



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

(43) Date of publication:
05.07.2023 Bulletin 2023/27

(51) International Patent Classification (IPC):
F24C 7/02 ^(2006.01) **F24C 15/02** ^(2006.01)
F24C 15/04 ^(2006.01)

(21) Application number: **21861048.3**

(52) Cooperative Patent Classification (CPC):
F24C 7/02; F24C 15/02; F24C 15/04

(22) Date of filing: **19.07.2021**

(86) International application number:
PCT/JP2021/026950

(87) International publication number:
WO 2022/044619 (03.03.2022 Gazette 2022/09)

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

(72) Inventors:
• **TAKAYAMA, Masahiro**
Osaka 540-6207 (JP)
• **SAKATA, Masayuki**
Osaka 540-6207 (JP)
• **HAYAKAWA, Yuuji**
Osaka 540-6207 (JP)

(30) Priority: **28.08.2020 JP 2020144776**

(74) Representative: **SSM Sandmair**
Patentanwälte Rechtsanwalt
Partnerschaft mbB
Joseph-Wild-Straße 20
81829 München (DE)

(71) Applicant: **Panasonic Intellectual Property Management Co., Ltd.**
Osaka-shi, Osaka 540-6207 (JP)

(54) **HEATING COOKER**

(57) A cooker includes a housing, a heating chamber, a door, at least one heating device, a control board, a machine chamber, and a fan. The heating chamber is disposed inside the housing and includes a front opening. The door covers the front opening. The control board is connected to the at least one heating device. The ma-

chine chamber is disposed inside the housing, and houses a controller. The fan is housed in the machine chamber, and sends air toward the machine chamber. The door includes an outer frame, two members covering an opening surrounded by the outer frame, and an air intake port and an exhaust port provided in the outer frame. The air intake port is provided in the lower part of the door and close to the machine chamber.

FIG. 2

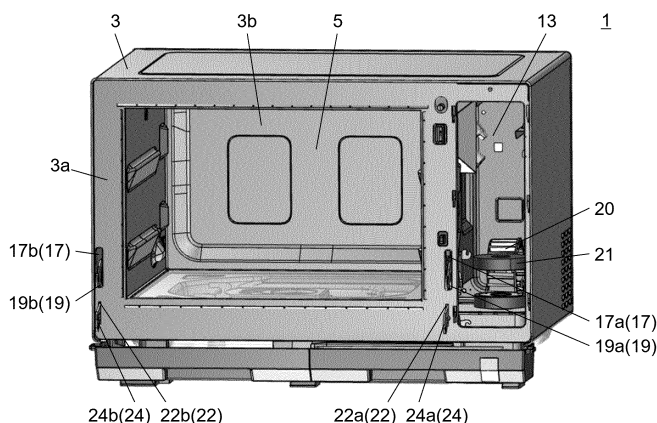
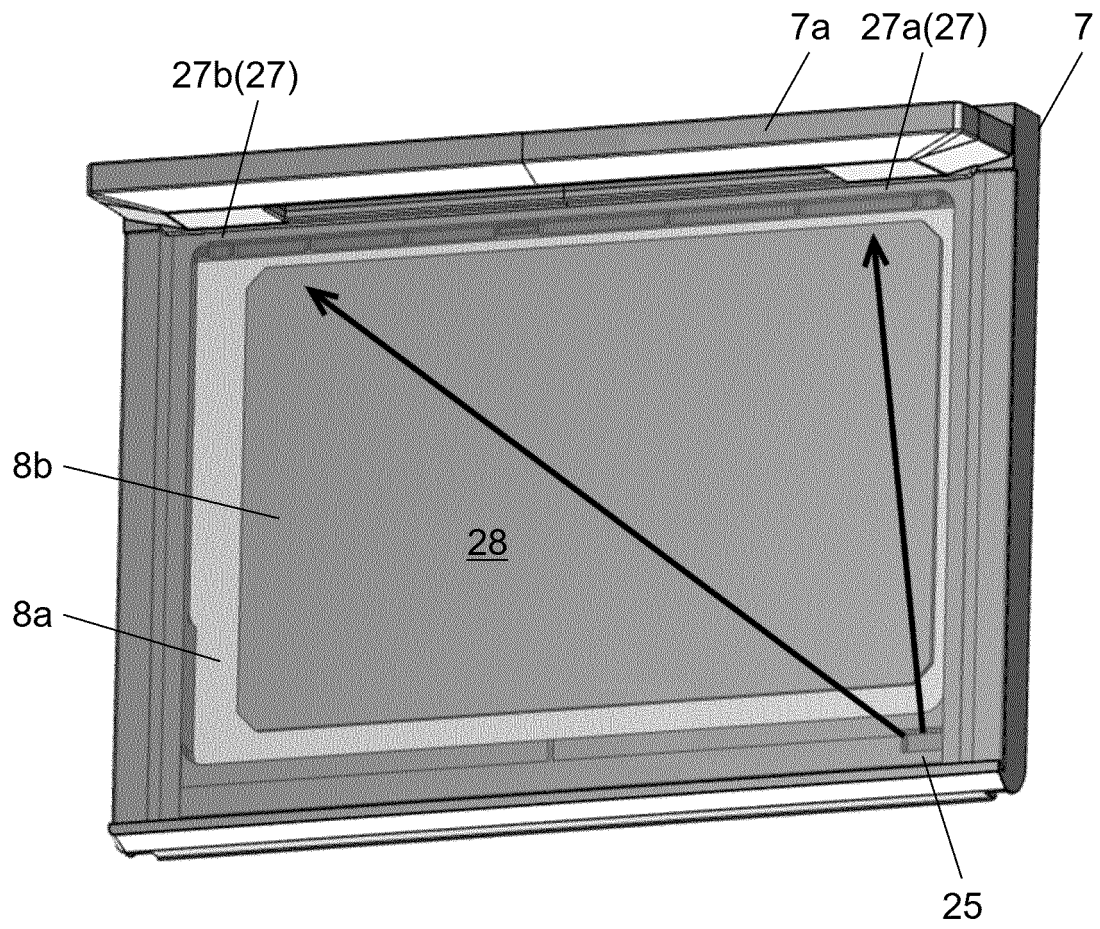


FIG. 8



Description

TECHNICAL FIELD

[0001] The present disclosure relates to a cooker for heating a heating target such as food.

BACKGROUND ART

[0002] A door covering a front opening of a heating chamber of a cooker is at least partially made of a transparent member such as glass. This allows a user to visually check an inside of the heating chamber (see, for example, Patent Literature 1).

[0003] Patent Literature 1 discloses a cooker including a door having an upper-side door frame and a lower-side door frame. Each of the upper-side door frame and the lower-side door frame includes an outer barrier, an inner barrier, and a cutout. The outer barrier faces the inner barrier with an inside space interposed therebetween. The cutout supports the outer barrier and the inner barrier from above and below, and communicates the outside with a space in the door.

Citation List

Patent Literature

[0004] PTL 1: Japanese Patent Application Unexamined Publication No. 2010-78308

SUMMARY OF THE INVENTION

[0005] A cooker disclosed in Patent Literature 1 intends to improve performance of suppressing occurrence of fogging, that is, dew condensation in a space between an outer barrier and an inner barrier. Specifically, a cooker disclosed in Patent Literature 1 has a water-preventing wall disposed in an inner side of the cutout provided in a lower-side door frame and being close to the space. This water-preventing wall has a height higher than a thickness of the outer barrier.

[0006] The present disclosure provides technology for further suppressing occurrence of fogging in a space in a door of a cooker.

[0007] A cooker of the present disclosure includes a housing, a heating chamber, a door, at least one heating device, a control board, a machine chamber, and a fan.

[0008] The heating chamber is disposed inside the housing and has a front opening. The door covers the front opening. The control board is connected to the at least one heating device. The machine chamber is disposed inside the housing and houses a controller. The fan is housed in the machine chamber and sends air toward the machine chamber.

[0009] The door includes an outer frame, two members covering an opening surrounded by the outer frame, an air intake port and an exhaust port provided in the outer

frame. The air intake port is provided in a lower part of the door and close to the machine chamber.

[0010] The cooker of the present disclosure can suppress occurrence of fogging in a space in the door.

BRIEF DESCRIPTION OF DRAWINGS

[0011]

FIG. 1 is a front perspective view of a cooker in a state in which a door is closed in accordance with one exemplary embodiment of the present disclosure.

FIG. 2 is a front perspective view of the cooker in a state in which the door and an operation panel are removed in accordance with the exemplary embodiment.

FIG. 3A is a perspective view of the door of the cooker in accordance with the exemplary embodiment.

FIG. 3B is an exploded perspective view of the door. FIG. 4 is a rear view of a first member constituting the door.

FIG. 5 is a rear view of a second member constituting the door.

FIG. 6 is a perspective view of the door viewed obliquely from below with an outer screen removed.

FIG. 7 is a partially expanded view of a vicinity of an exhaust port of FIG. 6.

FIG. 8 is a view schematically showing a flow of air in a space inside the door.

DESCRIPTION OF EMBODIMENTS

[0012] Hereinafter, the exemplary embodiment is described in detail with reference to drawings. However, a more detailed description than necessary may be omitted. For example, a detailed description of already-known matter, or repeated description of substantially the same configurations may be omitted.

[0013] The attached drawings and the following description are provided for a person skilled in the art to sufficiently understand the present disclosure, but are not intended to limit the subject matter described in claims.

Exemplary embodiment

[1-1 Configuration]

[0014] FIGs. 1 and 2 show an appearance of cooker 1 in accordance with one exemplary embodiment of the present disclosure. FIG. 1 is a front perspective view of cooker 1 in a state in which door 7 is closed. FIG. 2 is a front perspective view of cooker 1 in a state in which door 7 and operation panel 11 are removed.

[0015] In FIGs. 1 and 2, the front side of each drawing corresponds to the front of cooker 1. In other words, a door 7 side and a front opening 3b side of cooker 1 are

defined as the front, and a side opposite to the front (a deep side in FIGs. 1 and 2) is defined as the rear. The left side and the right side in FIG. 2 are defined as the left side and the right side of cooker 1, respectively.

[0016] As shown in FIGs. 1 and 2, cooker 1 includes housing 3, heating chamber 5, door 7, machine chamber 13, and operation panel 11. Heating chamber 5 is disposed in housing 3. Door 7 covers front opening 3b that is a front surface of housing 3 and is surrounded by front frame 3a. Machine chamber 13 is disposed in housing 3 and is adjacent to the right side of heating chamber 5. Operation panel 11 is disposed on the front surface of machine chamber 13.

[0017] Machine chamber 13 includes a microwave oscillator for generating microwaves. In this exemplary embodiment, the microwave oscillator is, for example, magnetron 21.

[0018] Heating chamber 5 has a microwave radiation port (not shown) for radiating microwaves generated by magnetron 21 into heating chamber 5. A heating target (food) placed in heating chamber 5 is heated by microwaves radiated from the microwave radiation port.

[0019] Inside of housing 3 and at the rear of a rear wall of heating chamber 5, a convection heater unit (not shown) is disposed. The convection heater unit includes a convection heater and a circulation fan.

[0020] For heating by the convection heater unit, a suction hole and a discharge hole (both are not shown) are formed on the rear wall of heating chamber 5. When the circulation fan is driven to rotate, air in heating chamber 5 is sucked through the suction hole. The air is heated by the convection heater, and is returned to heating chamber 5 through the discharge hole. Thus, the heating target is uniformly heated. On the front lower part of housing 3, a suction port (not shown) for sucking outside air into housing 3 is provided.

[0021] Magnetron 21 and the convection heater unit are heating devices of cooker 1.

[0022] Door 7 includes a horizontal rotation axis disposed below the front surface of housing 3, and is attached so as to cover front opening 3b of housing 3. Door 7 has handle 7a attached to the front upper part of door 7 by attachment part 7aa (see FIGs. 6 and 7). When handle 7a is pulled to rotate door 7 around the rotation axis, front opening 3b is opened. When door 7 is lifted with handle 7a and is rotated until door 7 is in a vertical state, front opening 3b is closed.

[0023] Operation panel 11 includes a display and an operation part. The display is, for example, a liquid crystal screen for displaying a menu screen and the like. The operation part includes, for example, push buttons or a dial, and receives instructions from a user to cooker 1.

[0024] Machine chamber 13 includes fan 20, magnetron 21, a convection heater unit, a control board (not shown), and the like. Fan 20 sends cooling air for cooling magnetron 21, the convection heater unit, a control board, and the like. The control board has the controller, an inverter circuit, and the like.

[0025] The controller includes a microprocessor and a semiconductor memory. The controller is connected to operation panel 11, fan 20, the convection heater unit, the inverter circuit, and the like. The controller receives instructions input through the operation part of operation panel 11, and controls the display of operation panel 11, fan 20, the convection heater unit, the inverter circuit, and the like. The inverter circuit drives magnetron 21.

[0026] Cooker 1 includes door arm attachment hole 17, door arm 19, hinge attachment hole 22, and hinge 24.

[0027] Door arm 19 includes first door arm 19a and second door arm 19b, is linked to door 7, and regulates an opening degree of door 7. Hinge 24 includes first hinge 24a and second hinge 24b having a common horizontal rotation axis, and links door 7 to housing 3 rotatably.

[0028] Door arm attachment hole 17 includes first door arm attachment hole 17a and second door arm attachment hole 17b. Hinge attachment hole 22 includes first hinge attachment hole 22a and second hinge attachment hole 22b. In this exemplary embodiment, door arm attachment hole 17 and hinge attachment hole 22 correspond to housing-side attachment holes.

[0029] First hinge attachment hole 22a is provided in a part of front frame 3a below front opening 3b at the right side. To first hinge attachment hole 22a, first hinge 24a is attached. First door arm attachment hole 17a is provided in a lower right part of front frame 3a and above first hinge attachment hole 22a.

[0030] The front end of first door arm 19a is attached to the rear surface at the right end of door 7, and is rotatable around the horizontal rotation axis. First door arm 19a is supported by a guide roller (not shown) disposed inside housing 3 at the rear of first door arm attachment hole 17a. The rear end of first door arm 19a is linked to the inside of housing 3 at the rear of the guide roller through a spring (not shown).

[0031] Second hinge attachment hole 22b is provided in a part of front frame 3a below front opening 3b at the left side. To second hinge attachment hole 22b, second hinge 24b is attached. Second door arm attachment hole 17b is provided in a lower left part of front frame 3a and above second hinge attachment hole 22b.

[0032] The front end of second door arm 19b is attached to the rear surface at the left end of door 7, and is rotatable around the horizontal rotation axis. Second door arm 19b is supported by a guide roller (not shown) disposed inside housing 3 at the rear of second door arm attachment hole 17b. The rear end of second door arm 19b is linked to the inside of housing 3 at the rear of the guide roller through a spring (not shown).

[0033] FIGs. 3A and 3B show a configuration of door 7 of cooker 1 in accordance with this exemplary embodiment. FIG. 3A is a perspective view of door 7. FIG. 3B is an exploded perspective view of door 7.

[0034] As shown in FIGs. 3A and 3B, door 7 includes handle 7a, member 7b, member 7c, member 7d, member 7e, outer screen 8a, and inner screen 8b. Members 7b, 7c, 7d, and 7e constitute outer frame of door 7. Outer

screen 8a and inner screen 8b are made of transparent glass, and cover an opening, surrounded by outer frames of door 7, in the middle of door 7.

[0035] Outer screen 8a is attached to attachment part 8c of member 7b. Inner screen 8b is attached to a rear side of member 7d. Space 28 in door 7 (see FIG. 8) is defined by outer screen 8a, inner screen 8b, and the outer frame of door 7.

[0036] Radio wave leakage prevention plate 7f is a metal plate disposed in space 28. Radio wave leakage prevention plate 7f prevents radio waves from leaking to the outside of heating chamber 5 through door 7. Radio wave leakage prevention plate 7f includes a large number of punching holes (not shown) provided in the middle of radio wave leakage prevention plate 7f facing front opening 3b.

[0037] A user can visually check the inside of heating chamber 5 from the front of cooker 1 through the punching hole, outer screen 8a, and inner screen 8b.

[0038] FIG. 4 is a rear view of member 7e constituting door 7. As shown in FIG. 4, member 7e includes door arm attachment hole 18 and hinge attachment hole 23 provided in the rear surface.

[0039] Door arm attachment hole 18 includes first door arm attachment hole 18a and second door arm attachment hole 18b. Hinge attachment hole 23 includes first hinge attachment hole 23a and second hinge attachment hole 23b. In this exemplary embodiment, door arm attachment hole 18 and hinge attachment hole 23 correspond to door-side attachment holes.

[0040] First hinge attachment hole 23a and second hinge attachment hole 23b are provided in the rear lower part of member 7e at the left end and the right end, respectively, in FIG. 4 (at the right end and left, respectively, in FIGs. 1 and 2). First door arm attachment hole 18a and second door arm attachment hole 18b are provided above first hinge attachment hole 23a and second hinge attachment hole 23b, respectively. In FIG. 4, first door arm 19a and first hinge 24a are not shown.

[0041] When front opening 3b is covered with door 7, first door arm attachment hole 17a faces first door arm attachment hole 18a, and second door arm attachment hole 17b faces second door arm attachment hole 18b. First hinge attachment hole 22a faces first hinge attachment hole 23a, and second hinge attachment hole 22b faces second hinge attachment hole 23b.

[0042] First door arm attachment hole 17a and first hinge attachment hole 22a communicate with machine chamber 13. Therefore, air sent from fan 20 flows toward the outside of housing 3 through first door arm attachment hole 17a and first hinge attachment hole 22a. When door 7 covers front opening 3b, the air reaches to door 7.

[0043] FIG. 5 is a rear view of member 7b constituting door 7. Air intake port 25 is provided in the rear lower part of member 7b at the left end of FIG. 5 (the right end in FIGs. 1 and 2). The air flowing out to the outside of housing 3 is supplied to space 28 in door 7 through air intake port 25. Thus, the water vapor that is present in

space 28 in door 7 can be exhausted to the outside.

[0044] Air intake port 25 is provided in the vicinity of first door arm attachment hole 18a and first hinge attachment hole 23a, but is not provided in the vicinity of second door arm attachment hole 18b and second hinge attachment hole 23b.

[0045] FIG. 6 is a perspective view of door 7 as viewed obliquely from below in a state in which outer screen 8a is removed. FIG. 7 is a partially expanded view of a vicinity of an exhaust port of FIG. 6.

[0046] As shown in FIGs. 6 and 7, door 7 includes vent hole 26 and exhaust port 27. Vent hole 26 is provided in a part of member 7c defining the upper end of space 28 in door 7. Exhaust port 27 is provided in a part of member 7b positioned above vent hole 26. Vent hole 26 and exhaust port 27 are openings for exhausting air flowing upward and water vapor in space 28 to the outside of door 7.

[0047] Vent hole 26 includes first vent hole 26a and second vent hole 26b. Exhaust port 27 includes first exhaust port 27a and second exhaust port 27b. First vent hole 26a and first exhaust port 27a are provided in the upper right part of door 7. Second vent hole 26b and second exhaust port 27b are provided in the upper left part of door 7.

[0048] As described above, air sent from fan 20 (see FIG. 2) is sent to the outside of housing 3 through first door arm attachment hole 17a and first hinge attachment hole 22a (see FIG. 2). The air is supplied to space 28 in door 7 through first door arm attachment hole 18a and first hinge attachment hole 23a of door 7 (see FIG. 4), and air intake port 25 (see FIG. 5).

[0049] FIG. 8 is a view schematically showing a flow of air in space 28 inside door 7. As shown in FIG. 8, the air supplied to space 28 generates an upward air flow in the entire area of the space 28.

[0050] Air intake port 25 is provided only in the right side (the left side in FIG. 5) of the lower part of door 7. Therefore, as shown by arrows in FIG. 8, mainly two air flows are generated in space 28. A first flow is an air flow from air intake port 25 to first exhaust port 27a positioned above air intake port 25. A second flow is an air flow from air intake port 25 to second exhaust port 27b positioned obliquely above air intake port 25.

[0051] When the temperature of space 28 is low, few air flows are generated in the lower left part of space 28. When cooker 1 is operated and the air in space 28 is heated, an air flow upward from the lower left part in space 28 is generated. Thus, an air flow from air intake port 25 to the lower left part of space 28 is generated. As a result, water vapor that is present in the entire part of space 28 can be efficiently exhausted to the outside of door 7.

[0052] In this exemplary embodiment, air is supplied to the inside of space 28 for efficiently exhausting water vapor in space 28 rather than for cooling outer screen 8a of door 7. Therefore, it is sufficient to provide air intake port 25 only in a part of the lower part of space 28, and it is not necessary to provide air intake port 25 over the entire part of the lower part of space 28.

[0053] The outer periphery of space 28, excluding air intake port 25 and exhaust port 27, may be sealed. Thus, even if a user spills liquid in the vicinity of door 7 or boils water in the vicinity of cooker 1, it is possible to suppress entering of foreign matter such as liquid or water vapor into space 28. If most of the outer periphery of space 28 is sealed, occurrence of dew condensation in space 28 can be suppressed.

[0054] In this exemplary embodiment, air intake port 25 is provided in the lower part of door 7, and exhaust port 27 is provided below attachment part 7aa of handle 7a. This can suppress entering of foreign matter such as liquid and water vapor from air intake port 25 or exhaust port 27.

[0055] Air intake port 25 and exhaust port 27 are provided in not the entire part but only a part of the upper part or the lower part of door 7. This can suppress entering of foreign matter from intake port 25 or exhaust port 27.

[1-2. Operation]

[0056] Hereinafter, operations and actions of cooker 1 configured as mentioned above are described.

[0057] A user places a heating target in heating chamber 5, closes door 7, operates operation panel 11 to set heating conditions such as heating time and a heating temperature. A controller (not shown) of cooker 1 controls magnetron 21 or the like so that the heating target is heated under the set heating conditions.

[0058] While magnetron 21 works, fan 20 is driven, air is sent toward magnetron 21, a control board, or the like. The air from fan 20 is supplied to space 28 in door 7 through hinge attachment hole 22 and door arm attachment hole 17 of housing 3, hinge attachment hole 23 and door arm attachment hole 18 of door 7, and air intake port 25. The air supplied to space 28 is exhausted to the outside, together with water vapor that is present in space 28, through exhaust port 27 provided in the upper part of door 7.

[0059] Thus, water vapor that is present in space 28 can be efficiently exhausted to the outside. As a result, occurrence of dew condensation in space 28 can be suppressed. Even if dew condensation temporarily occurs in space 28, water vapor can be quickly exhausted to the outside to remove dew condensation.

[0060] According to this exemplary embodiment, water vapor can be exhausted more efficiently than a case where water vapor in space 28 is exhausted only by natural convection through air intake port 25 and exhaust port 27 provided in space 28. Therefore, occurrence of dew condensation in space 28 can be suppressed more effectively.

[0061] A more moderate air flow can be generated than a case where air is sent into space 28 by a special-purpose fan or the like provided in the vicinity of space 28. Therefore, it is possible to suppress excessively cooling of door 7 to affect heating in heating chamber 5.

[0062] This exemplary embodiment uses, as a fan for sending air to space 28, fan 20 for cooling electronic components such as magnetron 21 and a control board. Thus, occurrence of dew condensation in space 28 can be suppressed without adding a special-purpose fan or the like. As a result, an increase of the manufacturing cost of cooker 1 can be suppressed.

[0063] In this exemplary embodiment, as an air passage through which air is sent from machine chamber 13 to door 7, a housing-side attachment hole and a door-side attachment hole are used. Thus, air can be supplied into space 28 without adding a special-purpose air passage. As a result, an increase in the manufacturing cost of cooker 1 can be suppressed.

[1-3. Advantageous effect etc.]

[0064] As mentioned above, in this exemplary embodiment, a cooker includes a housing, a heating chamber, a door, at least one heating device, a control board, a machine chamber, and a fan.

[0065] The heating chamber is disposed inside the housing and has a front opening. The door covers the front opening. The control board is connected to the at least one heating device. The machine chamber is disposed inside the housing and includes the controller. The fan is housed in the machine chamber and sends air toward the machine chamber.

[0066] The door has an outer frame, two members covering an opening surrounded by the outer frame, and an air intake port and an exhaust port provided in the outer frame. The air intake port is provided in the lower part of the door and close to the machine chamber.

[0067] Thus, water vapor that is present in a space in the door can be exhausted efficiently. As a result, occurrence of dew condensation in the space can be suppressed. During heating, the progress of cooking in the heating chamber can be always checked visually through a screen disposed in the door.

[0068] In this exemplary embodiment, the exhaust port is provided in a part of the upper part of the door. Thus, together with heated air, water vapor that is present in the space in the door can be efficiently exhausted. As a result, occurrence of fogging in the space in the door can be effectively suppressed.

[0069] In this exemplary embodiment, the door has a handle attached to the upper part of the door by an attachment part. The exhaust port is provided below the attachment part of the handle. Thus, entering of foreign matter such as liquid and water vapor from the exhaust port to a space in the door can be suppressed.

[0070] In this exemplary embodiment, the cooker further includes a door arm linking the door to the housing. The door has a door-side attachment hole to which the front end of the door arm is attached. The housing has a housing-side attachment hole to which the rear end of the door arm is attached. The machine chamber communicates with the inside of the door defined by the outer

frame and the two members through a housing-side attachment hole, an air intake port, and a door-side attachment hole.

[0071] This configuration does not require a special-purpose air passage for supplying the air sent from the fan to the space in the door. As a result, an increase in manufacturing cost of the cooker can be suppressed.

Modified Example

[0072] The above exemplary embodiment is an example of the technology in accordance with the present disclosure, and the technology in accordance with the present disclosure is not limited to the above exemplary embodiment. The technology in accordance with the exemplary embodiment includes modified examples with modifications, substitutions, additions, omissions, and the like, applied to the above-described exemplary embodiment.

[0073] Hereinafter, a modified example of the above exemplary embodiment is described below.

[0074] The cooker of the above exemplary embodiment includes a microwave and a convection heater unit as a heating device. However, the cooker of the present disclosure is not limited to this configuration.

[0075] The cooker of the present disclosure may further include, as a heating device, a radiation heater disposed on the ceiling of heating chamber 5 in housing 3 and radiating a heating target from above. The cooker of the present disclosure may further include, as a heating device, a steam generator disposed in machine chamber 13 and heating the heating target by supplying heating chamber 5 with high temperature steam. The cooker of the present disclosure may include at least one of the plurality of heating devices.

[0076] In cooker 1 of the above-mentioned exemplary embodiment, machine chamber 13 is disposed at the right side with respect to heating chamber 5. However, machine chamber 13 may be disposed at the left side with respect to heating chamber 5. In this case, air intake port 25 is disposed at the left side of door 7.

INDUSTRIAL APPLICABILITY

[0077] The technology of the present disclosure is applicable to a cooker for heating a heating target such as food.

REFERENCE MARKS IN THE DRAWINGS

[0078]

1 cooker
3 housing

3a front frame
3b front opening

5 heating chamber
7 door

7a handle
7aa attachment part
7b member
7c member
7d member
7e member
7f radio wave leakage prevention plate
8a outer screen
8b inner screen
8c attachment part

11 operation panel
13 machine chamber
17 door arm attachment hole (housing-side attachment hole)

17a first door arm attachment hole (housing-side attachment hole)
17b second door arm attachment hole (housing-side attachment hole)

18 door arm attachment hole (door-side attachment hole)

18a first door arm attachment hole (door-side attachment hole)
18b second door arm attachment hole (door-side attachment hole)

19 door arm

19a first door arm
19b second door arm

20 fan

21 magnetron

22 hinge attachment hole (housing-side attachment hole)

22a first hinge attachment hole (housing-side attachment hole)
22b second hinge attachment hole (housing-side attachment hole)

23 hinge attachment hole (door-side attachment hole)

23a first hinge attachment hole (door-side attachment hole)
23b second hinge attachment hole (door-side attachment hole)

24 hinge

24a first hinge

24b second hinge	
25 air intake port	
26 vent hole	
26a first vent hole	
26b second vent hole	5
27 exhaust port	
27a first exhaust port	
27b second exhaust port	
28 space	10

Claims

1. A cooker comprising:
 - a housing;
 - a heating chamber disposed inside the housing, and having a front opening;
 - a door covering the front opening;
 - at least one heating device;
 - a control board including a controller connected to the at least one heating device;
 - a machine chamber disposed inside the housing, and housing the controller; and
 - a fan housed in the machine chamber and sending air toward the machine chamber,
 - wherein the door includes an outer frame, two members covering an opening surrounded by the outer frame, an air intake port and an exhaust port each provided in the outer frame, and the air intake port is provided in a lower part of the door and close to the machine chamber.
2. The cooker according to claim 1, wherein the exhaust port is provided in a part of an upper part of the door.
3. The cooker according to claim 2, wherein
 - the door has a handle attached to the upper part of the door by an attachment part, and the exhaust port is provided below the attachment part of the handle.
4. The cooker according to any one of claim 1 to claim 3, further comprising a door arm linking the door to the housing, wherein
 - the door has a door-side attachment hole to which a front end of the door arm is attached,
 - the housing has a housing-side attachment hole to which a rear end of the door arm is attached, and
 - the machine chamber communicates with an inside of the door defined by the outer frame and the two members through the housing-side attachment hole, the air intake port, and the door-side attachment hole.

FIG. 1

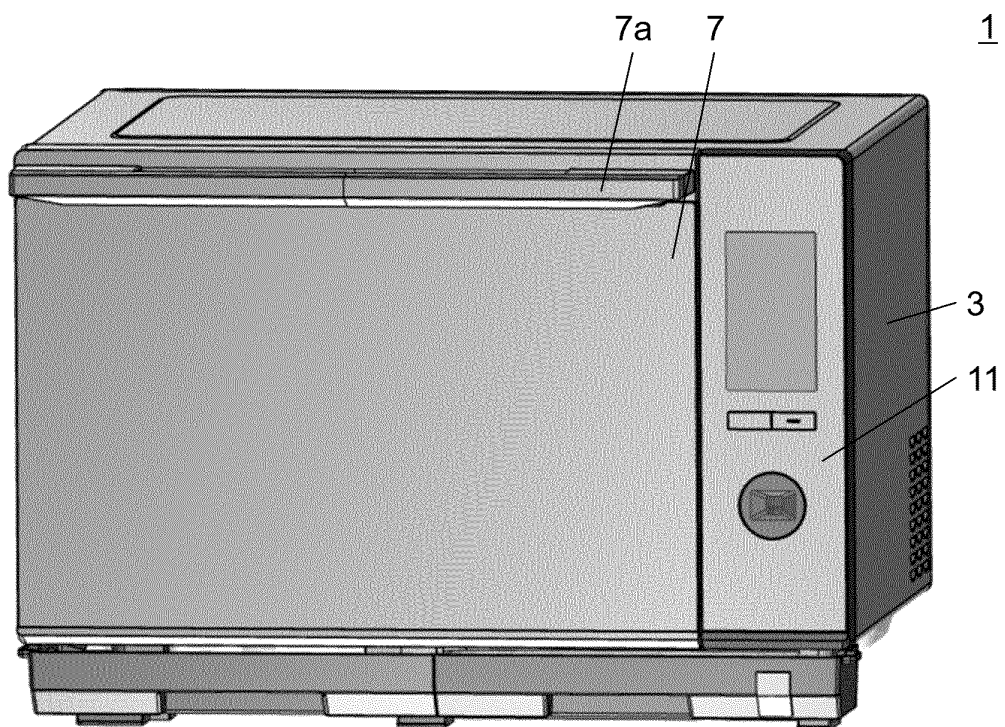


FIG. 2

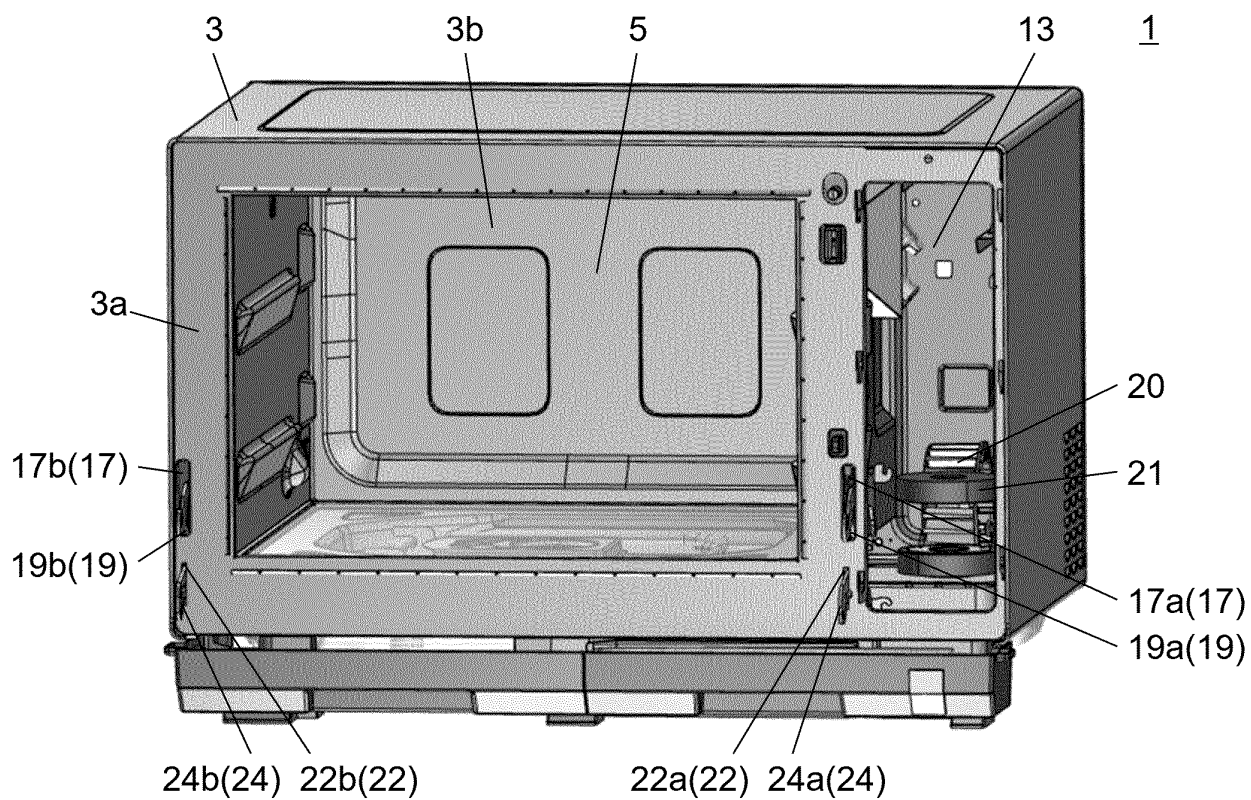


FIG. 3A

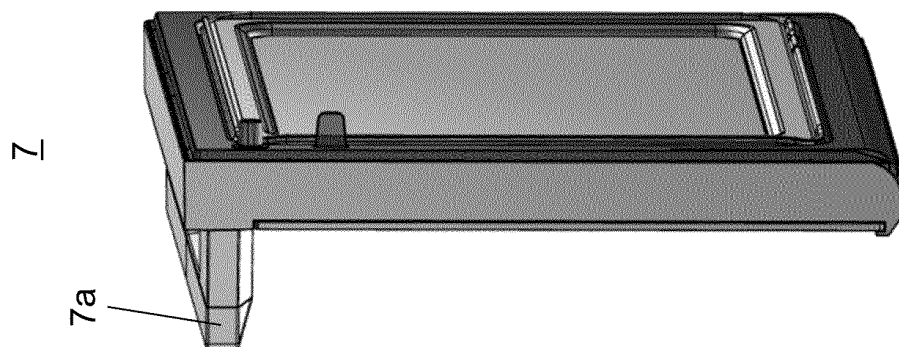


FIG. 3B

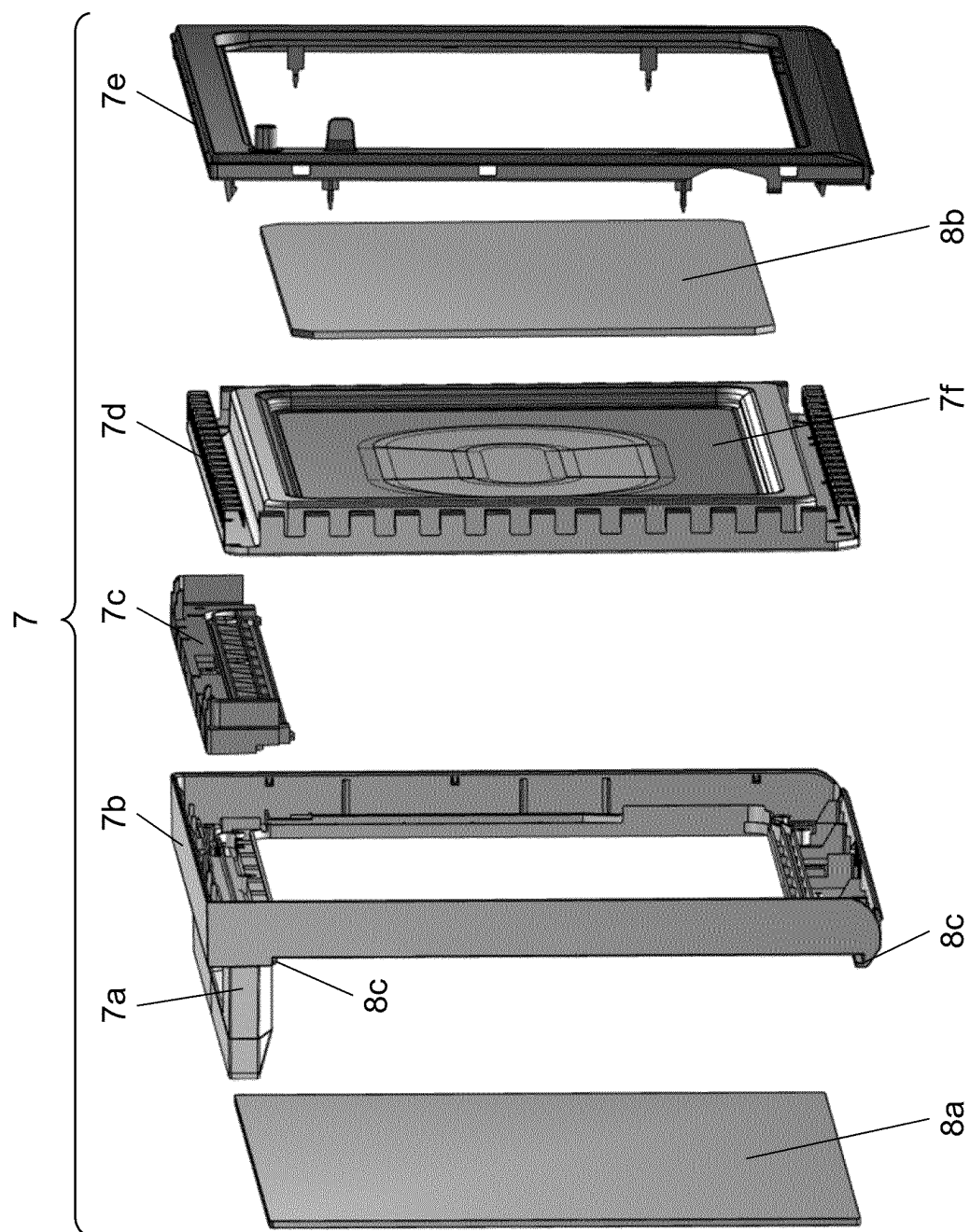


FIG. 4

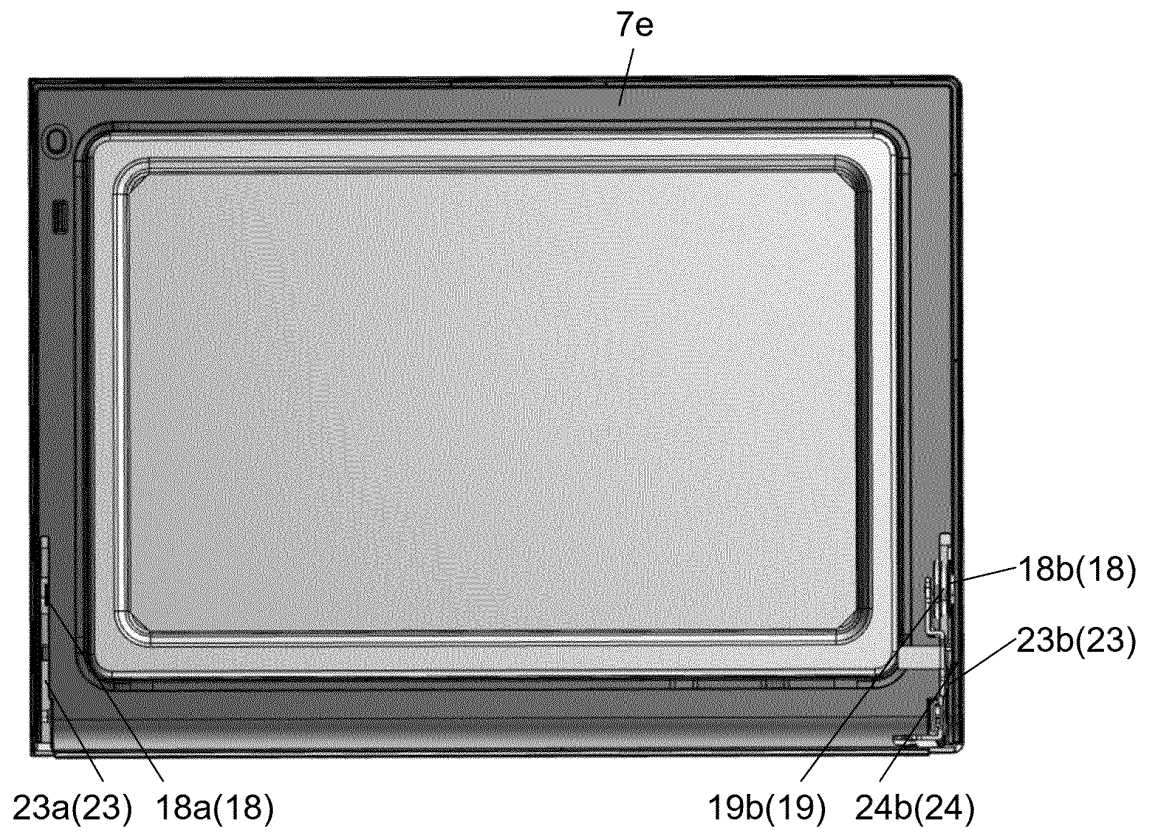


FIG. 5

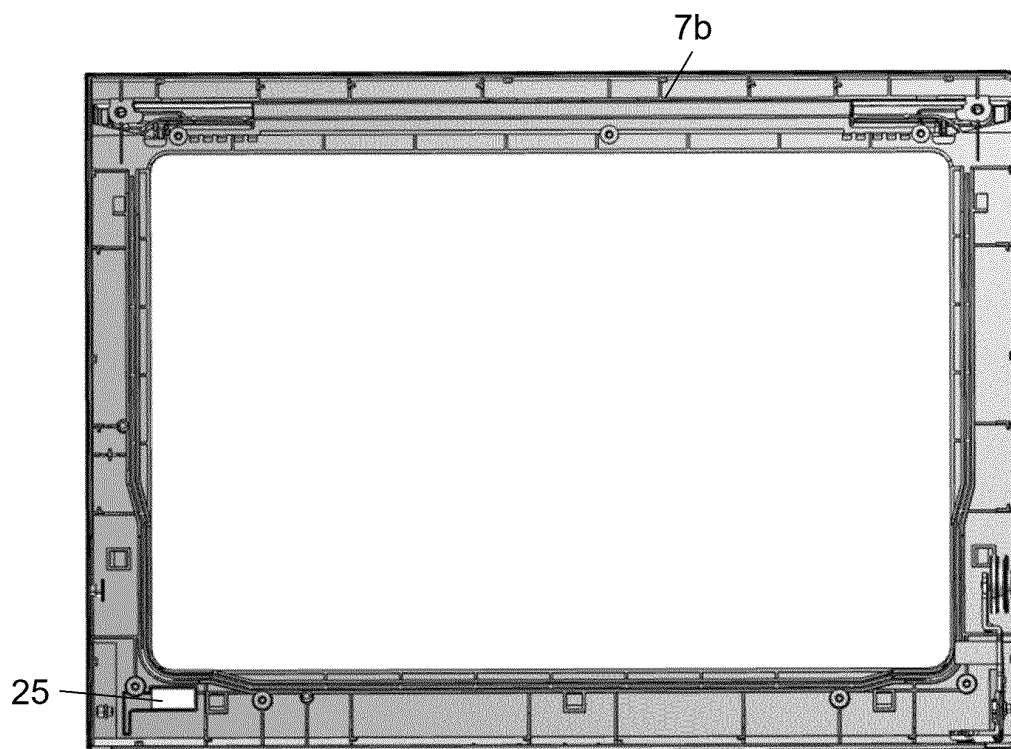


FIG. 6

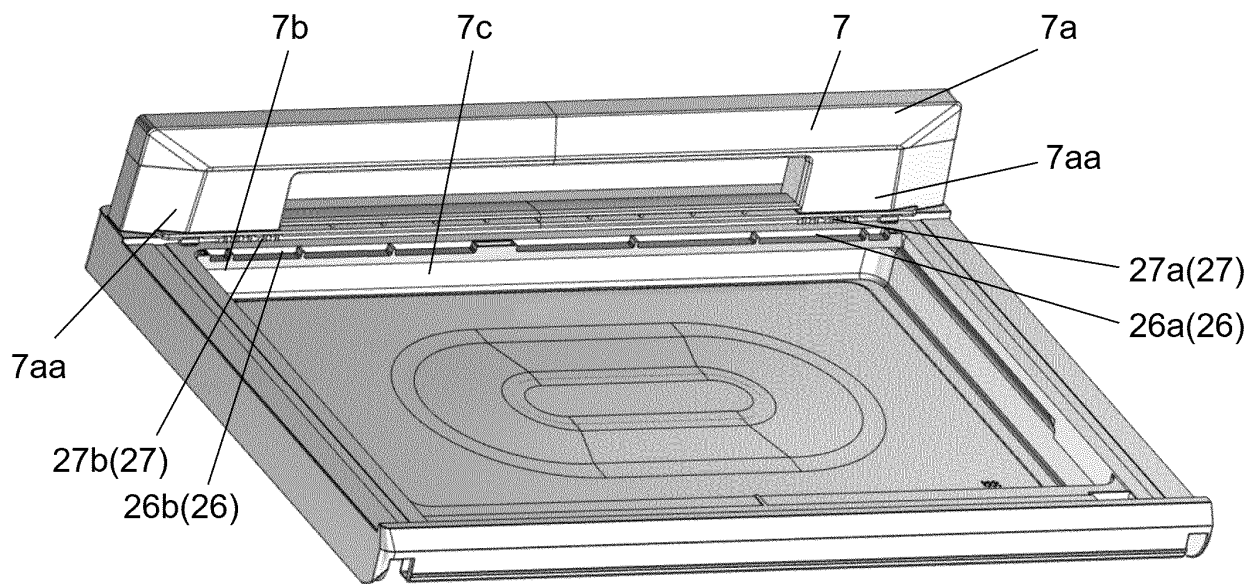


FIG. 7

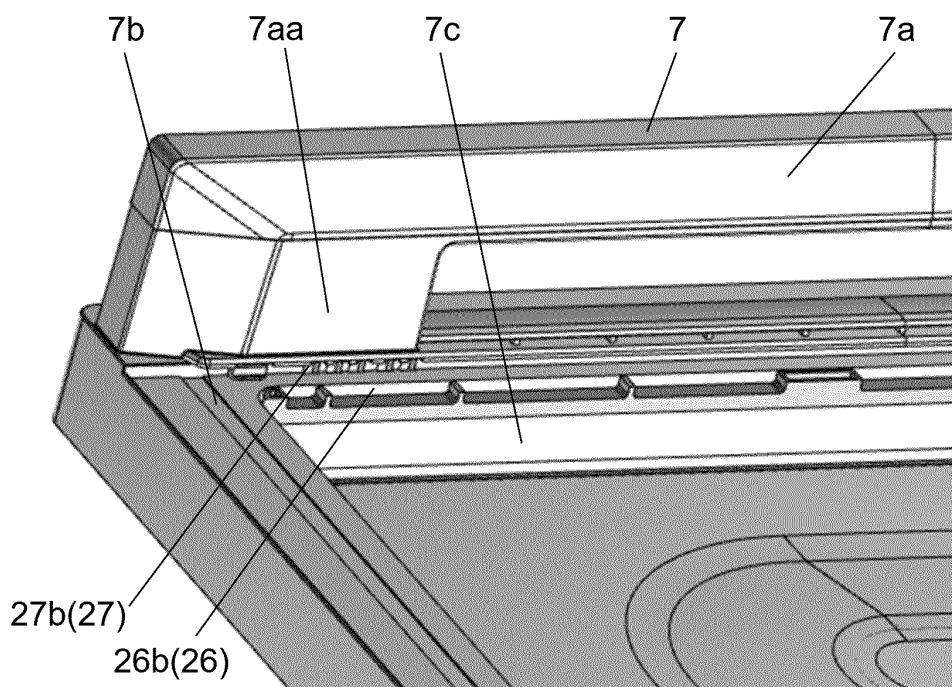
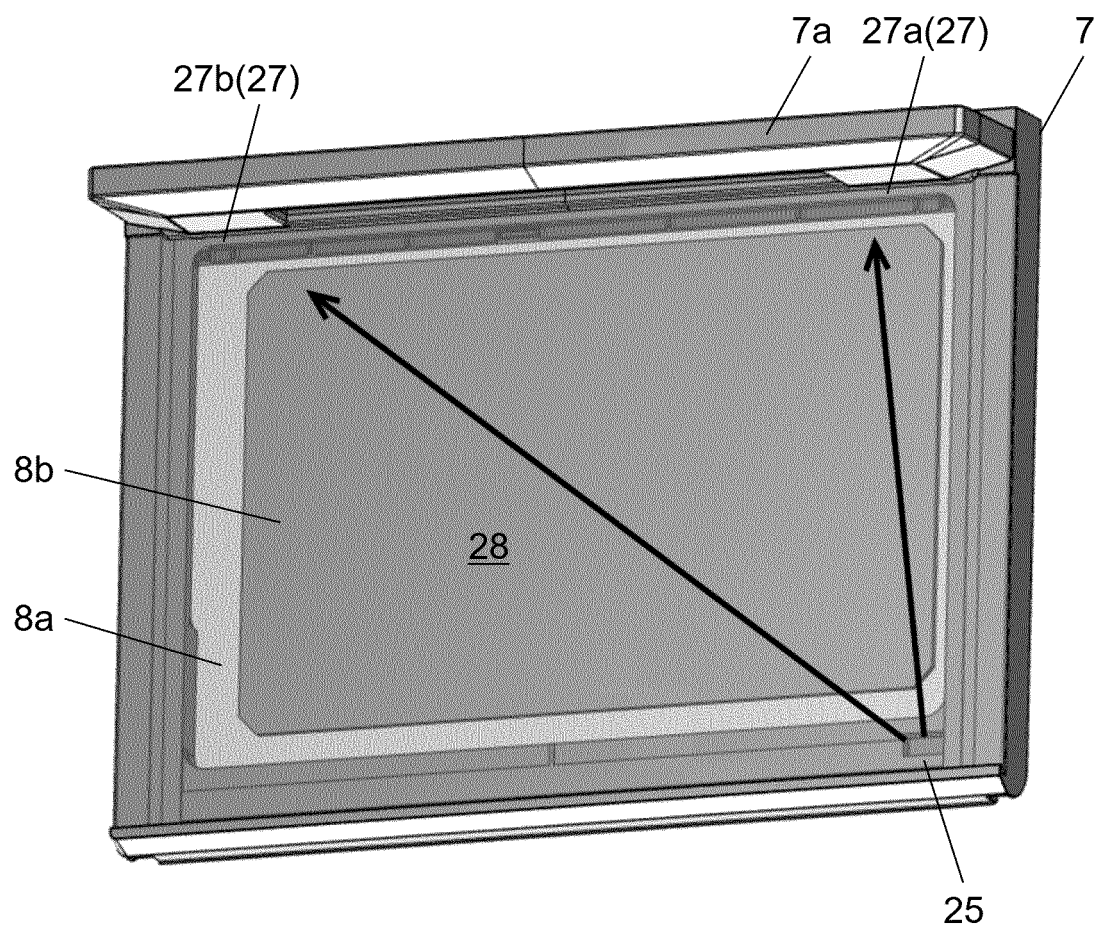


FIG. 8



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2021/026950

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. F24C7/02 (2006.01) i, F24C15/02 (2006.01) i, F24C15/04 (2006.01) i
 FI: F24C15/02 F, F24C7/02 521U, F24C15/04 C

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)

Int. Cl. F24C7/02, F24C15/02, F24C15/04

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Published examined utility model applications of Japan 1922-1996

Published unexamined utility model applications of Japan 1971-2021

Registered utility model specifications of Japan 1996-2021

Published registered utility model applications of Japan 1994-2021

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 2010-78308 A (PANASONIC CORP.) 08 April 2010	1-3
A	(2010-04-08), paragraphs [0021]-[0036], [0045], fig. 1-5, 9	4
Y	JP 2013-164237 A (PANASONIC CORP.) 22 August 2013	1-3
A	(2013-08-22), paragraph [0026], fig. 7	4
A	JP 10-134936 A (SANYO ELECTRIC CO., LTD.) 22 May 1998 (1998-05-22), paragraphs [0023], [0029]	1-4
A	JP 2001-304580 A (MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.) 31 October 2001 (2001-10-31), paragraph [0012]	1-4

☒ 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

"I" 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
02.09.2021

Date of mailing of the international search report
14.09.2021

Name and mailing address of the ISA/
Japan Patent Office
3-4-3, Kasumigaseki, Chiyoda-ku,
Tokyo 100-8915, Japan

Authorized officer

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No. PCT/JP2021/026950
--

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 9-196388 A (SANYO ELECTRIC CO., LTD.) 29 July 1997 (1997-07-29), paragraph [0033]	1-4

Form PCT/ISA/210 (continuation of second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/JP2021/026950

Patent Documents referred to in the Report	Publication Date	Patent Family	Publication Date
JP 2010-78308 A	08.04.2010	(Family: none)	
JP 2013-164237 A	22.08.2013	EP 2816290 A1 paragraphs [0041]- [0044], fig. 7 WO 2013/121777 A1 CN 104105924 A	
JP 10-134936 A	22.05.1998	(Family: none)	
JP 2001-304580 A	31.10.2001	(Family: none)	
JP 9-196388 A	29.07.1997	(Family: none)	

Form PCT/ISA/210 (patent family annex) (January 2015)

REFERENCES CITED IN THE DESCRIPTION

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

Patent documents cited in the description

- JP 2010078308 A [0004]