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(54) **COOKER**

(57) A heating cooking apparatus (100) includes a heating cooking chamber (100A), a first heater (141), a first fan (142), a second heater (131), a second fan (132), and a control unit (5). The first fan (142) blows first air heated by the first heater (141) into the heating cooking chamber (100A). The second heater (131) heats second air (F2). The second fan (132) blows the second air (F2) heated by the second heater (131) into the heating cooking chamber (100A). The control unit (5) controls the first heater (141), the first fan (142), the second heater (131), and the second fan (132). The control unit (5) stops energization of the first heater (141) and energizes the second heater (131) before notification of completion of a preheating process. The preheating process indicates a process in which a temperature in the heating cooking chamber (100A) exceeds a threshold temperature at least once.

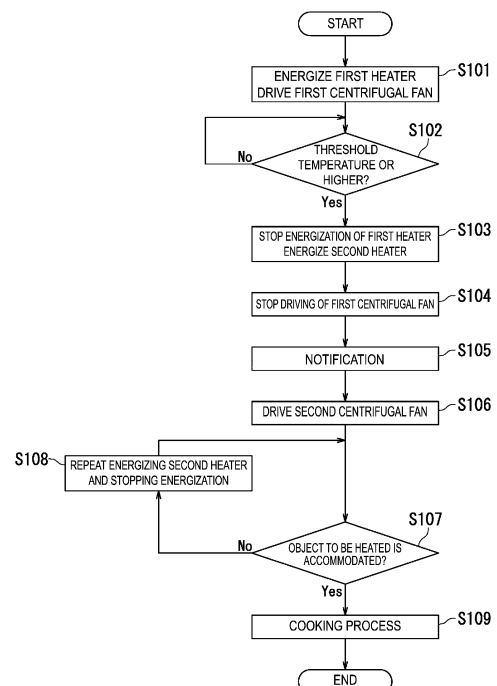


FIG. 13

Description

Technical Field

[0001] The present invention relates to a heating cooking apparatus.

Background Art

[0002] PTL 1 discloses a pull-out type heating cooking apparatus. The pull-out type heating cooking apparatus disclosed in PTL 1 includes a heating cooking apparatus main body and a pull-out body. The heating cooking apparatus main body includes a heating cooking chamber. The pull-out body can be pulled out toward the outside of the heating cooking apparatus main body in a state where the pull-out body is accommodated in the heating cooking chamber.

[0003] Heating functions of the pull-out type heating cooking apparatus disclosed in PTL 1 include a microwave heating function and a rapid hot air heating function. The microwave heating function is a function of irradiating an object to be heated with microwaves. The rapid hot air heating function is a function of blowing hot air from a top blow-out port and a side blow-out port toward an object to be heated and suctioning hot air from a side suction port. The top blow-out port is formed in a top wall of the heating cooking chamber. The side blow-out port is formed in a left side wall of the heating cooking chamber. The side suction port is formed in a back side wall of the heating cooking chamber.

Citation List

Patent Literature

[0004] PTL 1: JP 2010-133634 A

Summary of Invention

Technical Problem

[0005] The pull-out type heating cooking apparatus sometimes preheats the inside of the heating cooking chamber, and then heats and cooks an object to be heated. However, in the pull-out type heating cooking apparatus, there is room for further shortening a cooking period taken to heat and cook the object to be heated in the preheated heating cooking chamber.

[0006] In light of the above-described problem, an object of the present invention is to provide a heating cooking apparatus that can shorten a cooking period taken to heat and cook an object to be heated in a heating cooking chamber.

Solution to Problem

[0007] According to one aspect of the present inven-

tion, a heating cooking apparatus includes a heating cooking chamber, a first heater, a first fan, a second heater, a second fan, and a control unit. The heating cooking chamber accommodates an object to be heated. The first heater heats first air. The first fan blows the first air heated by the first heater into the heating cooking chamber. The second heater heats second air. The second fan blows the second air heated by the second heater into the heating cooking chamber. The control unit controls the first heater, the first fan, the second heater, and the second fan. The control unit stops energization of the first heater and energizes the second heater before notification of completion of a preheating process. The preheating process indicates a process in which a temperature in the heating cooking chamber exceeds a threshold temperature at least once before the object to be heated is accommodated in the heating cooking chamber.

Advantageous Effects of Invention

[0008] According to the heating cooking apparatus of the present invention, it is possible to shorten a cooking period taken to heat and cook an object to be heated in a heating cooking chamber.

Brief Description of Drawings

[0009]

FIG. 1 is a perspective view illustrating a pull-out type heating cooking apparatus according to an embodiment of the present invention.

FIG. 2 is a right side view illustrating the pull-out type heating cooking apparatus according to the present embodiment.

FIG. 3 is a top view illustrating the pull-out type heating cooking apparatus according to the present embodiment.

FIG. 4 is an exploded perspective view illustrating a pull-out body according to the present embodiment. FIG. 5 is a schematic cross-sectional view illustrating a heating cooking chamber according to the present embodiment.

FIG. 6 is a diagram illustrating a first partitioning member according to the present embodiment.

FIG. 7 is a schematic cross-sectional view illustrating the heating cooking chamber according to the present embodiment.

FIG. 8 is a diagram illustrating a second partitioning member according to the present embodiment.

FIG. 9 is a block diagram illustrating a configuration of the pull-out type heating cooking apparatus according to the present embodiment.

FIG. 10 is a schematic cross-sectional view illustrating the heating cooking chamber according to the present embodiment.

FIG. 11 is a time chart executed by a control unit according to the present embodiment.

FIG. 12 is a graph showing a relationship between a temperature of a predetermined region included in the heating cooking chamber and time according to the present embodiment.

FIG. 13 is a flowchart for explaining a cooking method by the pull-out type heating cooking apparatus according to the present embodiment.

FIG. 14 is a perspective view illustrating a cabinet to which the pull-out type heating cooking apparatus according to the present embodiment is attached.

Description of Embodiments

[0010] Hereinafter, embodiments of a pull-out type heating cooking apparatus according to the present invention will be described with reference to the drawings. Note that, in the drawings, the same or equivalent components are denoted by the same reference numerals and signs, and description thereof will not be repeated.

[0011] A pull-out type heating cooking apparatus 100 according to the present embodiment will be described with reference to FIG. 1 to FIG. 3. FIG. 1 is a perspective view illustrating the pull-out type heating cooking apparatus 100. FIG. 2 is a right side view illustrating the pull-out type heating cooking apparatus 100. FIG. 3 is a top view illustrating the pull-out type heating cooking apparatus 100. More specifically, FIG. 1 to FIG. 3 illustrate the pull-out type heating cooking apparatus 100 in a state where a pull-out body 2 is pulled out. Further, FIG. 1 illustrates an external appearance of the pull-out type heating cooking apparatus 100 as viewed diagonally from the upper front right. The pull-out type heating cooking apparatus 100 is an example of a heating cooking apparatus.

[0012] As illustrated in FIG. 1, the pull-out type heating cooking apparatus 100 heats and cooks an object H to be heated. The object H to be heated is, for example, a food product. The pull-out type heating cooking apparatus 100 includes a heating chamber 1, the pull-out body 2, an operation panel 3, and a heating cooking chamber 100A.

[0013] In the present embodiment, a side at which the operation panel 3 of the pull-out type heating cooking apparatus 100 is disposed is defined as a front side of the pull-out type heating cooking apparatus 100, and a side opposite to the front side (rear face side) is defined as a rear side of the pull-out type heating cooking apparatus 100. Further, a right side when the pull-out type heating cooking apparatus 100 is viewed from the front side is defined as a right side of the pull-out type heating cooking apparatus 100, and a side opposite to the right side is defined as a left side of the pull-out type heating cooking apparatus 100. Further, in a direction orthogonal to a front-rear direction and a left-right direction of the pull-out type heating cooking apparatus 100, a side at which the operation panel 3 is disposed is defined as an upper side of the pull-out type heating cooking apparatus 100, and a side opposite to the upper side (bottom side)

is defined as a lower side of the pull-out type heating cooking apparatus 100. Note that these orientations do not limit an orientation of the pull-out type heating cooking apparatus 100 according to the present invention in use.

[0014] As illustrated in FIG. 1 to FIG. 3, the heating chamber 1 is a box-like member. Specifically, the heating chamber 1 includes a right outer wall 1G, a left outer wall 1H, a top outer wall 1J, a bottom outer wall 1F, and a back outer wall 1K. The heating chamber 1 accommodates the heating cooking chamber 100A.

[0015] The pull-out body 2, on which the object H to be heated is placed, can be pulled out in a first direction D1 from the heating cooking chamber 100A. The first direction D1 is the forward direction. A third direction D3 intersects the first direction D1. In the present embodiment, the third direction D3 is orthogonal to the first direction D1. In the present embodiment, the third direction D3 is the upward direction. Specifically, the pull-out body 2 includes a lid portion 21, a placing portion 22, and a support portion 23.

[0016] The heating cooking chamber 100A includes an accommodation space 120 that accommodates the object H to be heated. The shape of the heating cooking chamber 100A is, for example, a substantially rectangular parallelepiped shape. Specifically, the heating cooking chamber 100A includes a pair of side wall portions 10, a back wall 1E, and an opening portion 100B. The back wall 1E intersects the first direction D1. The opening portion 100B faces the back wall 1E. The opening portion 100B opens toward the first direction D1. The opening portion 100B communicates with the outside of the heating cooking chamber 100A. The pair of side wall portions 10 face each other in a second direction D2. The second direction D2 is the left direction. Specifically, the pair of side wall portions 10 includes a right wall 1A and a left wall 1B. The heating cooking chamber 100A further includes a top wall 1C and a bottom wall 1D. Materials of the right wall 1A, the left wall 1B, the top wall 1C, the bottom wall 1D, and the back wall 1E are, for example, a metal.

[0017] The heating chamber 1 further includes a space R between the heating chamber 1 and the heating cooking chamber 100A. Specifically, the heating chamber 1 further includes the space R between the bottom wall 1D and the bottom outer wall 1F. The heating chamber 1 further includes the space R between the right wall 1A and the right outer wall 1G. The heating chamber 1 further includes the space R between the left wall 1B and the left outer wall 1H. The heating chamber 1 further includes the space R between the top wall 1C and the top outer wall 1J. The heating chamber 1 further includes the space R between the back wall 1E and the back outer wall 1K.

[0018] As illustrated in FIG. 3, the pull-out type heating cooking apparatus 100 further includes a pair of rail members 11. Specifically, one rail member of the pair of rail members 11 includes a right side rail member 111, and the other rail member of the pair of rail members 11 includes a left side rail member 112. The right side rail

member 111 and the left side rail member 112 face each other in the left-right direction.

[0019] Each of the right side rail member 111 and the left side rail member 112 is disposed in the heating chamber 1. Specifically, each of the right side rail member 111 and the left side rail member 112 is disposed between the heating chamber 1 and the heating cooking chamber 100A. More specifically, the right side rail member 111 is fixed on the right wall 1A in the space R between the right wall 1A and the right outer wall 1G. The left side rail member 112 is fixed on the left wall 1B in the space R between the left wall 1B and the left outer wall 1H. Particularly, each of the right side rail member 111 and the left side rail member 112 extends in the first direction D1.

[0020] Meanwhile, the pull-out type heating cooking apparatus 100 further includes a pair of slide members 24. Specifically, one slide member of the pair of slide members 24 includes a right side slide member 241, and the other slide member of the pair of slide members 24 includes a left side slide member 242. The right side slide member 241 and the left side slide member 242 face each other in the left-right direction.

[0021] Each of the right side slide member 241 and the left side slide member 242 is disposed on the lid portion 21. Specifically, one end portion of the right side slide member 241 is attached to a right edge portion of the lid portion 21. One end portion of the left side slide member 242 is attached to a left edge portion of the lid portion 21. Particularly, each of the right side slide member 241 and the left side slide member 242 extends in a direction opposite to the first direction D1 from the lid portion 21.

[0022] The right side slide member 241 is slidably supported by the right side rail member 111. The left side slide member 242 is slidably supported by the left side rail member 112.

[0023] As illustrated in FIG. 2, the pull-out type heating cooking apparatus 100 further includes a support member 25. The support member 25 supports the lid portion 21. One end portion of the support member 25 is attached at a center portion in the left-right direction of the lid portion 21 and below the placing portion 22. The support member 25 is a plate-like member extending in the direction opposite to the first direction D1 from the lid portion 21. The support member 25 includes a rack portion. The rack portion includes teeth. The support member 25 may be a single plate-like member or a plurality of plate-like members.

[0024] Meanwhile, the pull-out type heating cooking apparatus 100 further includes a drive mechanism 4. The drive mechanism 4 drives the support member 25. The drive mechanism 4 is positioned below the heating cooking chamber 100A. Specifically, the drive mechanism 4 is accommodated in the space R between the bottom wall 1D and the bottom outer wall 1F. For example, the drive mechanism 4 includes a drive motor 41, a pinion, and a drive rail 42. The drive rail 42 is fixed in the space R between the bottom wall 1D and the bottom outer wall 1F. The drive rail 42 is a member having the front-rear

direction as a longitudinal direction. The support member 25 is slidably supported by the drive rail 42. The pinion is attached to an endmost portion of the drive motor 41.

[0025] The pinion engages with the rack portion of the support member 25. Furthermore, the support member 25 moves in the front-rear direction as a result of rotation of the pinion. Note that the drive mechanism 4 may drive at least one of the support member 25, and the right side slide member 241 and the left side slide member 242. Furthermore, in a case where the right side slide member 241 and the left side slide member 242 are driven, the drive mechanism 4 may be positioned more on the side than the heating cooking chamber 100A.

[0026] As illustrated in FIG. 1, the operation panel 3 receives an operation from a user. The operation includes, for example, a cooking method for heating and cooking the object H to be heated, or information about movement of the lid portion 21 between the closed position and the open position thereof. Specifically, the operation panel 3 includes a display unit, a storage unit 6, and a control unit 5. The display unit displays various pieces of information. Specifically, the display unit includes a liquid crystal panel.

[0027] The storage unit 6 is constituted by a random access memory (RAM) and a read only memory (ROM). The storage unit 6 stores a control program for controlling an operation of each unit of the pull-out type heating cooking apparatus 100. The storage unit 6 stores setting information input by operating the display unit.

[0028] The control unit 5 is a hardware circuit that includes a processor such as a central processing unit (CPU). The control unit 5 executes the control program stored in the storage unit 6.

[0029] Next, the pull-out body 2 will be described in detail with reference to FIG. 4. FIG. 4 is an exploded perspective view illustrating the pull-out body 2 according to the present embodiment. As illustrated in FIG. 4, the lid portion 21 includes a plate-like member 211 and a cover member 212.

[0030] The lid portion 21 opens and closes the opening portion 100B of the heating cooking chamber 100A. Specifically, the lid portion 21 moves between a closed position and an open position. The closed position indicates a position where the plate-like member 211 closes the opening portion 100B. On the other hand, the open position is positioned more on the first direction D1 side than the closed position and indicates a position where the plate-like member 211 opens the opening portion 100B.

[0031] The cover member 212 covers the entire front surface of the plate-like member 211 on the first direction D1 side. Specifically, the cover member 212 is positioned outside the heating cooking chamber 100A when the plate-like member 211 is positioned at the closed position. The material of the cover member 212 is synthetic resin. The synthetic resin includes, for example, polybutylene terephthalate.

[0032] The object H to be heated can be placed on the

placing portion 22. Specifically, the placing portion 22 has a placing surface on which the object H to be heated is placed. The material of the placing portion 22 is a non-metal, and is preferably ceramic or glass, for example.

[0033] The support portion 23 is attached to the lid portion 21 and supports a peripheral edge portion of the placing portion 22 such that the placing portion 22 is held in a horizontal state. Specifically, the support portion 23 includes a bottom plate portion 23A and a pair of wall portions 20. The material of the support portion 23 is, for example, a metal.

[0034] The bottom plate portion 23A includes a rectangular opening 23A1. The rectangular opening 23A1 is positioned at substantially a center portion of the bottom plate portion 23A.

[0035] One wall portion of the pair of wall portions 20 includes a right side plate portion 23C, and the other wall portion of the pair of wall portions 20 includes a left side plate portion 23D. Each of the right side plate portion 23C and the left side plate portion 23D extends along the first direction D1. The right side plate portion 23C and the left side plate portion 23D face each other in the left-right direction. More specifically, the right side plate portion 23C and the left side plate portion 23D extend upward from the peripheral edge portion of the bottom plate portion 23A. Specifically, the positions of the upper ends of the right side plate portion 23C and the left side plate portion 23D are higher than the positions of the upper ends of the right side rail member 111 and the left side rail member 112. The placing portion 22 is fitted among the lid portion 21, the right side plate portion 23C, and the left side plate portion 23D. The peripheral edge portion of the placing portion 22 is fixed to an upper surface of the peripheral edge portion of the bottom plate portion 23A.

[0036] The support portion 23 further includes a pair of rollers 23E and a pair of rollers 23F. The pair of rollers 23E and the pair of rollers 23F rotate as the pull-out body 2 moves. Specifically, one roller of the pair of rollers 23E includes a right side roller 23E1, and the other roller of the pair of rollers 23E includes a left side roller 23E2. The right side roller 23E1 and the left side roller 23E2 rotate about a rotation axis along the second direction D2. In addition, the right side roller 23E1 is attached to a rear end portion of the right side plate portion 23C. The left side roller 23E2 is attached to a rear end portion of the left side plate portion 23D. The right side roller 23E1 and the left side roller 23E2 are in contact with the bottom wall 1D.

[0037] Also, one roller of the pair of rollers 23F includes a right side roller 23F1, and the other roller of the pair of rollers 23F includes a left side roller 23F2. The right side roller 23F1 and the left side roller 23F2 rotate about a rotation axis along the third direction D3. The right side roller 23F1 is attached to a rear end portion of the right side plate portion 23C. The left side roller 23F2 is attached to a rear end portion of the left side plate portion 23D. The right side roller 23F1 is in contact with the right

wall 1A. The left side roller 23F2 is in contact with the left wall 1B.

[0038] The placing portion 22 and the support portion 23 are accommodated in the heating cooking chamber 100A when the plate-like member 211 is positioned at the closed position. On the other hand, when the plate-like member 211 is positioned at the open position, the placing portion 22 and the support portion 23 are pulled out from the heating cooking chamber 100A, in a state where the pair of rollers 23E and the pair of rollers 23F are accommodated in the heating cooking chamber 100A.

[0039] Next, the heating cooking chamber 100A according to the present embodiment will be further described with reference to FIG. 5. FIG. 5 is a schematic cross-sectional view illustrating the heating cooking chamber 100A according to the present embodiment. Particularly, FIG. 5 illustrates a cross section of the heating cooking chamber 100A taken along a plane orthogonal to the left-right direction.

[0040] As illustrated in FIG. 5, the pull-out type heating cooking apparatus 100 further includes a first air sending unit 14. The first air sending unit 14 circulates first air F1 between the inside of the heating cooking chamber 100A and the inside of a first air sending chamber 14A.

[0041] Specifically, the first air sending unit 14 includes a first suction hole portion 14D, a first blow-out hole portion 14C, and a first partitioning member 14B. The first suction hole portion 14D is positioned in the third direction D3 with respect to the accommodation space 120. The first blow-out hole portion 14C is positioned in the third direction D3 with respect to the accommodation space 120. More specifically, the first air sending unit 14 is positioned above the heating cooking chamber 100A with the top wall 1C interposed therebetween. The first suction hole portion 14D is positioned above the heating cooking chamber 100A. The first blow-out hole portion 14C is positioned above the heating cooking chamber 100A.

[0042] The first air sending unit 14 suctions the first air F1 in the heating cooking chamber 100A through the first suction hole portion 14D and blows the first air F1 into the heating cooking chamber 100A through the first blow-out hole portion 14C. Particularly, the first air sending unit 14 suctions the first air F1 from a predetermined region EA in the accommodation space 120 and blows the first air F1 into the predetermined region EA in the accommodation space 120. The predetermined region EA is, for example, a center region within the accommodation space 120. For example, a center portion of the object H to be heated is disposed in the predetermined region EA.

[0043] As described above, according to the pull-out type heating cooking apparatus 100, the first suction hole portion 14D and the first blow-out hole portion 14C are positioned in the same third direction D3 with respect to the accommodation space 120, which reduces the distance between the first suction hole portion 14D and the first blow-out hole portion 14C. As a result, a circulation

path of the first air F 1 is also reduced. Thus, the predetermined region EA within the heating cooking chamber 100A can be heated in a short period of time.

[0044] Furthermore, the first suction hole portion 14D and the first blow-out hole portion 14C are positioned above the heating cooking chamber 100A. When the heating cooking chamber 100A has a rectangular parallelepiped shape having a short distance between the top wall 1C and the bottom wall 1D and the predetermined region EA is a center region within the accommodation space 120, a distance between the first suction hole portion 14D and the predetermined region EA and a distance between the first blow-out hole portion 14C and the predetermined region EA are reduced. As a result, the predetermined region EA within the heating cooking chamber 100A can be heated by the first air sending unit 14 within a shorter period of time.

[0045] Particularly, the first air sending unit 14 further includes the first air sending chamber 14A, a first heater 141, a first centrifugal fan 142, a first drive unit 143, and a first energization unit 144. The first centrifugal fan 142 is an example of a "first fan". The first air sending chamber 14A is, for example, a box-like member. The first centrifugal fan 142 includes a plurality of blades.

[0046] The first heater 141 and the first centrifugal fan 142 are accommodated in the first air sending chamber 14A. In other words, the first heater 141 is positioned above the heating cooking chamber 100A. The first heater 141 heats the first air F1 in the first air sending chamber 14A. Specifically, the shape of the first heater 141 is a circular ring when viewed from the upper side to the lower side. Further, the first heater 141 is disposed along the outer circumference of the first centrifugal fan 142. As a result, the first centrifugal fan 142 blows the first air F1 heated by the first heater 141 into the heating cooking chamber 100A. Thus, the predetermined region EA within the heating cooking chamber 100A can be heated in a short period of time.

[0047] The first drive unit 143 is positioned outside the first air sending chamber 14A. The first drive unit 143 is connected to an external power source. The first drive unit 143 drives the first centrifugal fan 142. The first drive unit 143 includes, for example, a motor. The first drive unit 143 is controlled by the control unit 5.

[0048] The first energization unit 144 is positioned outside the first air sending chamber 14A. The first energization unit 144 is connected to the external power source. The first energization unit 144 energizes the first heater 141. The energized first heater 141 generates heat. The first drive unit 143 is controlled by the control unit 5. The first energization unit 144 includes, for example, a switch.

[0049] Next, the first partitioning member 14B according to the present embodiment will be further described with reference to FIG. 5 and FIG. 6. FIG. 6 is a diagram illustrating the first partitioning member 14B according to the present embodiment.

[0050] As illustrated in FIG. 5 and FIG. 6, the first par-

tioning member 14B is positioned above the accommodation space 120. Specifically, the first partitioning member 14B is positioned between the first air sending chamber 14A and the heating cooking chamber 100A. The first partitioning member 14B is, for example, a plate-like member made of a metal. The shape of the first partitioning member 14B is, for example, a square shape when viewed from the upper side to the lower side. The first partitioning member 14B is disposed in a substantially center portion of the top wall 1C. The first suction hole portion 14D and the first blow-out hole portion 14C are disposed in the first partitioning member 14B. Thus, the first suction hole portion 14D and the first blow-out hole portion 14C can be easily disposed above the accommodation space 120.

[0051] More specifically, the first suction hole portion 14D is, for example, a set of a plurality of punched holes. Similarly, the first blow-out hole portion 14C is, for example, a set of a plurality of punched holes. The punched holes are examples of suction holes and blow-out holes. Each of the punched holes has, for example, a circular shape. The diameter of each of the punched holes of the first suction hole portion 14D and the first blow-out hole portion 14C is, for example, 3.4 mm. Thus, each of the first suction hole portion 14D and the first blow-out hole portion 14C has a small size. As a result, it is possible to prevent a tool or the like from being caught in the first suction hole portion 14D and the first blow-out hole portion 14C when the heating cooking chamber 100A is cleaned.

[0052] More specifically, the first blow-out hole portion 14C surrounds the first suction hole portion 14D. Specifically, the first suction hole portion 14D is positioned at the center portion of the first partitioning member 14B. The set of the plurality of punched holes of the first suction hole portion 14D has, for example, a circular shape. On the other hand, the first blow-out hole portion 14C is formed along the outer circumference of the first suction hole portion 14D. The set of the plurality of punched holes of the first blow-out hole portion 14C has, for example, an annular shape.

[0053] The first centrifugal fan 142 opposes the heating cooking chamber 100A through the first partitioning member 14B. The first suction hole portion 14D opposes the first centrifugal fan 142.

[0054] Here, flow of the first air F1 will be described in detail. First, the first drive unit 143 drives the first centrifugal fan 142, and the first energization unit 144 energizes the first heater 141. The first centrifugal fan 142 suctions the first air F1 in the heating cooking chamber 100A into the first air sending chamber 14A through the first suction hole portion 14D. The first air F1 taken into the first air sending chamber 14A is heated by the first heater 141. The first centrifugal fan 142 blows the first air F1 in the first air sending chamber 14A into the heating cooking chamber 100A through the first blow-out hole portion 14C.

[0055] The first air F1 blown into the heating cooking

chamber 100A moves downward. Thereafter, the first air F1 that has reached the peripheral region of the predetermined region EA in the heating cooking chamber 100A moves, for example, toward the center region of the predetermined region EA and moves upward so that the movement direction of the first air F1 is reversed. That is, the predetermined region EA is disposed below the first heater 141 and the first centrifugal fan 142. The first air F1 moving upward moves within the heating cooking chamber 100A. Thereafter, the first air F1 is taken into the first air sending chamber 14A again from the first suction hole portion 14D. In this manner, the first air sending unit 14 circulates the first air F1 between the first air sending chamber 14A and the predetermined region EA in the heating cooking chamber 100A.

[0056] As described above, according to the pull-out type heating cooking apparatus 100, the first blow-out hole portion 14C surrounds the first suction hole portion 14D, and thus it is possible to more uniformly heat the predetermined region EA in the heating cooking chamber 100A.

[0057] Next, a second air sending unit 13 according to the present embodiment will be further described with reference to FIG. 7. FIG. 7 is a diagram illustrating a schematic cross section of the heating cooking chamber 100A according to the present embodiment. Particularly, FIG. 7 illustrates a cross section of the heating cooking chamber 100A taken along a plane orthogonal to the left-right direction.

[0058] As illustrated in FIG. 7, the pull-out type heating cooking apparatus 100 further includes the second air sending unit 13. The second air sending unit 13 circulates second air F2 between the inside of the heating cooking chamber 100A and the inside of a second air sending chamber 13A.

[0059] Specifically, the second air sending unit 13 includes a second suction hole portion 13D, a second blow-out hole portion 13C, and a second partitioning member 13B. The second suction hole portion 13D is positioned in a direction opposite to the first direction D1 with respect to the accommodation space 120. The second blow-out hole portion 13C is positioned in the direction opposite to the first direction D1 with respect to the accommodation space 120. Specifically, the second air sending unit 13 is positioned on a rear side of the heating cooking chamber 100A with the back wall 1E interposed therebetween. The rear side of the heating cooking chamber 100A is an example of a "predetermined side of the heating cooking chamber 100A". The second suction hole portion 13D is positioned on the rear side of the heating cooking chamber 100A. The second blow-out hole portion 13C is positioned on the rear side of the heating cooking chamber 100A.

[0060] The second air sending unit 13 suctions the second air F2 in the heating cooking chamber 100A through the second suction hole portion 13D and blows the second air F2 into the heating cooking chamber 100A through the second blow-out hole portion 13C. Specifi-

cally, the second air sending unit 13 suctions the second air F2 from a center portion in the heating cooking chamber 100A and blows the second air F2 to a peripheral edge portion in the heating cooking chamber 100A.

[0061] Particularly, the second air sending unit 13 further includes the second air sending chamber 13A, a second heater 131, a second centrifugal fan 132, a second drive unit 133, and a second energization unit 134. The second centrifugal fan 132 is an example of a "second fan". The second air sending chamber 13A is, for example, a box-like member. The second centrifugal fan 132 includes a plurality of blades.

[0062] The second heater 131 and the second centrifugal fan 132 are accommodated in the second air sending chamber 13A. In other words, the second heater 131 is disposed on the rear side of the heating cooking chamber 100A. The second heater 131 heats the second air F2 in the second air sending chamber 13A. Specifically, the shape of the second heater 131 is a circular ring when viewed from the front side to the rear side. Further, the second heater 131 is disposed along the outer circumference of the second centrifugal fan 132. As a result, the second centrifugal fan 132 blows the second air F2 heated by the second heater 131 into the heating cooking chamber 100A. Thus, the entire inside of the heating cooking chamber 100A can be heated in a short period of time.

[0063] The second drive unit 133 is positioned outside the second air sending chamber 13A. The second drive unit 133 is connected to the external power source. The second drive unit 133 drives the second centrifugal fan 132. The second drive unit 133 includes, for example, a motor. The second drive unit 133 is controlled by the control unit 5.

[0064] The second energization unit 134 is positioned outside the second air sending chamber 13A. The second energization unit 134 is connected to the external power source. The second energization unit 134 energizes the second heater 131. The energized second heater 131 generates heat. The second energization unit 134 is controlled by the control unit 5. The second energization unit 134 includes, for example, a switch.

[0065] In the present embodiment, the number of blades of the second centrifugal fan 132 is smaller than the number of blades of the first centrifugal fan 142. The size of the second centrifugal fan 132 is greater than the size of the first centrifugal fan 142. Particularly, the diameter of the second centrifugal fan 132 is greater than the diameter of the first centrifugal fan 142. Further, the thickness of the second centrifugal fan 132 along the rotation axis is greater than the thickness of the first centrifugal fan 142 along the rotation axis. Accordingly, the size of the second air sending chamber 13A is greater than the size of the first air sending chamber 14A. In particular, the thickness of the second air sending chamber 13A along the rotation axis is greater than the thickness of the first air sending chamber 14A along the rotation axis. As a result, the predetermined region EA in

the heating cooking chamber 100A can be heated in a short period of time by the first air sending unit 14, and the entire inside of the heating cooking chamber 100A can be heated by the second air sending unit 13.

[0066] Next, the second partitioning member 13B according to the present embodiment will be further described with reference to FIG. 7 and FIG. 8. FIG. 8 is a diagram illustrating the second partitioning member 13B according to the present embodiment.

[0067] As illustrated in FIG. 7 and FIG. 8, the second partitioning member 13B is positioned on the rear side of the accommodation space 120. Specifically, the second partitioning member 13B is positioned between the second air sending chamber 13A and the heating cooking chamber 100A. The second partitioning member 13B is, for example, a plate-like member made of a metal. The shape of the second partitioning member 13B is, for example, a rectangular shape when viewed from the front side to the rear side. The second partitioning member 13B is disposed on substantially the entire surface of the back wall 1E. The second suction hole portion 13D and the second blow-out hole portion 13C are disposed in the second partitioning member 13B. Thus, the second suction hole portion 13D and the second blow-out hole portion 13C can be easily disposed behind the accommodation space 120.

[0068] More specifically, the second suction hole portion 13D is, for example, a set of a plurality of punched holes. Similarly, the second blow-out hole portion 13C is, for example, a set of a plurality of punched holes. The punched holes are examples of suction holes and blow-out holes. Each of the punched holes has, for example, a circular shape. The diameter of each of the punched holes of the second suction hole portion 13D and the second blow-out hole portion 13C is, for example, 3.4 mm. Thus, each of the second suction hole portion 13D and the second blow-out hole portion 13C has a small size. As a result, it is possible to prevent a tool or the like from being caught in the second suction hole portion 13D and the second blow-out hole portion 13C when the heating cooking chamber 100A is cleaned.

[0069] More specifically, the second blow-out hole portion 13C is disposed along the outer circumference of the second partitioning member 13B. The distance between the second blow-out hole portion 13C and the second suction hole portion 13D is greater than the distance between the first blow-out hole portion 14C and the first suction hole portion 14D. Specifically, the second suction hole portion 13D is positioned at the center portion of the second partitioning member 13B. The set of the plurality of punched holes of the second suction hole portion 13D has, for example, a circular shape. On the other hand, the second blow-out hole portion 13C is positioned at a peripheral edge portion along the edge of the back wall 1E. Specifically, the second blow-out hole portion 13C includes a first peripheral edge blow-out hole portion 13C1A, a second peripheral edge blow-out hole portion 13C1B, a third peripheral edge blow-out hole portion

13C1C, and a fourth peripheral edge blow-out hole portion 13C1D. When the pull-out type heating cooking apparatus 100 is viewed from the front, the first peripheral edge blow-out hole portion 13C1A is positioned in an upper right region of the back wall 1E. The second peripheral edge blow-out hole portion 13C1B is positioned in a lower right region of the back wall 1E. The third peripheral edge blow-out hole portion 13C1C is positioned in a lower left region of the back wall 1E. The fourth peripheral edge blow-out hole portion 13C1D is positioned in an upper left region of the back wall 1E. Note that the distance between the blow-out hole portion and the suction hole portion refers to the distance between the center of the suction hole portion and the blow-out hole farthest from the center of the suction hole portion.

[0070] The second centrifugal fan 132 opposes the heating cooking chamber 100A through the second partitioning member 13B. The second suction hole portion 13D opposes the second centrifugal fan 132.

[0071] Now, the flow of the second air F2 will be described in detail. First, the second drive unit 133 drives the second centrifugal fan 132, and the second energization unit 134 energizes the second heater 131. The second centrifugal fan 132 suctions the second air F2 in the heating cooking chamber 100A into the second air sending chamber 13A through the second suction hole portion 13D. The second air F2 taken into the second air sending chamber 13A is heated by the second heater 131. The second centrifugal fan 132 blows the second air F2 in the second air sending chamber 13A into the heating cooking chamber 100A through the second blow-out hole portion 13C.

[0072] The second air F2 blown into the heating cooking chamber 100A mainly moves forward along the right wall 1A and the left wall 1B. Thereafter, the second air F2 that has reached the rear face of the lid portion 21 moves rearward such that the movement direction of the second air F2 is reversed. The second air F2 moving rearward moves within the heating cooking chamber 100A. Thereafter, the second air F2 is taken into the second air sending chamber 13A again from the second suction hole portion 13D. In this manner, the second air sending unit 13 circulates the second air F2 between the inside of the second air sending chamber 13A and the inside of the heating cooking chamber 100A.

[0073] As described above, according to the pull-out type heating cooking apparatus 100, the second blow-out hole portion 13C is disposed along the outer circumference of the second partitioning member 13B, and thus the entire inside of the heating cooking chamber 100A can be more uniformly heated by the second air sending unit 13.

[0074] As illustrated again in FIG. 7 and FIG. 8, the pull-out type heating cooking apparatus 100 further includes a grill unit 16. Specifically, the grill unit 16 includes a heating cooking heater 161 and an energization unit 162. The heating cooking heater 161 is an example of a "third heater". The heating cooking heater 161 is posi-

tioned in the third direction D3 with respect to the accommodation space 120 and heats the object H to be heated. Particularly, the heating cooking heater 161 is positioned at an upper portion inside the heating cooking chamber 100A. As a result, the object H to be heated can be heated and cooked by transmitting heat generated by the heating cooking heater 161 to the object H to be heated. Particularly, the heating cooking heater 161 has a substantial U-shape when viewed from the upper side to the lower side. In the present embodiment, three of the grill units 16 are disposed. The heating cooking heater 161 is, for example, a sheathed heater.

[0075] The energization unit 162 is positioned outside the left wall 1B. The energization unit 162 is connected to the external power source. The energization unit 162 energizes the heating cooking heater 161. The energized heating cooking heater 161 generates heat. The energization unit 162 is controlled by the control unit 5. The energization unit 162 includes, for example, a switch.

[0076] A configuration of the pull-out type heating cooking apparatus 100 will be described in detail with reference to FIG. 9. FIG. 9 is a block diagram illustrating a configuration of the pull-out type heating cooking apparatus 100 according to the present embodiment. As illustrated in FIG. 9, the control unit 5 further includes a thermistor 51. The thermistor 51 is an example of a "temperature detection unit".

[0077] The thermistor 51 detects the temperature in the heating cooking chamber 100A. The thermistor 51 may be disposed in the heating cooking chamber 100A or may be disposed in the first air sending chamber 14A. The thermistor 51 is connected to the control unit 5. The thermistor 51 outputs a detection result to the control unit 5 at predetermined time intervals. Specifically, the control unit 5 calculates the temperature of air in the predetermined region EA in the heating cooking chamber 100A based on the detection result of the thermistor 51.

[0078] The control unit 5 controls the first drive unit 143, the second drive unit 133, the first energization unit 144, the second energization unit 134, the energization unit 162, the drive motor 41, the operation panel 3, and the storage unit 6 by executing control programs stored in the storage unit 6. Specifically, the control unit 5 controls the first drive unit 143, the second drive unit 133, the first energization unit 144, the second energization unit 134, and the energization unit 162 based on the detection result of the thermistor 51. As a result, the control unit 5 can control the first drive unit 143, the second drive unit 133, the first energization unit 144, the second energization unit 134, and the energization unit 162 at an appropriate timing.

[0079] Particularly, in the pull-out type heating cooking apparatus 100, a "cooking process", a "preheating process", and a "heat retaining process" are executed when a predetermined object H to be heated is heated and cooked.

[0080] Next, the "cooking process" according to the present embodiment will be further described with refer-

ence to FIG. 10. FIG. 10 is a diagram illustrating a schematic cross section of the heating cooking chamber 100A according to the present embodiment. Particularly, FIG. 10 illustrates a cross section of the heating cooking chamber 100A in which the "cooking process" is executed.

[0081] As illustrated in FIG. 10, the "cooking process" indicates heating and cooking the object H to be heated in a state where the temperature in the heating cooking chamber 100A is substantially the same as a threshold temperature. The threshold temperature is set by a user or calculated by the control unit 5 based on the type of the object H to be heated, a table, and the like. Specifically, the second drive unit 133 drives the second centrifugal fan 132. In addition, the second energization unit 134 energizes the second heater 131 and stops the energization of the second heater 131. Further, the energization unit 162 energizes the heating cooking heater 161. As a result, the object H to be heated is heated and cooked by transmitting heat generated by the heating cooking heater 161 to the object H to be heated.

[0082] Next, with reference to FIG. 11 and FIG. 12, the "preheating process" according to the present embodiment will be further described. FIG. 11 is a time chart executed by the control unit 5 according to the present embodiment. In the time chart of FIG. 11, the horizontal axis indicates time. In the time chart of FIG. 11, the vertical axis indicates whether each of the first drive unit 143, the second drive unit 133, the first energization unit 144, and the second energization unit 134 is in an ON state or an OFF state. The ON state indicates an energized state or a driven state. The OFF state indicates a non-energized state or a non-driven state.

[0083] FIG. 12 is a graph showing a relationship between the temperature of the predetermined region EA included in the heating cooking chamber 100A according to the present embodiment and time. In the graph of FIG. 12, the horizontal axis represents time, the vertical axis represents temperature, and a temperature change of the predetermined region EA included in the heating cooking chamber 100A is indicated by a solid line LA. The temperature is a temperature calculated based on the detection result of the thermistor 51.

[0084] As shown in FIGS. 11 and 12, the "preheating process" indicates a process in which the temperature in the heating cooking chamber 100A exceeds a threshold temperature TT at least once before the object H to be heated is accommodated in the heating cooking chamber 100A. Specifically, the "preheating process" indicates a process in which the temperature of the predetermined region EA in the heating cooking chamber 100A exceeds the threshold temperature TT before the object H to be heated is accommodated in the heating cooking chamber 100A.

[0085] More specifically, the "preheating process" indicates a process in which after the temperature of the predetermined region EA in the heating cooking chamber 100A reaches substantially the same temperature as the threshold temperature TT, a first predetermined period

Δt_1 or longer elapses from time t_1 at which the temperature reaches the threshold temperature TT . The first predetermined period Δt_1 indicates a period in which the temperature of the first heater 141 decreases to a first predetermined temperature or lower. The first predetermined temperature is an example of a "predetermined temperature". The first predetermined temperature is a temperature for suppressing overheating of the first air sending chamber 14A. The first predetermined period Δt_1 and the first predetermined temperature are set in advance by a manufacturer or the like.

[0086] Further, in the "preheating process", the second heater 131 is energized at the time t_1 at which the temperature of the predetermined region EA in the heating cooking chamber 100A becomes substantially the same as the threshold temperature TT , and the first predetermined period Δt_1 or longer elapses from the time t_1 . As a result, the temperature of the second heater 131 rises.

[0087] For example, the user inputs execution of the "preheating process" to the operation panel 3. When the execution of the "preheating process" is received, the control unit 5 controls the first drive unit 143, the second drive unit 133, the first energization unit 144, and the second energization unit 134 based on the detection result of the thermistor 51. Specifically, at time t_0 , the control unit 5 drives the first drive unit 143 and energizes the first energization unit 144. In other words, as illustrated in FIG. 5, the first air sending unit 14 circulates the first air F1 between the first air sending chamber 14A and the predetermined region EA in the heating cooking chamber 100A. As a result, the temperature of the predetermined region EA in the heating cooking chamber 100A rises.

[0088] Thereafter, when the control unit 5 drives the first drive unit 143 and energizes the first energization unit 144, the control unit 5 determines whether or not the temperature in the heating cooking chamber 100A is the threshold temperature TT or higher based on the detection result of the thermistor 51. When it is determined that the temperature of the predetermined region EA in the heating cooking chamber 100A is not the threshold temperature TT or higher, the control unit 5 continues to drive the first drive unit 143 and energize the first energization unit 144. On the other hand, when it is determined that the temperature of the predetermined region EA in the heating cooking chamber 100A is the threshold temperature TT or higher, the control unit 5 stops driving the first drive unit 143 and energizes the second energization unit 134. As a result, the temperature of the predetermined region EA in the heating cooking chamber 100A exceeds the threshold temperature TT .

[0089] The control unit 5 stops energization of the first energization unit 144, and stops driving of the first drive unit 143 at time t_2 at which the first predetermined period Δt_1 elapses from the time t_1 at which the second energization unit 134 is energized.

[0090] Further, the control unit 5 stops energization of the first energization unit 144 and drives the second drive unit 133 at time t_4 at which a third predetermined period

Δt_3 elapses from the time t_1 at which the second energization unit 134 is energized. The third predetermined period Δt_3 is longer than the first predetermined period Δt_1 . The third predetermined period Δt_3 indicates a period during which the temperature of the second heater 131 rises to a second predetermined temperature or higher. The second predetermined temperature indicates a temperature for suppressing overheating of the second air sending chamber 13A. The third predetermined period Δt_3 and the second predetermined temperature are set in advance by a manufacturer or the like. In other words, as illustrated in FIG. 7, the second air sending unit 13 circulates the second air F2 between the inside of the second air sending chamber 13A and the inside of the heating cooking chamber 100A. As a result, the temperature in the entire heating cooking chamber 100A becomes substantially the same as the threshold temperature TT .

[0091] In addition, the control unit 5 stops energization of the first energization unit 144, and makes a notification of the completion of the preheating process at time t_3 at which the second predetermined period Δt_2 or longer elapses from the time t_1 at which the second energization unit 134 is energized. In other words, the control unit 5 stops energization of the first heater 141 and energizes the second heater 131 before the notification of the completion of the preheating process. For example, the control unit 5 notifies the completion of the preheating process by sound or video. As a result, the user accommodates the object H to be heated in the heating cooking chamber 100A. The heating cooking chamber 100A executes the "cooking process".

[0092] As described above, the control unit 5 stops energization of the first heater 141 and energizes the second heater 131 before the notification of the completion of the preheating process, which makes it possible to start heating and cooking of the object H to be heated in a state where the temperature of the second heater 131 has risen. As a result, the cooking period for heating and cooking the object H to be heated can be shortened. For example, heating and cooking of the object H to be heated can be started in a state where the temperature in the entire heating cooking chamber 100A has risen.

[0093] In addition, the control unit 5 stops energization of the first energization unit 144 and stops driving of the first drive unit 143 at the time t_2 at which the first predetermined period Δt_1 elapses from the time t_1 at which the second energization unit 134 is energized, and thus, the temperature of the first heater 141 decreases to the first predetermined temperature or lower. As a result, it is possible to suppress overheating of the first air sending chamber 14A.

[0094] Particularly, the control unit 5 stops energization of the first energization unit 144 and makes a notification of the completion of the preheating process at the time t_3 at which a second predetermined period Δt_2 elapses from the time t_1 at which the second energization unit 134 is energized. The second predetermined period

Δt_2 is a period during which the temperature in the heating cooking chamber 100A decreases to substantially the same temperature as the threshold temperature TT. A length of the second predetermined period Δt_2 is preferably equal to or longer than a length of the first predetermined period Δt_1 and equal to or shorter than a length of the third predetermined period Δt_3 . The second predetermined period Δt_2 is set in advance by a manufacturer or the like. As a result, it is possible to start heating and cooking the object H to be heated in a state where the temperature in the heating cooking chamber 100A has risen in a short period of time.

[0095] Furthermore, the control unit 5 drives the second drive unit 133 after the notification of the completion of the preheating process. As a result, it is possible to stabilize determination of the threshold temperature TT at the notification time point. In addition, it is possible to suppress overheating of the second heater 131.

[0096] More particularly, in the pull-out type heating cooking apparatus 100, the "heat retaining process" is further executed. The "heat retaining process" indicates that the temperature in the heating cooking chamber 100A is maintained to be substantially the same as the threshold temperature TT after the "preheating process" is executed. Specifically, the control unit 5 controls the second energization unit 134. More specifically, the control unit 5 energizes the second energization unit 134 or stops energization of the second energization unit 134. As a result, the user does not need to accommodate the object H to be heated in the heating cooking chamber 100A immediately after being notified of the completion of the preheating process.

[0097] In addition, in the pull-out type heating cooking apparatus 100, when the lid portion 21 is pulled out during the execution of the "cooking process", the "preheating process", or the "heat retaining process", energization of the first energization unit 144 and energization of the second energization unit 134 are stopped. As a result, it is possible to inhibit hot air from flowing out toward the user who has opened the inside of the heating cooking chamber 100A.

[0098] Next, a cooking method by the pull-out type heating cooking apparatus 100 according to the present embodiment will be described with reference to FIG. 13. FIG. 13 is a flowchart for explaining the cooking method by the pull-out type heating cooking apparatus 100.

[0099] As illustrated in FIG. 13, in step S101, the control unit 5 drives the first centrifugal fan 142 and energizes the first heater 141.

[0100] Next, in step S102, the control unit 5 determines whether or not the temperature in the heating cooking chamber 100A is the threshold temperature TT or higher. In a case where the control unit 5 determines in step S102 that the temperature in the heating cooking chamber 100A is not the threshold temperature TT or higher, the process returns to step S102.

[0101] On the other hand, in a case where the control unit 5 determines in step S102 that the temperature in

the heating cooking chamber 100A is the threshold temperature TT or higher, the process proceeds to step S103. In step S103, the control unit 5 stops energization of the first heater 141 and energizes the second heater 131.

[0102] Next, in step S104, the control unit 5 stops driving of the first centrifugal fan 142.

[0103] Next, in step S105, the control unit 5 makes a notification of completion of the preheating process.

[0104] Next, in step S106, the control unit 5 drives the second centrifugal fan 132.

[0105] Next, in step S107, the control unit 5 determines whether or not the object H to be heated is accommodated in the heating cooking chamber 100A. In a case where the control unit 5 determines in step S107 that the object H to be heated is not accommodated in the heating cooking chamber 100A, the process proceeds to step S108. On the other hand, when the control unit 5 determines in step S107 that the object H to be heated is accommodated in the heating cooking chamber 100A, the process proceeds to step S109.

[0106] Next, in step S108, the control unit 5 repeats energizing the second heater 131 and stopping the energization of the second heater 131. The process returns to step S107.

[0107] Next, in step S109, the control unit 5 executes the "cooking process". Then, the cooking method ends.

[0108] As described above, the cooking process is executed after the preheating process is executed, which makes it possible to shorten the cooking period for heating and cooking the object H to be heated.

[0109] Subsequently, a cabinet 200 to which the pull-out type heating cooking apparatus 100 is attached will be described with reference to FIG. 14. FIG. 14 is a diagram illustrating an appearance of the cabinet 200 to which the pull-out type heating cooking apparatus 100 according to the present embodiment is attached.

[0110] The pull-out type heating cooking apparatus 100 is installed in the cabinet 200 in a built-in manner. As illustrated in FIG. 14, the cabinet 200 includes an upper wall 200A, a lower wall 200B, a right wall 200C, a left wall 200D, and a rear wall 200E. The upper wall 200A, the lower wall 200B, the right wall 200C, the left wall 200D, and the rear wall 200E form an accommodation portion 200F. The accommodation portion 200F is a rectangular parallelepiped space into which the pull-out type heating cooking apparatus 100 is fitted.

[0111] The embodiment of the present invention has been described above with reference to the accompanying drawings. However, the present invention is not limited to the embodiment described above, and the present invention can be implemented in various modes without departing from the gist thereof. The drawings primarily schematically illustrate each of the constituent elements for the sake of easier understanding, and the thickness, length, quantity, and the like of each of the illustrated constituent elements are different from the actual thickness, length, quantity, and the like by reason of creation

of the drawings. Further, the material, shape, dimensions, and the like of each of the constituent elements illustrated in the embodiment described above are merely examples and are not particularly limited, and various modifications can be made within the scope not substantially departing from the effects of the present invention.

(1) As described with reference to FIG. 1 to FIG. 14, the pull-out type heating cooking apparatus 100 includes the first air sending unit 14, the second air sending unit 13, and the grill unit 16, but the present invention is not limited thereto. The pull-out type heating cooking apparatus 100 may further include a microwave supply unit.

(2) As described with reference to FIGS. 1 to 14, the control unit 5 makes a notification of the completion of the preheating process at the time t_3 at which the second predetermined period Δt_2 elapses from the time t_1 , but the present invention is not limited thereto. For example, the control unit 5 may make a notification of the completion of the preheating process based on the detection result of the thermistor 51.

Industrial Applicability

[0112] The present invention provides a heating cooking apparatus, and the provided heating cooking apparatus has industrial applicability.

Reference Signs List

[0113]

5 Control unit
131 Second heater
132 Second centrifugal fan
141 First heater
142 First centrifugal fan
100 Pull-out type heating cooking apparatus
100A Heating cooking chamber
EA Predetermined region
F1 First air
F2 Second air
TT Threshold temperature

Claims

1. A heating cooking apparatus comprising:

a heating cooking chamber configured to accommodate an object to be heated;
a first heater configured to heat first air;
a first fan configured to blow the first air heated by the first heater into the heating cooking chamber;
a second heater configured to heat second air;
a second fan configured to blow the second air

heated by the second heater into the heating cooking chamber; and

a control unit configured to control the first heater, the first fan, the second heater, and the second fan,

wherein the control unit stops energization of the first heater and energizes the second heater before making a notification of completion of a preheating process, and

the preheating process indicates a process in which a temperature in the heating cooking chamber exceeds a threshold temperature at least once before the object to be heated is accommodated in the heating cooking chamber.

2. The heating cooking apparatus according to claim 1,

wherein the control unit stops energization of the first heater and stops driving of the first fan when a first predetermined period has elapsed from time of energization of the second heater, and

the first predetermined period indicates a period during which a temperature of the first heater decreases to a predetermined temperature or lower.

3. The heating cooking apparatus according to claim 1 or 2,

wherein the control unit stops energization of the first heater and makes a notification of completion of the preheating process when a second predetermined period has elapsed from time of energization of the second heater, and the second predetermined period indicates a period during which the temperature in the heating cooking chamber decreases to a temperature substantially identical to the threshold temperature.

4. The heating cooking apparatus according to any one of claims 1 to 3,

wherein the control unit drives the second fan after the notification of the completion of the preheating process.

5. The heating cooking apparatus according to any one of claims 1 to 4,

wherein the first heater is positioned at an upper portion of the heating cooking chamber, the second heater is positioned on a predetermined side of the heating cooking chamber, and the upper portion of the heating cooking chamber is different from the predetermined side of the heating cooking chamber.

6. The heating cooking apparatus according to any one of claims 1 to 5,

wherein the preheating process indicates a process in which a temperature of a predetermined region included in the heating cooking chamber exceeds the threshold temperature at least once, and
the predetermined region is disposed below the first heater and the first fan. 5
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7. The heating cooking apparatus according to any one of claims 1 to 6, further comprising

a temperature detection unit configured to detect a temperature in the heating cooking chamber, 15
wherein the control unit controls the first heater, the first fan, the second heater, and the second fan, based on a detection result of the temperature detection unit. 20

8. The heating cooking apparatus according to claim 7, further comprising

a third heater disposed in the heating cooking chamber, 25
wherein the control unit controls the third heater based on the detection result of the temperature detection unit. 30

9. The heating cooking apparatus according to any one of claims 1 to 8, further comprising

a pull-out body on which the object to be heated is placed, the pull-out body configured to be pulled out from the heating cooking chamber, 35
wherein the control unit stops energization of the first heater and energization of the second heater when the pull-out body is pulled out. 40

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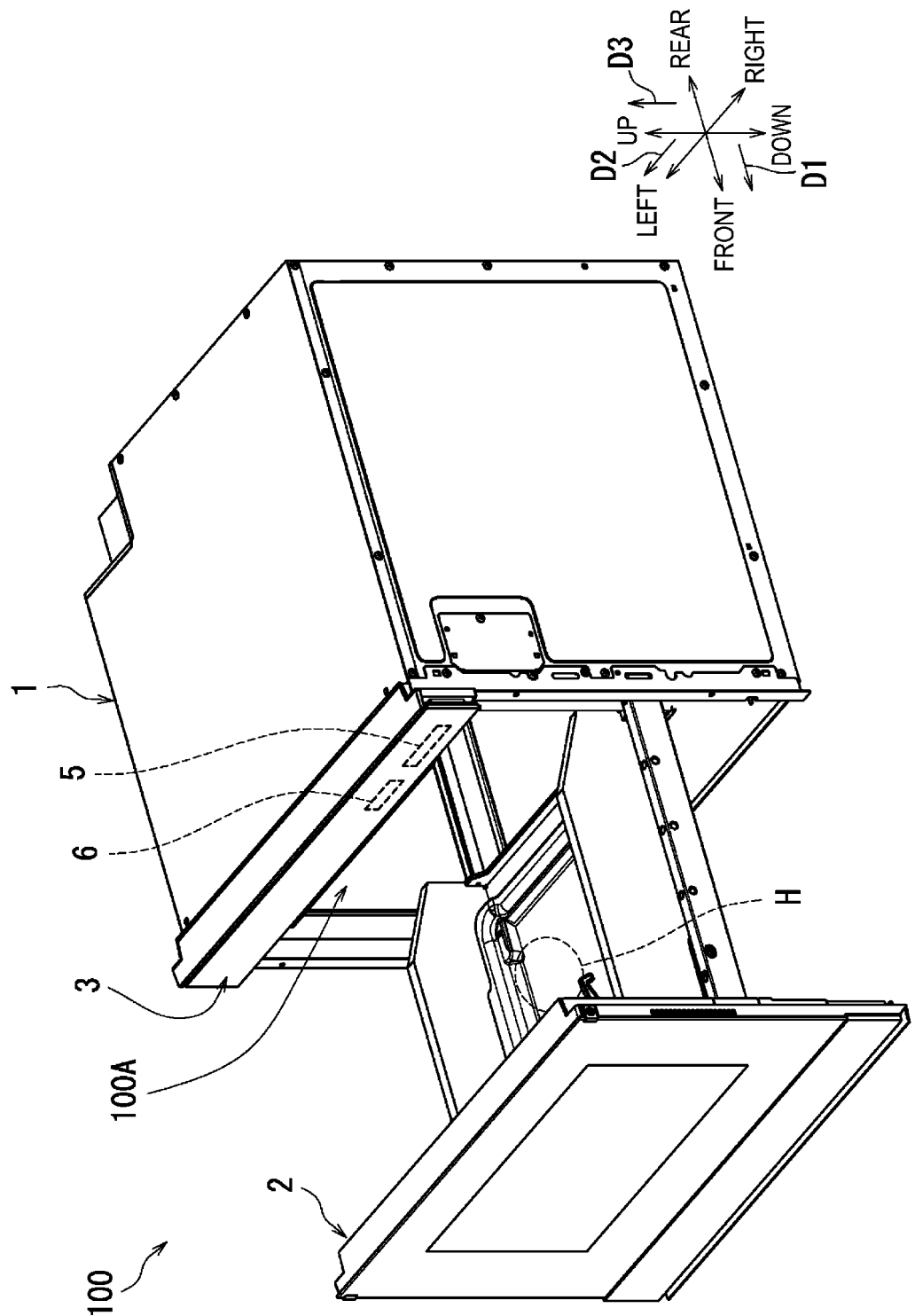


FIG. 1

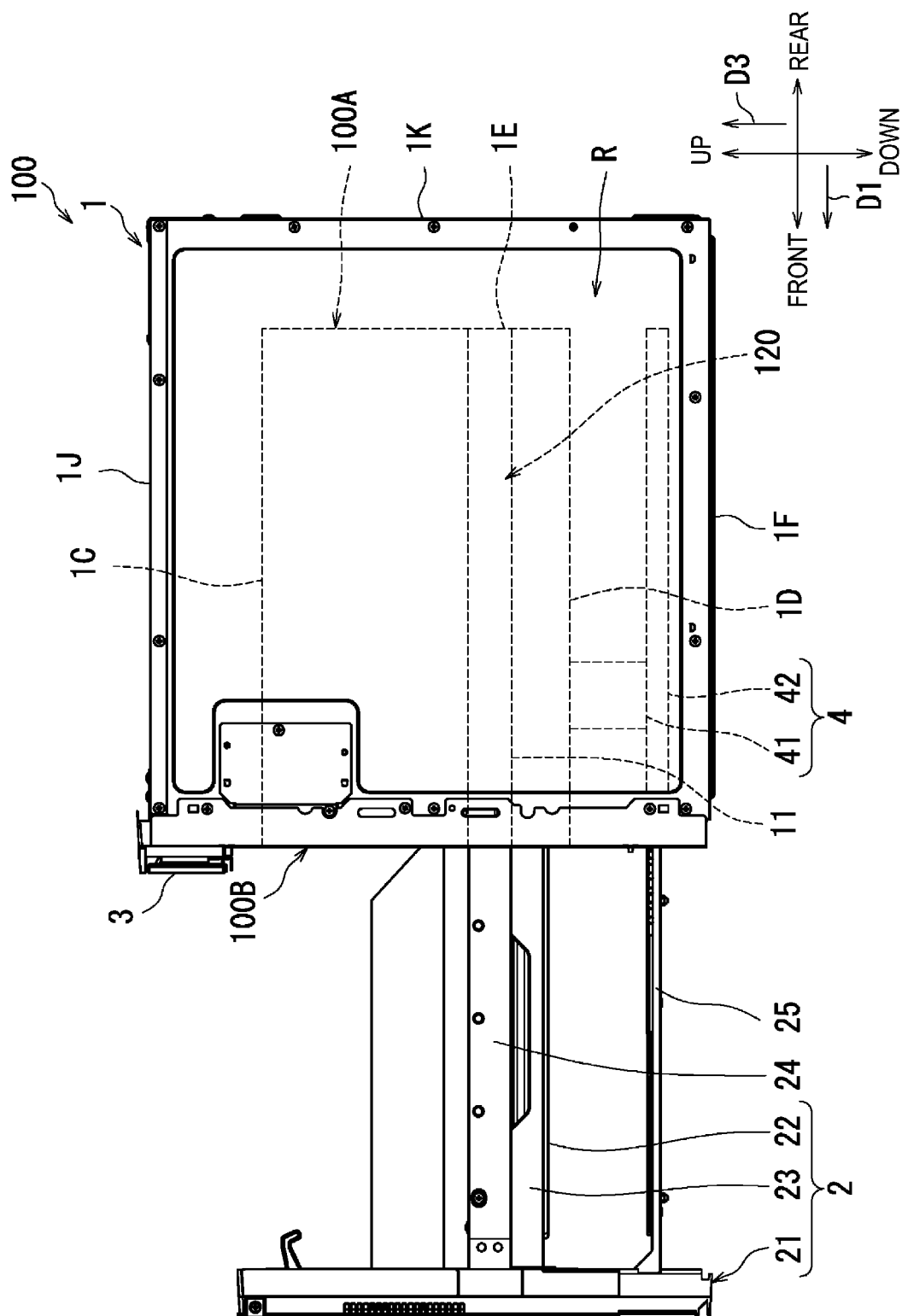


FIG. 2

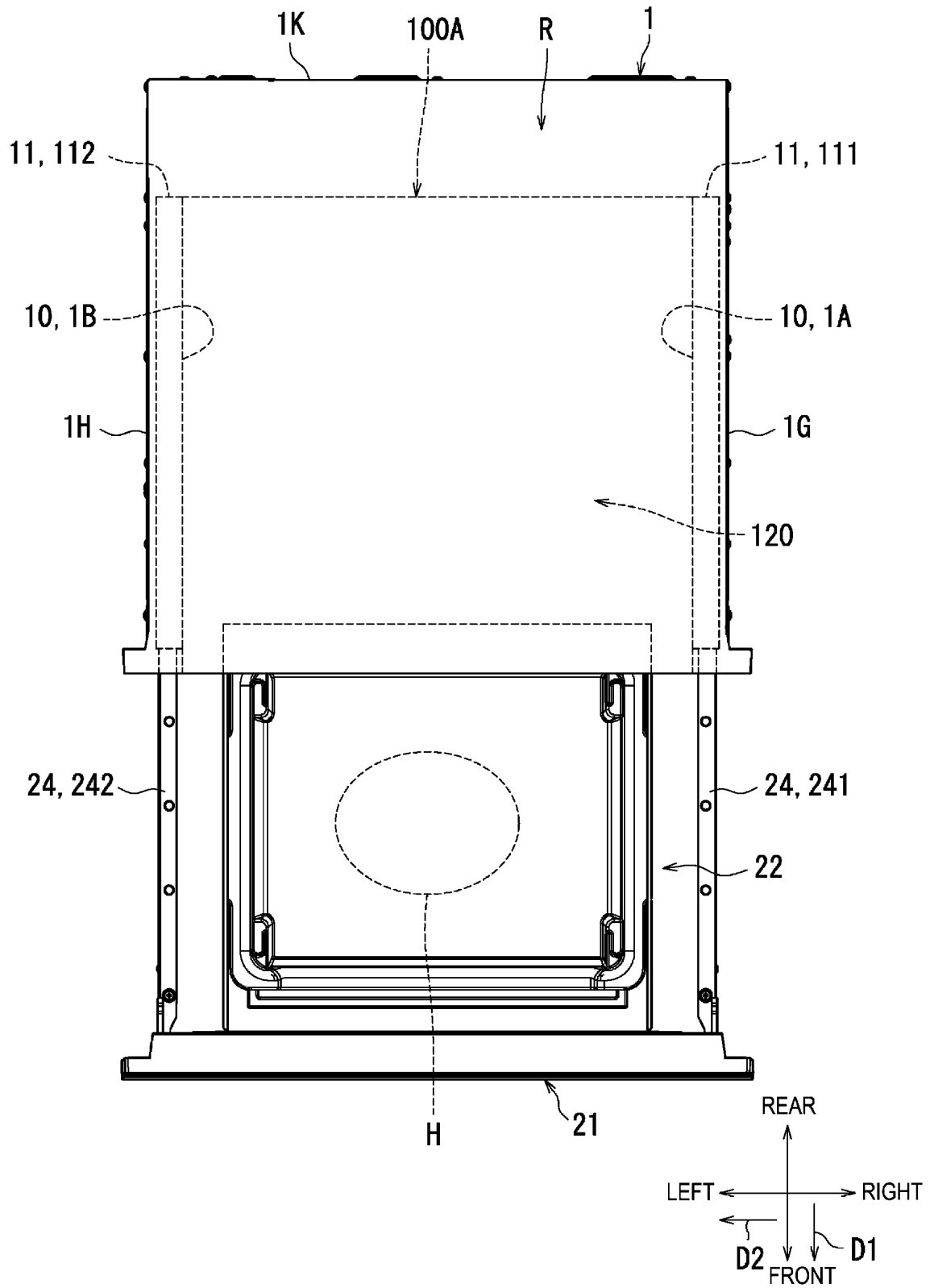


FIG. 3

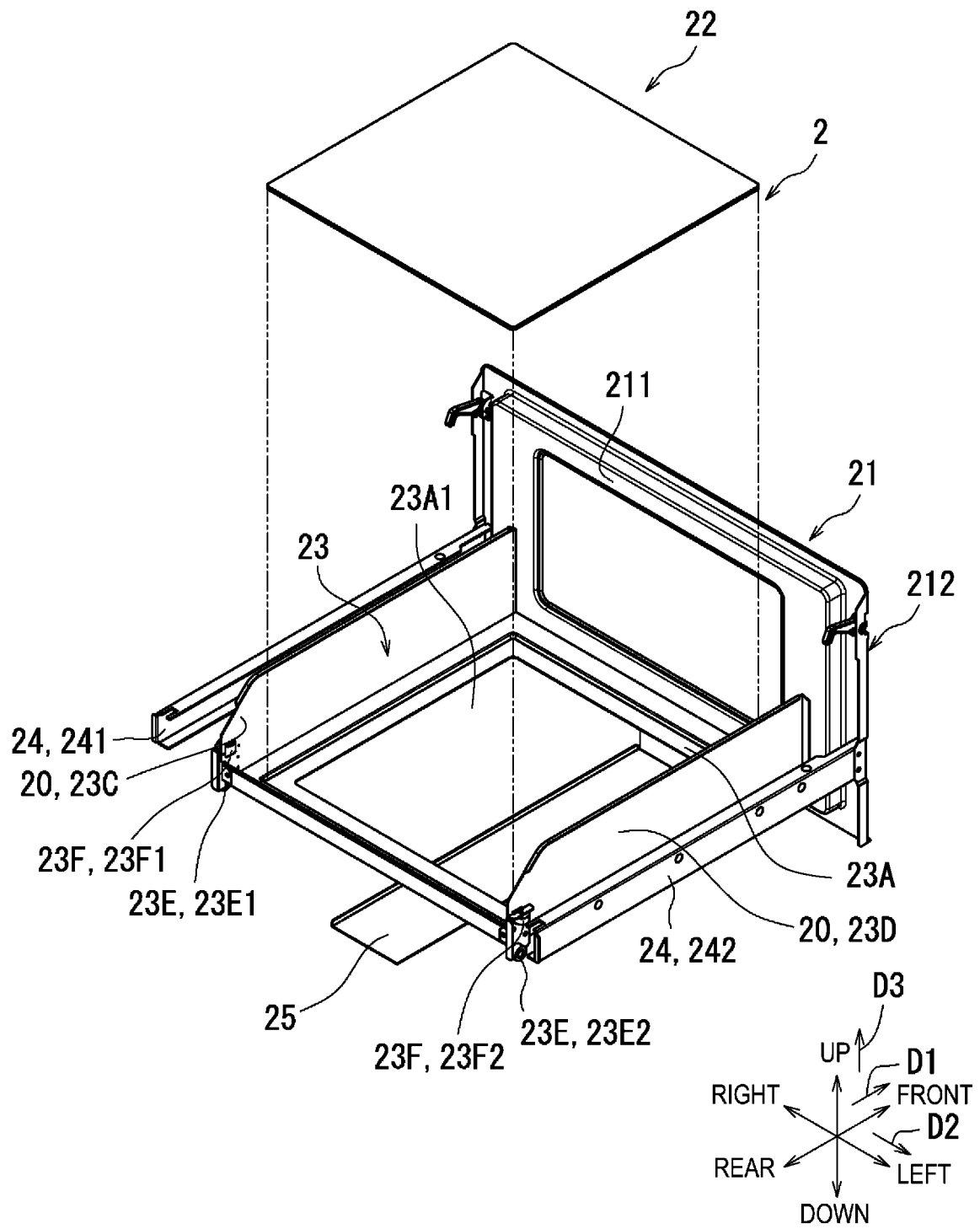


FIG. 4

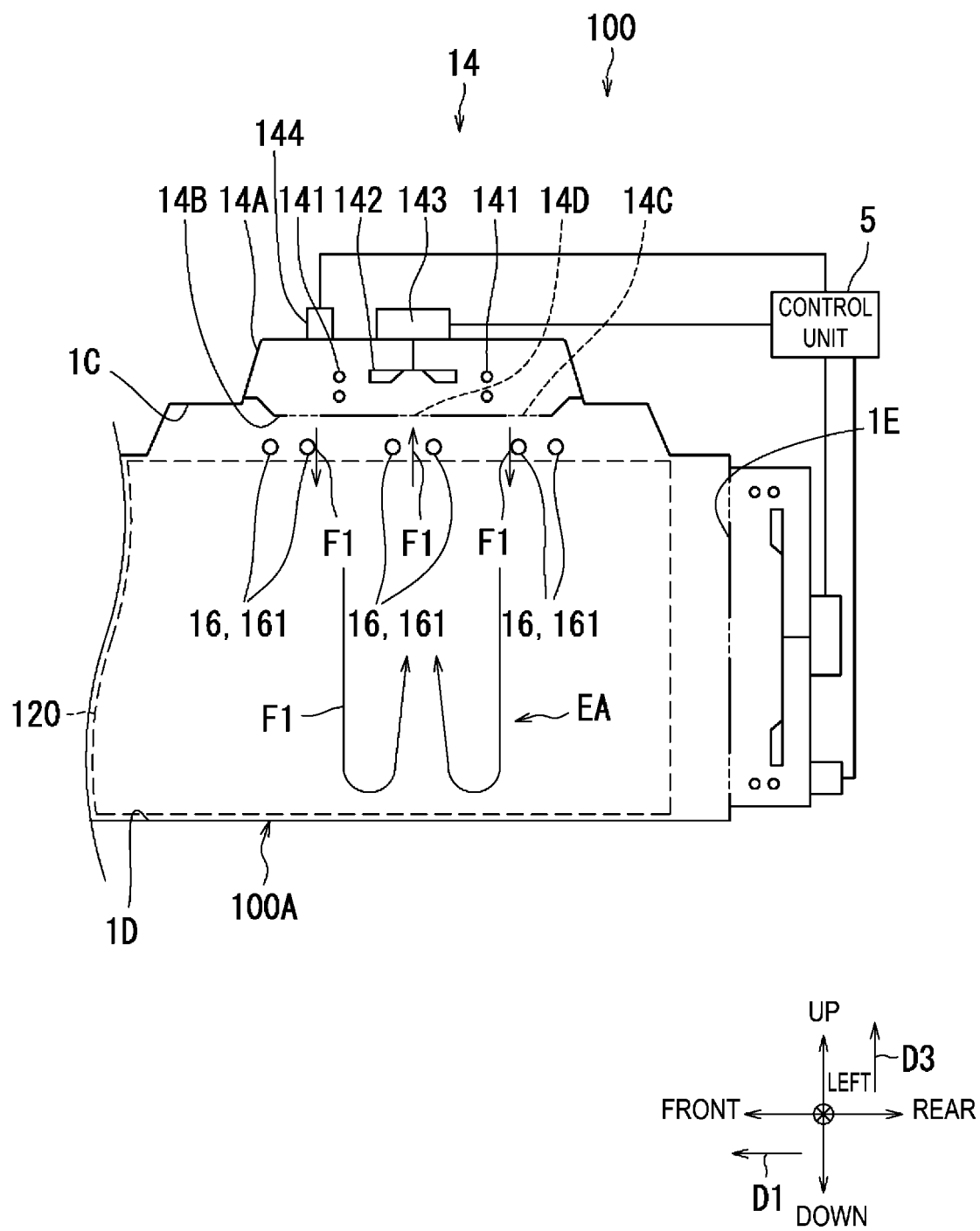


FIG. 5

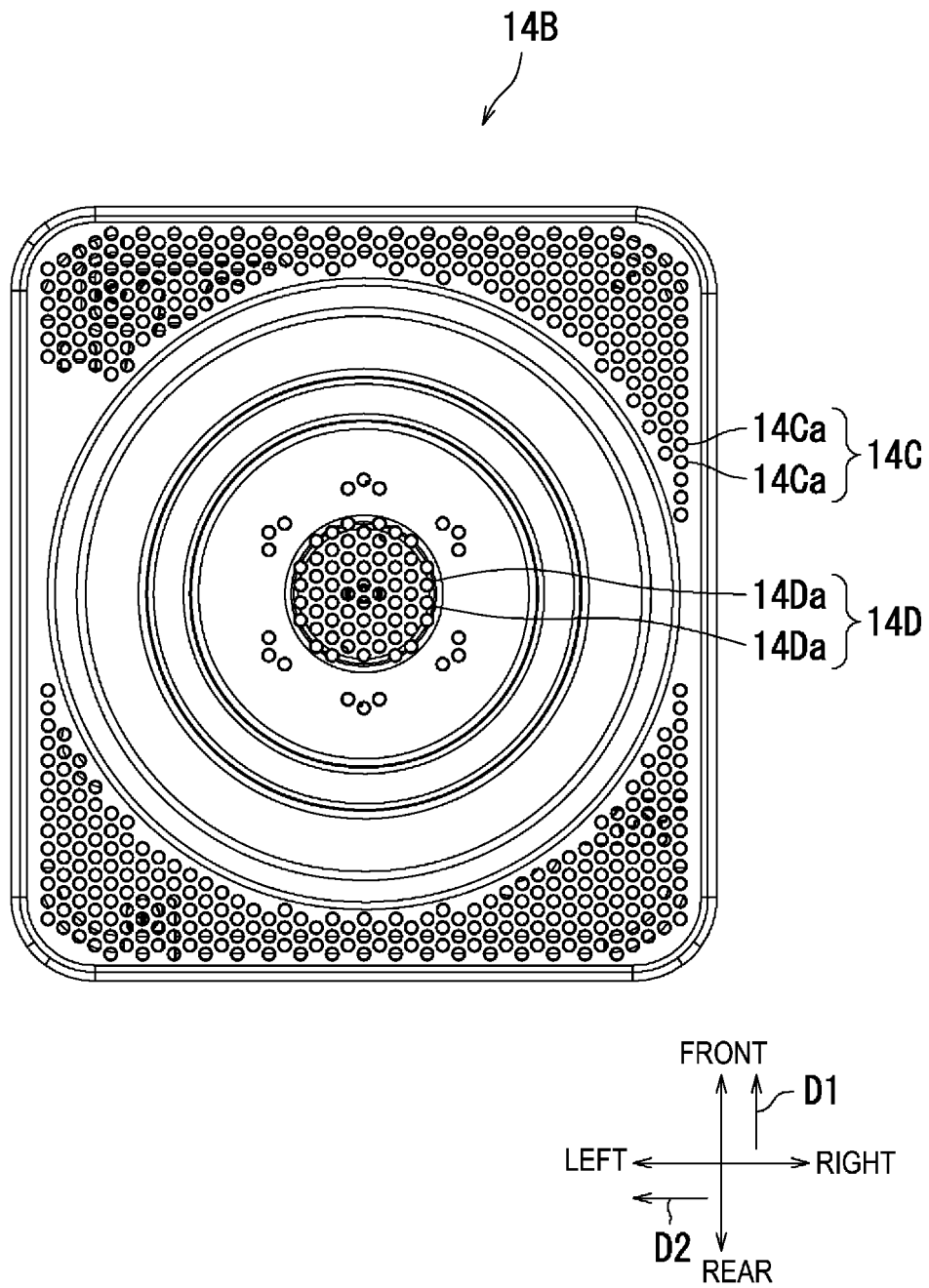


FIG. 6

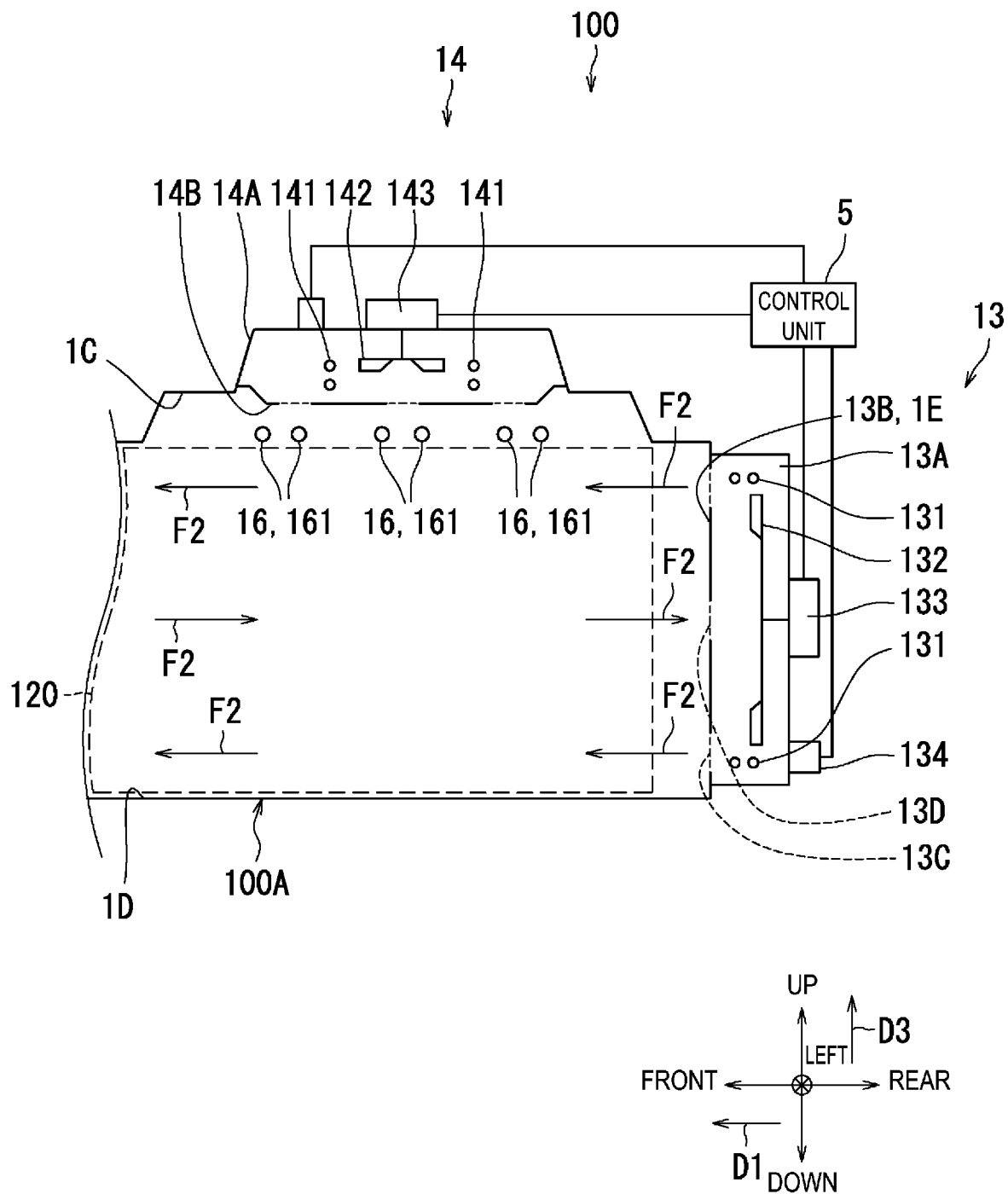
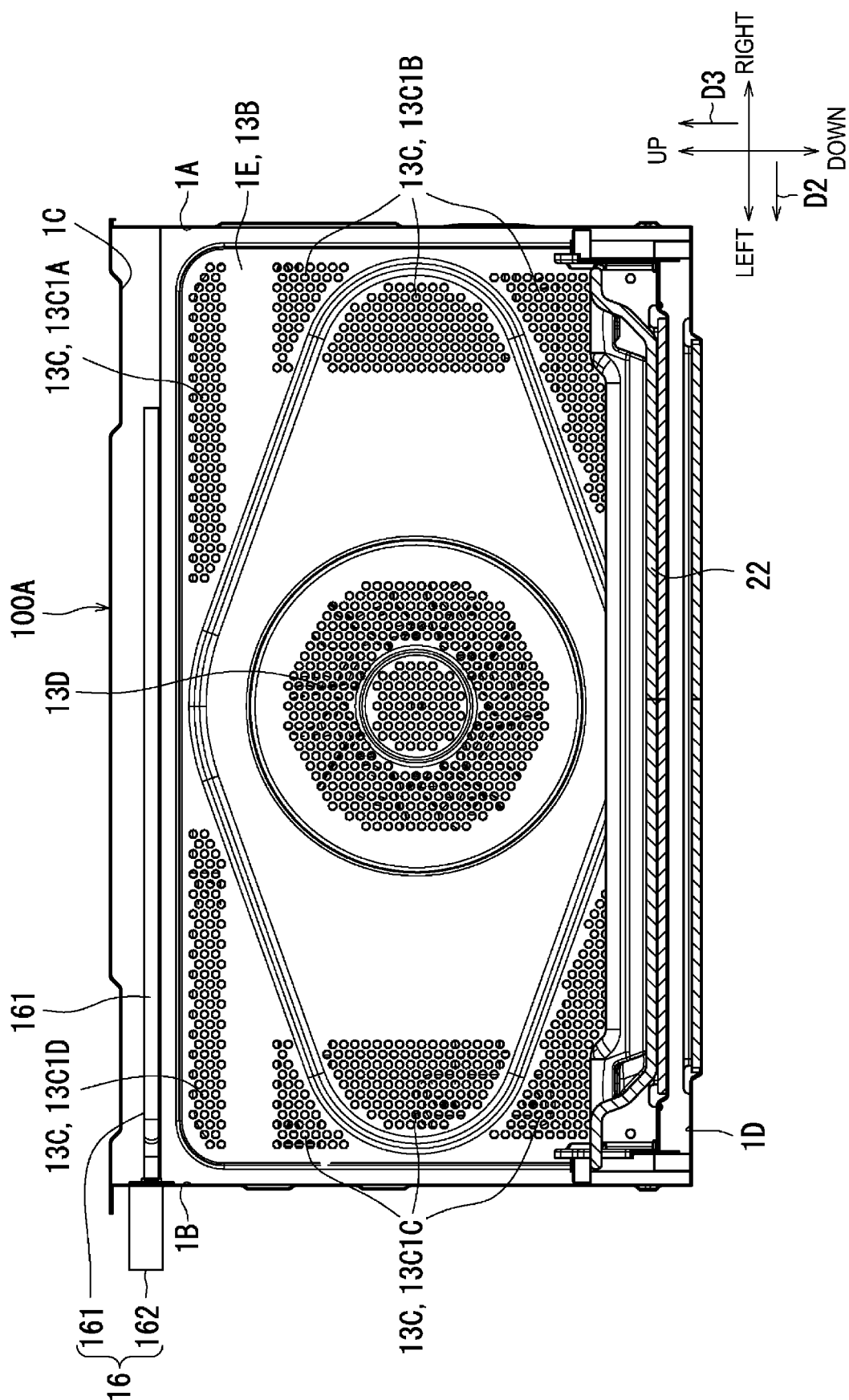


FIG. 7


$$\frac{\infty}{\mathbb{G}} \mathbb{F}$$

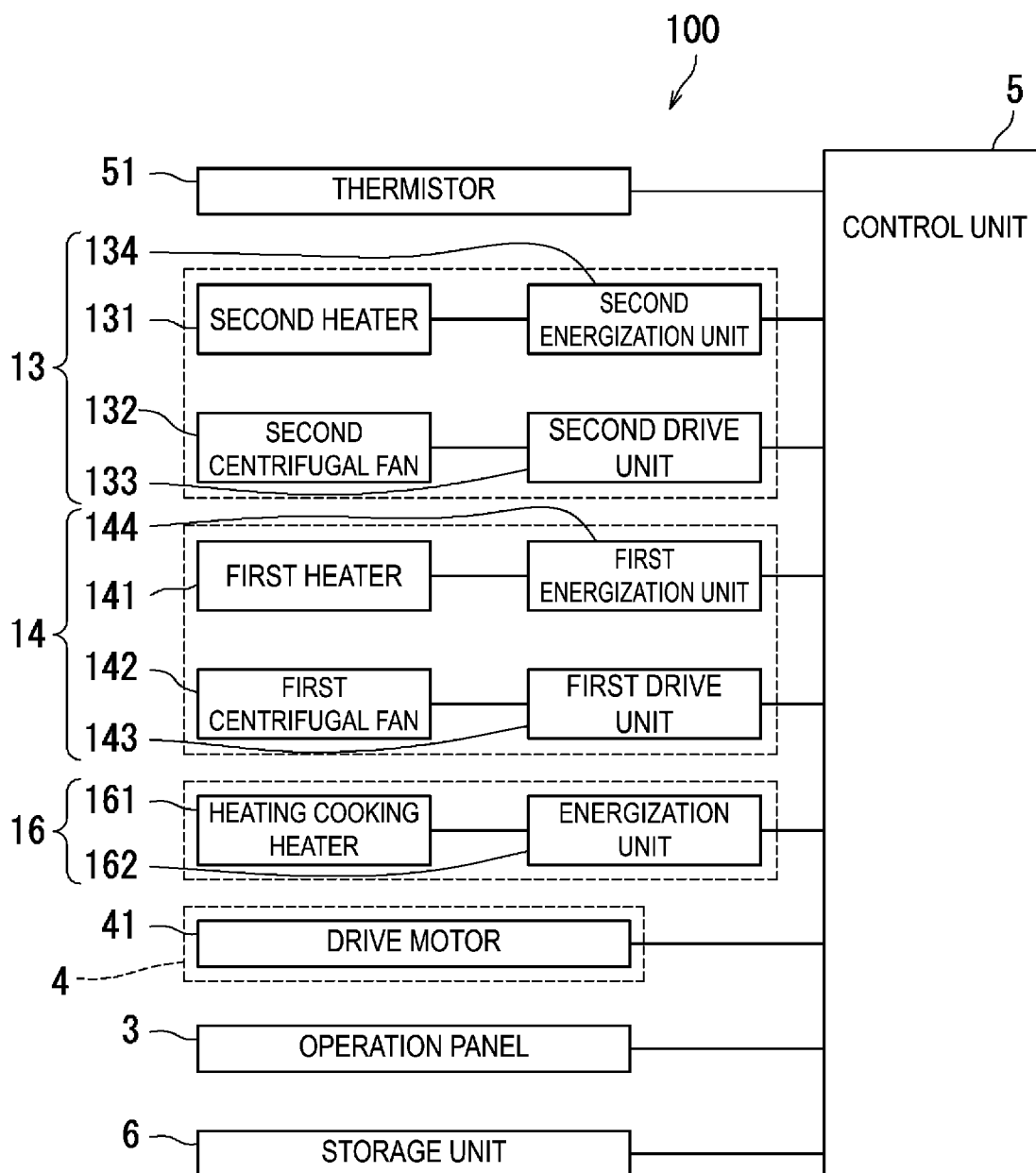


FIG. 9

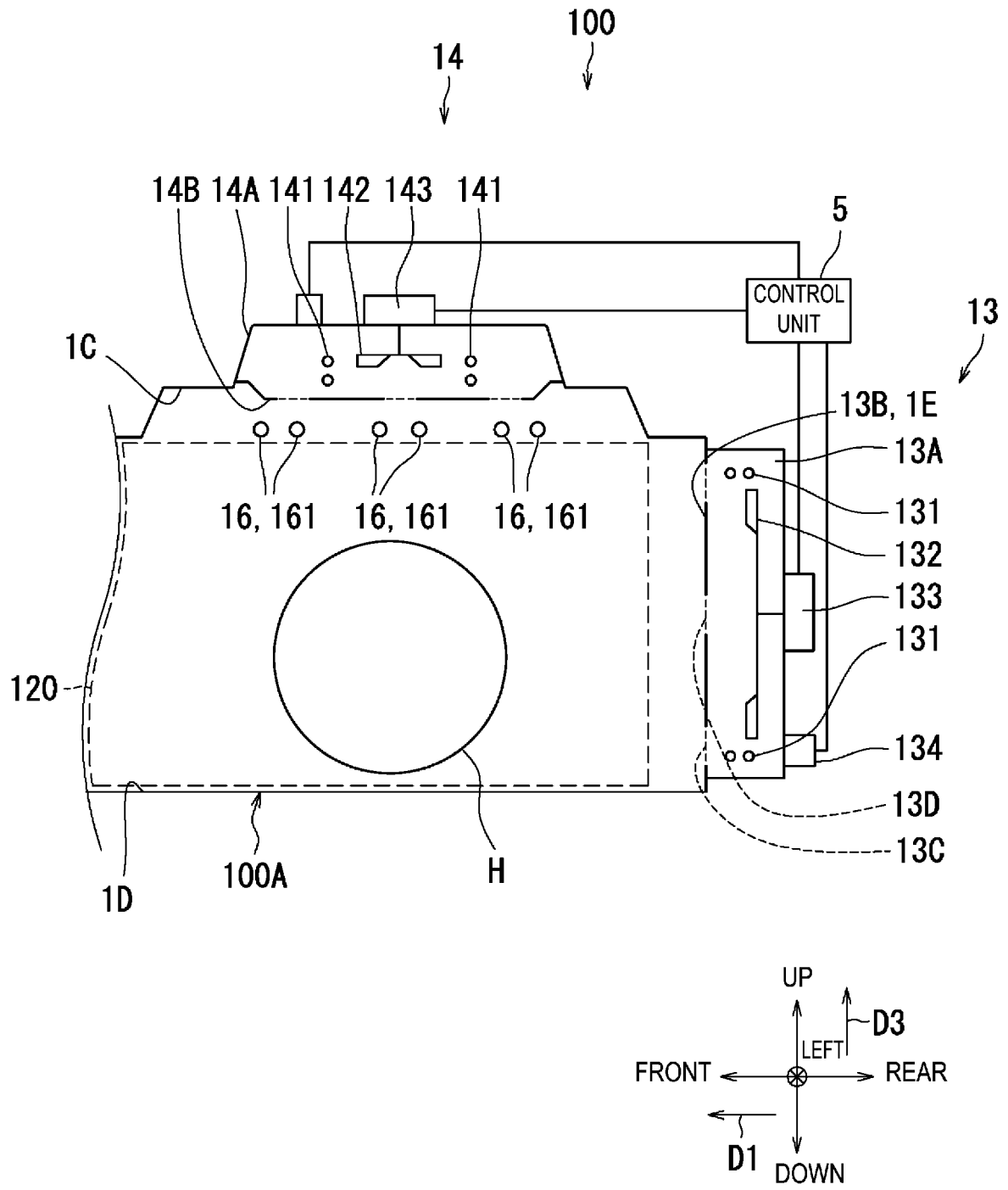


FIG. 10

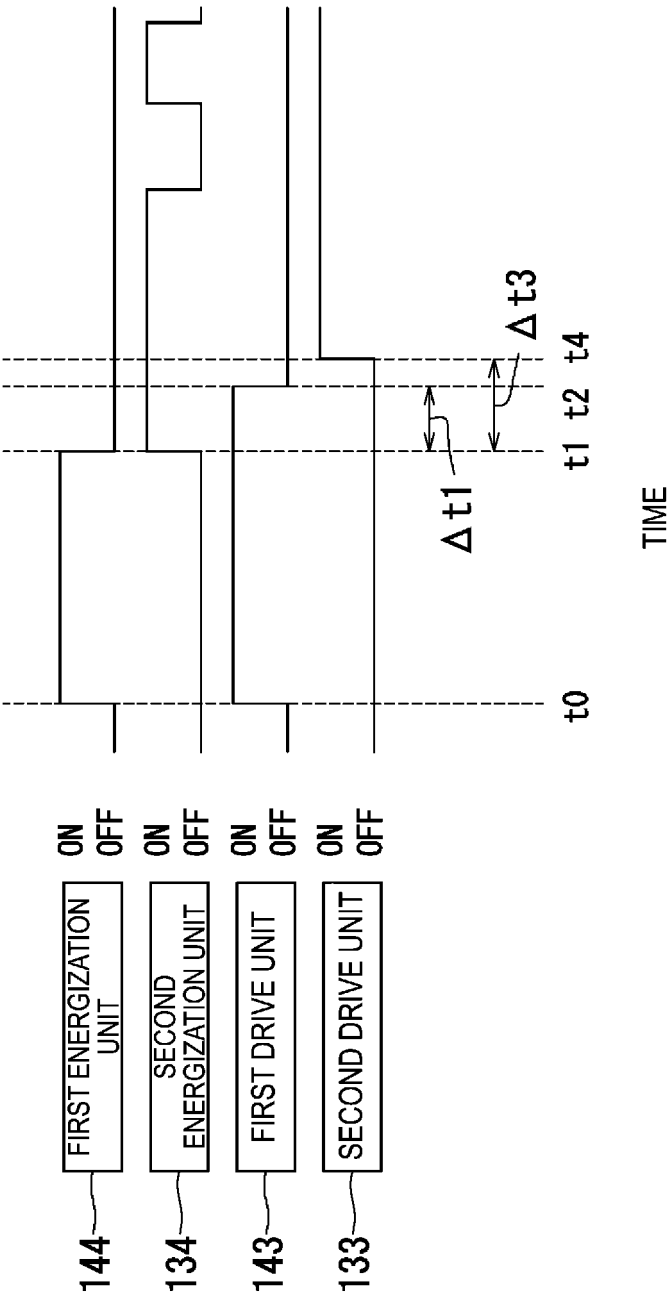


FIG. 11

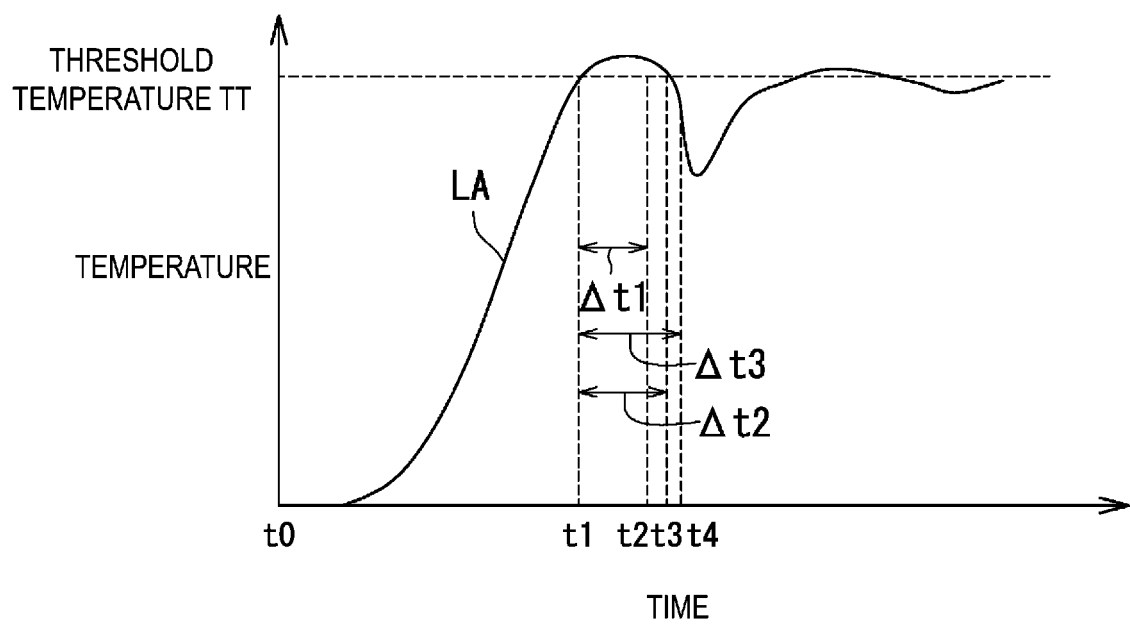


FIG. 12

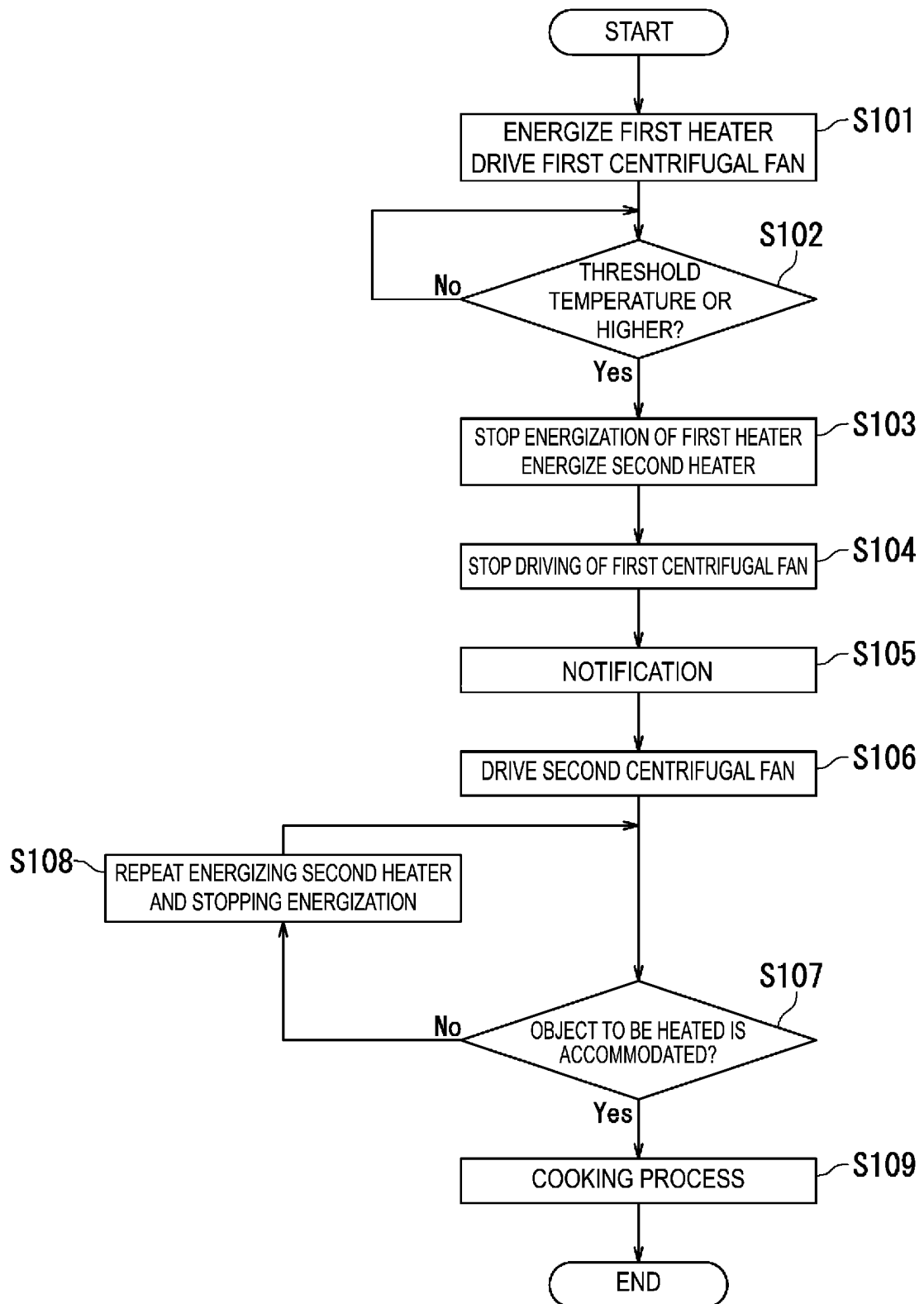


FIG. 13

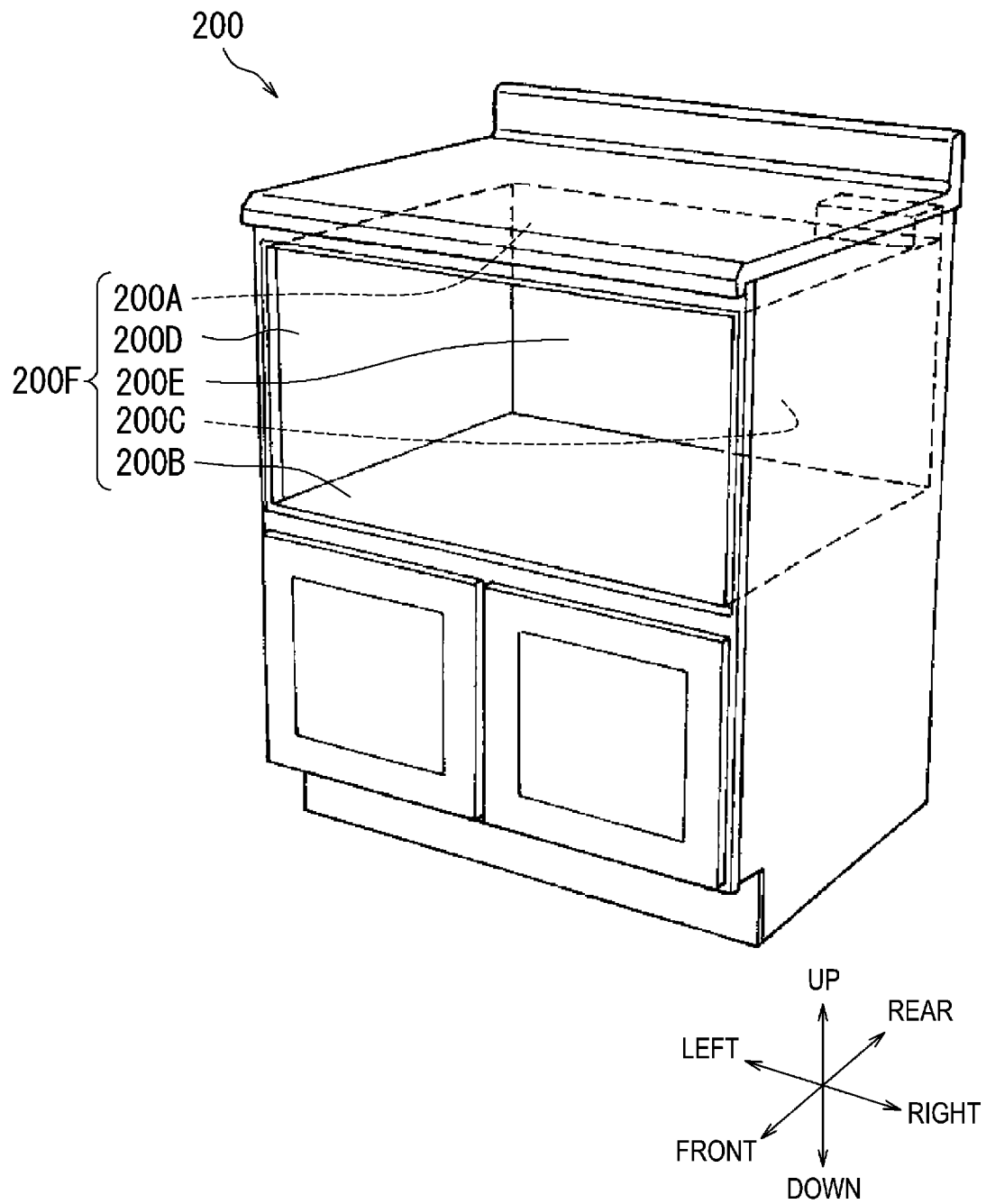


FIG. 14

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2022/001366

A. CLASSIFICATION OF SUBJECT MATTER

F24C 7/04(2021.01)i; **F24C 7/06**(2006.01)i; **F24C 7/08**(2006.01)i
 FI: F24C7/04 301Z; F24C7/06 A; F24C7/08 320

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)

F24C7/04; F24C7/06; F24C7/08

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 1971-2022
 Registered utility model specifications of Japan 1996-2022
 Published registered utility model applications of Japan 1994-2022

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 5-172343 A (MITSUBISHI ELECTRIC CORP.) 09 July 1993 (1993-07-09) paragraphs [0020]-[0023], fig. 1, 3-5	1, 5-8
Y		9
A		2-4
Y	JP 2020-118401 A (HARMAN CO., LTD.) 06 August 2020 (2020-08-06) paragraph [0064], fig. 7	9

☐ 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)

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“P” document published prior to the international filing date but later than the priority date claimed

“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

“&” document member of the same patent family

Date of the actual completion of the international search

03 March 2022

Date of mailing of the international search report

15 March 2022

Name and mailing address of the ISA/IP

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Telephone No.

International application No.

PCT/JP2022/001366

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
JP	5-172343	A	09 July 1993	(Family: none)	
JP	2020-118401	A	06 August 2020	(Family: none)	

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

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2010133634 A [0004]