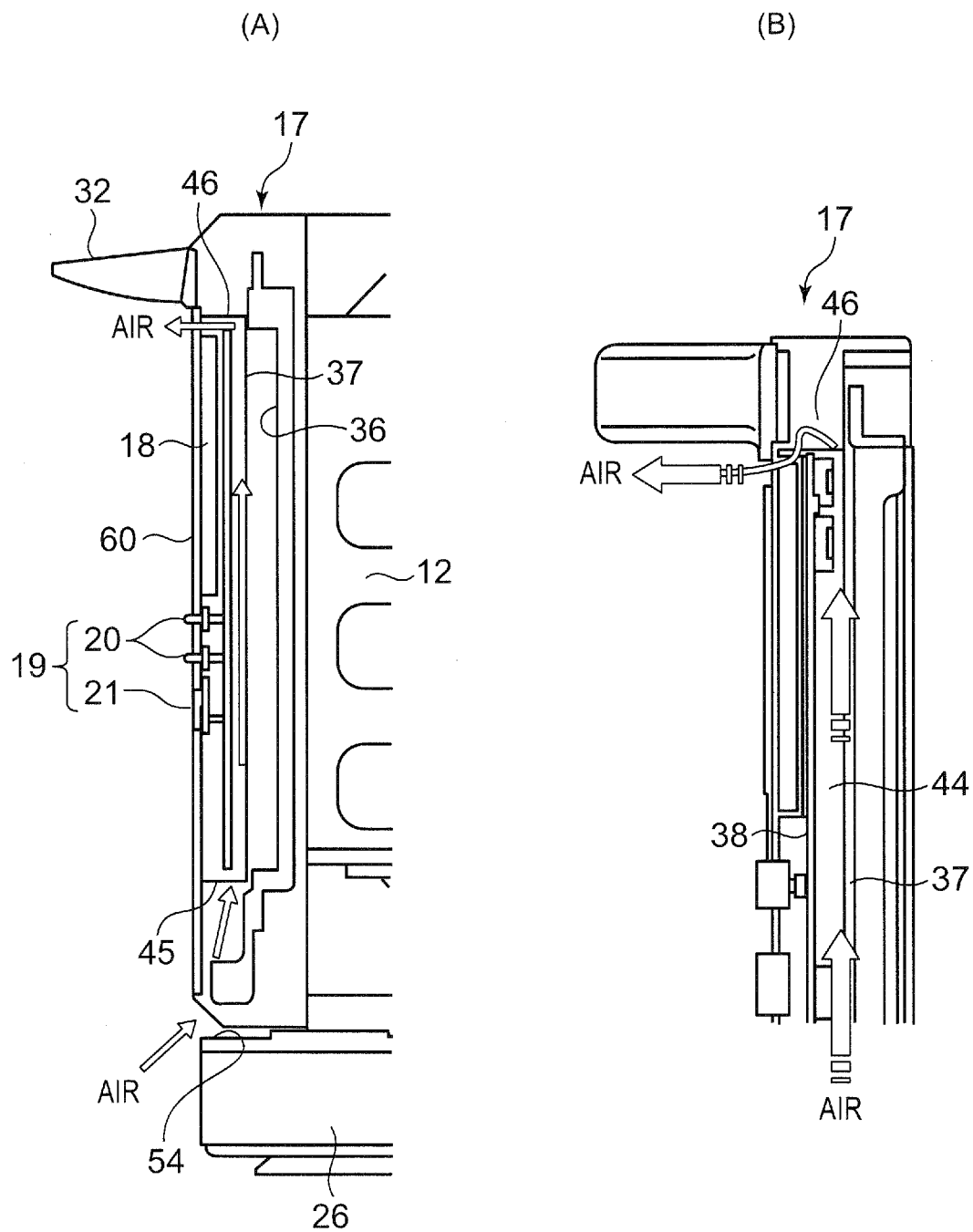
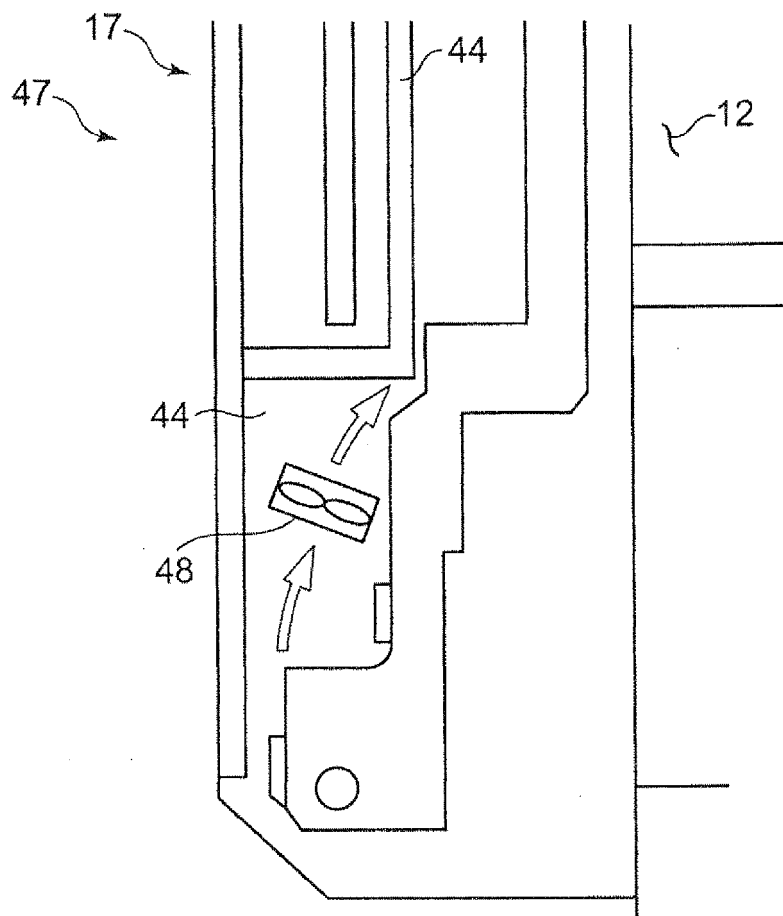


Fig. 6



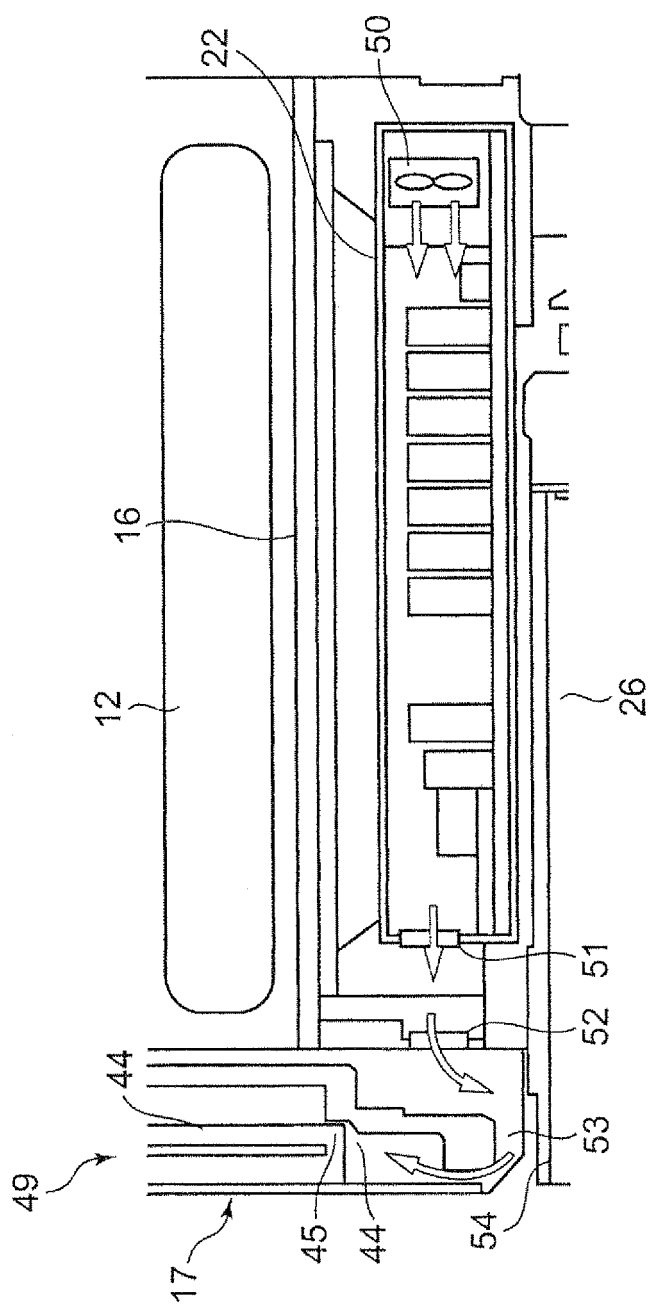


Fig. 7

Fig. 8

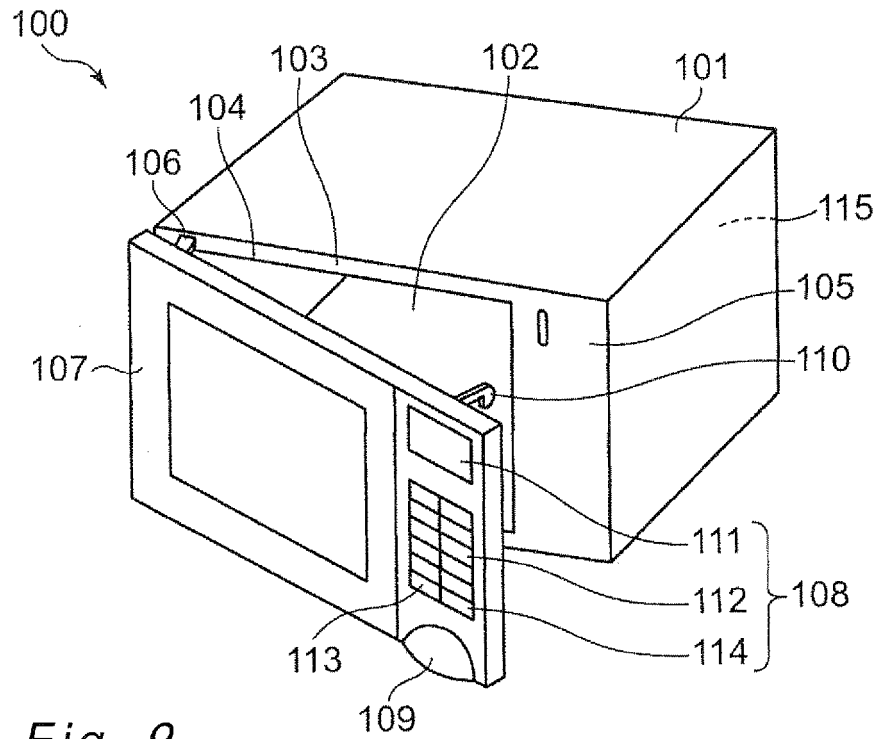
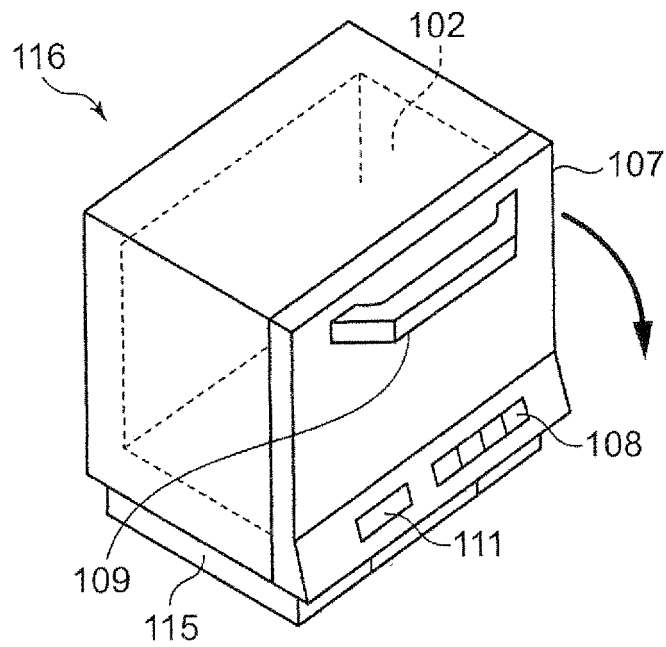


Fig. 9



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2013/000763

A. CLASSIFICATION OF SUBJECT MATTER

F24C15/00(2006.01)i, F24C1/00(2006.01)i, F24C7/02(2006.01)i, F24C15/04(2006.01)i, F24C15/34(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)

F24C15/00, F24C1/00, F24C7/02, F24C15/04, F24C15/34

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 1996-2013
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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 2005-265216 A (Toshiba Corp.),	1
Y	29 September 2005 (29.09.2005), entire text (Family: none)	2-6
Y	JP 2007-327675 A (Hitachi Appliances, Inc.), 20 December 2007 (20.12.2007), entire text (Family: none)	2-6
Y	JP 9-229377 A (Sharp Corp.), 05 September 1997 (05.09.1997), entire text (Family: none)	4-6



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
15 March, 2013 (15.03.13)

Date of mailing of the international search report
26 March, 2013 (26.03.13)

Name and mailing address of the ISA/
Japanese Patent Office

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2013/000763

C (Continuation).	DOCUMENTS CONSIDERED TO BE RELEVANT	
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 86830/1990 (Laid-open No. 46606/1992) (Hitachi Hometec, Ltd.), 21 April 1992 (21.04.1992), entire text (Family: none)	4-6
Y	JP 2007-147275 A (Matsushita Electric Industrial Co., Ltd.), 14 June 2007 (14.06.2007), paragraphs [0033], [0039] (Family: none)	6
A	CD-ROM of the specification and drawings annexed to the request of Japanese Utility Model Application No. 87820/1991 (Laid-open No. 40704/1993) (Tiger Corp.), 01 June 1993 (01.06.1993), entire text (Family: none)	1-6
A	DE 102009001739 B3 (BSH BOSCH SIEMENS HAUSGERAETE), 25 November 2010 (25.11.2010), entire text (Family: none)	1-6
A	JP 2005-331178 A (Toshiba Corp.), 02 December 2005 (02.12.2005), entire text (Family: none)	1-6

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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