



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

(43) Date of publication:
11.04.2018 Bulletin 2018/15

(51) Int Cl.:
F24C 7/02 (2006.01) F24C 15/02 (2006.01)

(21) Application number: **16799572.9**

(86) International application number:
PCT/JP2016/002507

(22) Date of filing: **24.05.2016**

(87) International publication number:
WO 2016/189859 (01.12.2016 Gazette 2016/48)

(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:
MA MD

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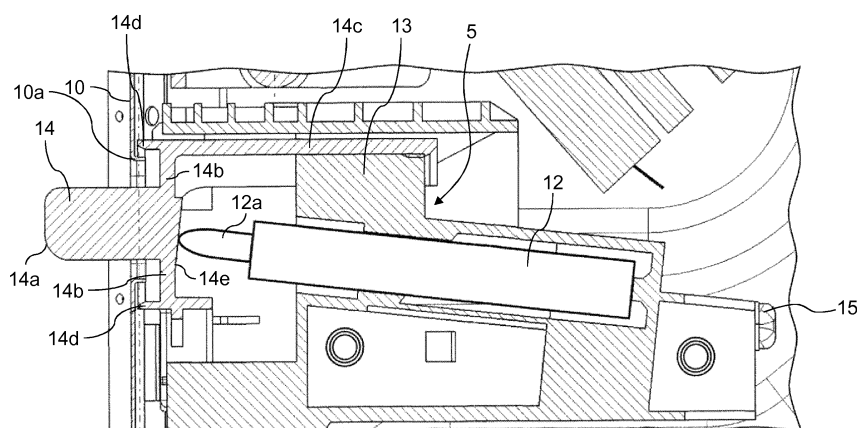
(30) Priority: **28.05.2015 JP 2015108878**

(54) **THERMAL COOKER**

(57) There is provided a heating cooker including: a heating chamber; a cooker body that has the heating chamber; a door of the cooker body that performs an opening operation and a closing operation with respect to a heating chamber opening which is provided on a front surface of the heating chamber; and damper unit (5) that is provided on the cooker body and comes into contact with the door before the door abuts on the cooker body during the closing operation of the door. Damper unit (5) includes damper (12) that has impact absorption tip portion (12a) which is contracted by impact; and damp-

er holder (13) that holds damper (12) and is attached to a heat insulation member which is disposed via space between the damper holder and a wall surface of the heating chamber. Damper unit (5) includes damper cap (14) that is always pressed in a direction in which the damper cap abuts on the door by impact absorption tip portion (12a), abuts on the door during the closing operation of the door, and slides with damper holder (13), and transfers impact during abutment on the door to impact absorption tip portion (12a).

FIG. 5



Description

TECHNICAL FIELD

[0001] The present disclosure relates to a heating cooker that heats and cooks an object to be heated which is a heating object in a heating chamber by using dielectric heating or the like, and particularly to a structure of a door that opens and closes the heating chamber.

BACKGROUND ART

[0002] As a typical heating cooker used in general households, there is a microwave oven which heats and cooks using dielectric heating. As the microwave oven in recent years, microwave ovens having an oven function by a heater and a steam function using steam along with a function of performing dielectric heating by microwave radiation into an object to be heated in a heating chamber have spread to general households.

[0003] In the microwave oven used in general households, as described above, a configuration having multiple functions is desired and further improvement in functionality, miniaturization, and improvement in operability are desired.

[0004] In a heating cooker used in general households, particularly in microwave ovens in the recent years, a multifunctional configuration such as the microwave oven function, the oven function, the steam function and the like are stored compactly inside a small-sized cooker casing. In addition, in such a microwave oven, since there is a high heat region inside the cooker casing, it is necessary to shut off heat from the high heat region for components that are susceptible to high heat such as electronic components. In addition, depending on the component, it is necessary to provide air cooling means such as a fan, and thus to actively cool down the component. Accordingly, in a highly functional heating cooker such as a microwave oven, despite having many components, component disposition is widely limited, which is an obstacle to miniaturization.

[0005] In the microwave oven, a door which opens and closes in order to bring an object to be heated into and out of the heating chamber is an important element from the viewpoint of operability by a user. In addition, in the microwave oven, microwaves are radiated into the heating chamber during a dielectric heating operation. Therefore, an opening and closing mechanism is provided between the door and the body which has a complicated configuration and has a towing means for the door and the body being reliably in contact with each other so as to prevent leakage of the microwave. Further, a mechanism that interlocks control of a heating operation according to an opening and closing operation of the door is provided in the door and the body so that the microwave radiation is reliably stopped when the user opens the door and the microwave radiation is in an enabled state when the user closes the door, for example.

[0006] As described above, in a multifunctional and highly functional heating cooker, in order to achieve miniaturization, it is necessary to efficiently dispose many components in a very small space. Accordingly, in the multifunctional and highly functional heating cooker, increasing operability and reliability while attaining miniaturization is an important issue in order to further promote the spread of the heating cooker.

[0007] In addition, in the heating cooker, in particular, increasing the operability and reliability in the opening and closing operation of the door which is frequently used by the user is an important issue. For example, during a closing operation of the door, on/off sound of a contact of the control switch for interlocking with the heating operation, collision sound generated when the door abuts on a body side, and vibration generated during the collision therebetween is uncomfortable to the user.

[0008] As described above, although various proposals have been made for mechanisms for reducing unpleasant sound generated during the opening and closing operation of the door, there has been a problem that the mechanism becomes large and complicate in order to interlock with the opening and closing mechanism of the door. Further, provision of such a mechanism within the casing of a multifunctional, highly functional, and small-sized heating cooker as described above is a major obstacle to achievement of miniaturization thereof due to limitation of disposition space and a disposition position.

Citation List

Patent Literature

[0009]

PTL 1: Japanese Patent Unexamined Publication No. 4-249091

PTL 2: Japanese Patent Unexamined Publication No. 2002-39541

SUMMARY OF THE INVENTION

[0010] The present disclosure has been made to solve the problems described above, and is to provide a heating cooker that has an excellent operability by a user, has high reliability, and has a small size by being capable of reducing unpleasant sound generated during the closing operation of the door, suppressing vibration during a closing operation of a door, and performing easy action with respect to limitation of disposition space and a disposition position.

[0011] According to the present disclosure, there is provided a heating cooker including: a heating chamber; a cooker body that has the heating chamber; a door of the cooker body that performs an opening operation and a closing operation with respect to a heating chamber opening which is provided on a front surface of the heat-

ing chamber; and a damper unit that is provided on the cooker body and comes into contact with the door before the door abuts on the cooker body during the closing operation of the door. The damper unit includes a damper that has an impact absorption tip portion which is contracted by impact; a damper holder that holds the damper and is attached to a heat insulation member which is disposed via space between the damper holder and a wall surface of the heating chamber; and a damper cap that is always pressed in a direction in which the damper cap abuts on the door by the impact absorption tip portion, abuts on the door during the closing operation of the door, and slides with the damper holder, and transfers impact during abutment on the door to the impact absorption tip portion.

[0012] With such a configuration, the heating cooker that has an excellent operability by the user, high reliability, and a small size by having a configuration that can reduce unpleasant sound being generated during the closing operation of the door, suppress vibration during the closing operation of the door, and performing easy action with respect to limitation of the disposition space and the disposition position can be provided.

BRIEF DESCRIPTION OF DRAWINGS

[0013]

FIG. 1 is a perspective view illustrating an external appearance of a heating cooker according to an embodiment of the present disclosure.

FIG. 2 is a front view illustrating an opened state in which the door is stopped at an opened position in the heating cooker according to the embodiment of the present disclosure.

FIG. 3 is a cross-sectional view illustrating a state during the closing operation of the door in the heating cooker according to the embodiment of the present disclosure, as viewed from the side.

FIG. 4 is a cross-sectional view illustrating a closed state of the door in the heating cooker according to the embodiment of the present disclosure, as viewed from the side.

FIG. 5 is a cross-sectional view illustrating a configuration of a damper unit in the heating cooker according to the embodiment of the present disclosure.

FIG. 6A is a front view illustrating an external appearance shape of the damper unit in the heating cooker according to the embodiment of the present disclosure.

FIG. 6B is a top view illustrating the external appearance shape of the damper unit in the heating cooker according to the embodiment of the present disclosure.

FIG. 6C is a right side view illustrating the external appearance shape of the damper unit in the heating cooker according to the embodiment of the present disclosure.

FIG. 6D is a perspective view illustrating the external appearance shape of the damper unit in the heating cooker according to the embodiment of the present disclosure, as viewed from the upper right side of the front surface side.

FIG. 6E is a perspective view illustrating the external appearance shape of the damper unit in the heating cooker according to the embodiment of the present disclosure, as viewed a right side surface from the upper side of the rear surface side.

FIG. 7 is a view illustrating a cooling passage of air flow from a fan which is a cooler in the heating cooker according to the embodiment of the present disclosure, as viewed from the right side.

DESCRIPTION OF EMBODIMENTS

[0014] Hereinafter, with reference to drawings, before describing embodiments according to the present disclosure in detail, various aspects of the present disclosure will be described.

[0015] First, according to a first aspect of the present disclosure, there is provided a heating cooker including: a heating chamber; a cooker body that has the heating chamber; a door of the cooker body that performs an opening operation and a closing operation with respect to a heating chamber opening which is provided on a front surface of the heating chamber; and a damper unit that is provided on the cooker body and comes into contact with the door before the door abuts on the cooker body during the closing operation of the door. The damper unit is configured to include a damper that has an impact absorption tip portion which is contracted by impact; a damper holder that holds the damper and is attached to a heat insulation member which is disposed via space between the damper holder and a wall surface of the heating chamber; and a damper cap that is always pressed in a direction in which the damper cap abuts on the door by the impact absorption tip portion, abuts on the door during the closing operation of the door, and slides with the damper holder, and transfers impact during abutment on the door to the impact absorption tip portion.

[0016] The heating cooker of the first aspect configured as described above can be configured to have an excellent operability, high reliability, and a small size by having a configuration that can reduce unpleasant sound and vibration generated during the closing operation of the door and perform easy action with respect to limitation of disposition space and a disposition position.

[0017] In a heating cooker according to a second aspect of the present disclosure, in the first aspect, the damper cap may have an abutment end that projects from a damper opening which is formed in a heating chamber outer edge portion which constitutes an outer peripheral portion of the heating chamber opening, in an opened state of the heating chamber, a flange portion that is formed at a base of the projection portion of the

abutment end and radially expands, and a slider that slides with the damper holder along with the contraction operation of the impact absorption tip portion after the abutment end is abutted on the door, during the closing operation of the door. The damper opening may be configured so as to be closed by the flange portion by the abutment end projecting.

[0018] The heating cooker of the second aspect configured as described above is configured so that penetration of moisture and foreign matter such as dust from the damper opening through which the abutment end of the damper cap projects is prevented, in the opened state of the heating chamber. Therefore, the heating cooker of the second aspect is configured so that mixing of foreign matter to the damper disposed inside the casing of the heating chamber outer edge portion is prevented, and thus reliability of the damper unit is increased, and therefore a configuration which increases the reliability of the heating cooker can be realized.

[0019] In a heating cooker according to a third aspect of the present disclosure, in the second aspect, a leakage prevention member may be provided so as to surround the heating chamber opening between the door and the heating chamber outer edge portion in the closed state of the door, and the damper opening may be configured to be disposed outside the leakage prevention member as viewed from the front surface, in the closed state of the door.

[0020] In the heating cooker of the third aspect configured as described above, in the closed state of the door, leakage of the moisture or the like from the heating chamber opening to the outside of the leakage prevention member is suppressed and penetration of moisture or the like into the damper unit or the like via the damper opening is prevented, and thus the reliability is increased.

[0021] In the second aspect or the third aspect, a heating cooker according to a fourth aspect of the present disclosure may further include a latch switch unit that interlocks a heating operation of the heating cooker with the opening and closing operation of the door. The latch switch unit may be configured so that start of the heating operation is in a startable state after detectors of the latch switch unit and the door come into contact with each other and may be configured so that the door and the detectors of the latch switch unit come into contact with each other, in an impact absorption state after the door and the abutment end are abutted on each other, in the closing operation of the door.

[0022] The heating cooker of the fourth aspect configured as described above is configured so that the door and the detectors of the latch switch unit come into contact with each other after the door comes into contact with the abutment end of the damper unit. Therefore, the heating cooker is configured so that the door comes into contact with the detectors of the latch switch unit, and thus the unpleasant sound that is generated during the abutment between the door and the latch switch unit on each other during the closing operation can be reliably

reduced, in an impact absorption state in which the door comes into contact with the damper unit, and thus the door moves slowly and smoothly.

[0023] In a heating cooker according to a fifth aspect of the present disclosure, in any one of the first to the fourth aspects, a cooler that cools by air flow may be disposed inside the cooker body, the damper may be held by the damper holder such that at least a portion thereof is exposed, and the damper may be disposed on a cooling passage of the air flow by the cooler.

[0024] In the heating cooker of the fifth aspect configured as described above, since the damper of the damper unit is reliably cooled by the cooler, the impact absorption capability as the damper is reliably performed and a heating cooker having a high reliability can be configured.

[0025] Here, as an embodiment according to the heating cooker of the present disclosure, a heating cooker having a dielectric heating function by microwaves, an oven function by heater heating, and a steam function by steam will be described.

[0026] The heating cooker of the present disclosure is not limited to the configuration of the heating cooker described in the following embodiments, but may include a heating cooker having each function alone, a heating cooker in which several functions are combined, or various heating cookers configured based on technical ideas equivalent to the technical features to be described in the following embodiments.

(Embodiment)

[0027] Hereinafter, with reference to the attached drawings, a heating cooker according to an embodiment of the present disclosure will be described in detail.

[0028] FIG. 1 is a perspective view illustrating an external appearance of heating cooker 50 according to an embodiment of the present disclosure.

[0029] As illustrated in FIG. 1, heating cooker 50 according to the embodiment has an opening (heating chamber opening 2a) on a front surface thereof which is a front surface of heating cooker 50 and is configured to have cooker body 1 including heating chamber 2 and door 3 which opens and closes heating chamber 2. Operation portion 4 which performs various operations such as cooking setting and cooking start of thermal cooking on a right side as viewed from a front surface thereof (this is an example and may be provided in other portions) is disposed on cooker body 1 according to the embodiment.

[0030] In heating cooker 50 of the present embodiment, in heating chamber 2 in which an object to be heated being a subject to be heated is accommodated and disposed, a microwave radiation port (not illustrated) which radiates microwaves is provided on a lower side of a bottom surface of heating chamber 2 and is configured to perform dielectric heating by the microwaves radiated from the microwave radiation port. In addition, a heater (not illustrated) which heats an inside portion of heating chamber 2 is provided on both the lower side of

the bottom surface and an upper side of a ceiling of heating chamber 2, and thus is configured so that oven cooking and grill cooking can be performed on the inside portion of heating chamber 2. Further, a steam blow-out port (not illustrated) is provided in the upper portion of heating chamber 2, and thus the heating cooker has a steam heating function.

[0031] Although not illustrated in the drawing, an interior light which illuminates the inside portion of heating chamber 2 and various sensors which detect a surface temperature of the object to be heated and an interior temperature (temperature inside heating chamber) are provided on a wall surface of heating chamber 2.

[0032] As illustrated in FIG. 1, in heating cooker 50 of the present embodiment, a rotation shaft (hinge) (not illustrated) is provided at a position on a lower side thereof with respect to heating chamber opening 2a in door 3. A user grips handle 3a on the upper side of door 3 and pulls handle 3a toward on the front side to open heating chamber opening 2a. Door 3 is connected to be rotatable to cooker body 1 by an opening and closing mechanism having a towing portion by which door 3 is stopped at an opened position where heating chamber opening 2a is fully opened, a closed position where heating chamber opening 2a is closed, and thus heating chamber 2 becomes a closed space, and a middle position in a state where door 3 is slightly opened for releasing hot air and steam in the heating chamber.

[0033] FIG. 2 is a front view illustrating the opened state in which door 3 is stopped at the opened position in heating cooker 50 according to the embodiment of the present disclosure.

[0034] In cooker body 1, heating chamber outer edge portion 10, which is the outer peripheral portion of heating chamber opening 2a of heating chamber 2, is configured to have a front surface side formed as a flat surface, and is configured to abut on and be in close contact with an inside wall surface of door 3 when door 3 is in the closed position. In the opened state of door 3 illustrated in FIG. 2, damper opening 10a from which abutment end 14a of damper cap 14 projects in damper unit 5 to be described below is formed on heating chamber outer edge portion 10 which constitutes an outer peripheral portion of heating chamber opening 2a. Even if the user releases his/her hand from door 3 just before the closed position during the closing operation of door 3, damper unit 5 has an impact absorption function to reliably close heating chamber opening 2a by door 3 by continuously rotating the closing operation slowly and smoothly. Therefore, even in a state where the user separates his/her hand from door 3 just before door 3 is in the closed position and door 3 is pulled by the towing portion of the opening and closing mechanism, door 3 is in an impact absorption state in which door 3 moves slowly, smoothly, and gently to the closed position without door 3 being abruptly closed and colliding with the cooker body 1.

[0035] In addition, two detectors 6 and 7 of latch switch unit 8 are provided in heating chamber outer edge portion

10. On the other hand, door 3 is provided with projection ends 11a and 11b corresponding to each of detectors 6 and 7 of latch switch unit 8 (see FIGS. 1, 3, or the like). In two detectors 6 and 7 of latch switch unit 8, upper detector 6 is a detecting portion for controlling on/off of an electric circuit of a control system corresponding to the opening and closing operation of door 3 and lower detector 7 is a detecting portion for controlling on/off of an electric circuit of an electric power system corresponding to the opening and closing operation of door 3.

[0036] In the opened state of door 3, a position of damper opening 10a from which abutment end 14a of damper unit 5 projects is provided in the vicinity of an upper portion of arm 21 of the opening and closing mechanism which is connected so that door 3 rotates about cooker body 1. In addition, damper opening 10a is disposed below detectors 6 and 7 of latch switch unit 8 (see FIG. 1). In the impact absorption state after abutment end 14a of damper unit 5 comes into contact with door 3 during the closing operation of door 3, detector 6 of the control system and detector 7 of the electric power system in latch switch unit 8 are configured respectively so that the respective electric circuits are in an activatable state by sequentially coming into contact with projection ends 11a and 11b provided on door 3.

[0037] As described above, in the present embodiment, in the impact absorption state in which door 3 is slowly and smoothly rotated in the closing operation of door 3, detector 6 and detector 7 in latch switch unit 8 are configured to be in contact with projection ends 11a and 11b provided on the door 3, respectively. Therefore, in the configuration of the embodiment, sound which is generated when detectors 6 and 7 come into contact with projection ends 11a and 11b, respectively, is greatly reduced, so that generation of unpleasant sound is suppressed by the user.

[0038] Annular gasket 9 is disposed on the inner wall surface of door 3 as a leakage prevention member. Gasket 9 is formed of an elastic body, for example, a rubber member, and is disposed so as to surround an outer periphery of heating chamber opening 2a of cooker body 1 in the closed state of door 3. In other words, in the closed state of door 3, gasket 9 which is a leakage prevention member is disposed between heating chamber outer edge portion 10 and the inner wall surface of door 3, surrounds heating chamber opening 2a, and thus moisture or the like from heating chamber opening 2a is prevented from leaking from a portion between cooker body 1 and door 3.

[0039] The disposition position of gasket 9 is a position outside heating chamber opening 2a, as viewed from the front surface and is a position inside damper opening 10a where abutment end 14a of damper unit 5 projects. In addition, the positions of detector 6 of the control system and detector 7 of the electric power system in latch switch unit 8 provided in heating chamber outer edge portion 10 are located outside gasket 9. Therefore, in the closed state of door 3, with respect to damper opening 10a of

abutment end 14a of damper unit 5, detector 6 of the control system, and detector 7 of the electric power system, penetration of moisture or the like from heating chamber 2 is prevented by gasket 9. In FIG. 2, the disposition position of gasket 9 in the closed state of door 3 is illustrated by disposition position 9A (two-dot chain line).

[0040] FIG. 3 and FIG. 4 are cross-sectional views of heating cooker 50 according to the embodiment of the present disclosure, as viewed from the side. FIG. 3 illustrates a state during the closing operation of door 3 and FIG. 4 illustrates a closed state in which heating chamber opening 2a on the front surface of heating chamber 2 of cooker body 1 is closed by the closing operation of door 3.

[0041] As illustrated in FIG. 3, abutment end 14a of damper unit 5 projects in a substantially horizontal direction as viewed from the side so as to come into contact with the inner surface of door 3 during the closing operation of door 3. Abutment end 14a is configured to attenuate a rotating force of door 3 in the rotating direction during the closing operation of door 3 after coming into contact with the inner wall surface of door 3.

[0042] In the closed state illustrated in FIG. 4, abutment end 14a of damper unit 5 is pressed by the inner wall surface of door 3 and is stored inside damper opening 10a. At this time, projection ends 11a and 11b of door 3 are also in contact with detector 6 of the control system and detector 7 of the electric power system in latch switch unit 8, respectively, and thus the circuits corresponding to the detectors respectively are in an activatable state.

[0043] As illustrated in FIG. 3 and FIG. 4, damper unit 5 is provided in the casing of cooker body 1 and in addition to latch switch unit 8, various components such as the electric circuit of the control system and the electric circuit of the electric power system, magnetron 16 which is a microwave generator for generating a microwave, fan 17 (see FIG. 7) which is a cooler for cooling magnetron 16, electronic components, or the like, and the like are disposed in the space on the right surface side as viewed from the front surface of heating chamber 2. In addition, a plurality of heaters 18 and 19 are provided at positions above and below the heating chamber 2, respectively.

[0044] The components such as damper unit 5, latch switch unit 8, electric circuit, and fan 17, which are described above are attached to heat insulation plate 20 which is a heat insulation member provided via an air layer between the wall surface of heating chamber 2 and the components so that heat from the wall surface of heating chamber 2 is not directly transferred to the components. In addition, air flow from fan 17 which is a cooler flows to the electric circuit, damper unit 5, and latch switch unit 8 to cool the respective components after cooling magnetron 16.

[0045] In the configuration of the present embodiment, as described above, detector 6 of the control system in latch switch unit 8 projects in the door direction (front direction of heating chamber 2) from heating chamber outer edge portion 10 of heating chamber 2. On the other

hand, in door 3, projection end 11a is provided at a position corresponding to detector 6 of the control system. During the closing operation of door 3, the arm portion of latch switch unit 8 is configured to rotate by detector 6 of the control system being pressed by projection end 11a provided on door 3. By interlocking with the rotation of the arm portion of latch switch unit 8, the switch mechanism of the electric circuit of the control system operates, and the on/off control of the control system is performed.

[0046] In addition, detector 7 of the electric power system in the latch switch unit 8 is formed in the heating chamber outer edge portion 10 of the heating chamber 2 and projection end 11b is provided at a position corresponding to the detector 7 of the electric power system in the door 3. In the closed state of door 3, the projection end 11b of door 3 is introduced into detector 7 of the electric power system, the switching mechanism of the electric circuit of the electric power system in latch switch unit 8 is switched, and the on/off control of the electric power system is performed.

[0047] In the inside portion of door 3 in the present embodiment, a microwave leakage prevention mechanism (not illustrated) is provided at a position facing heating chamber outer edge portion 10 of heating chamber 2 in the closed state of door 3. In the closed state of door 3, the microwave leakage mechanism prevents leakage of microwaves from the inside portion of heating chamber 2 from a position between heating chamber outer edge portion 10 and the inner wall surface of door 3.

[0048] Here, the configuration of damper unit 5 will be described.

[0049] FIG. 5 is a cross-sectional view illustrating a configuration of damper unit 5 according to the embodiment of the present disclosure.

[0050] Damper unit 5 includes damper 12 that has impact absorption tip portion 12a that absorbs impact by contracting when damper unit 5 abuts on door 3, damper holder 13 that holds damper 12 and attaches damper 12 to heat insulation plate 20 (refer to FIG. 3 and FIG. 4) which is a heat insulation member, and damper cap 14 which is always pressed in a direction in which damper cap 14 is in contact with door 3 by impact absorption tip portion 12a of damper 12.

[0051] Damper cap 14 has abutment end 14a which can be in contact with door 3 and projects from damper opening 10a of heating chamber outer edge portion 10 in the opened state of door 3, flange portion 14b that is formed to be radially expanded at the outer peripheral portion of the base of the projection portion of abutment end 14a, and slider 14c that slides along a linear groove formed on damper holder 13. Abutment end 14a, flange portion 14b and slider 14c are integrally formed in damper cap 14 by resin molding.

[0052] During the closing operation of door 3, after abutment end 14a comes into contact with door 3, slider 14c is configured to slide in a straight line shape along the groove formed in damper holder 13 along with the

contraction operation of impact absorption tip portion 12a. In addition, flange portion tip 14d is formed at the outer peripheral end portion of flange portion 14b and flange portion tip 14d constitutes the position of the end portion on the front surface side of slider 14c. Pressing surface 14e is formed on a side opposite to abutment end 14a of damper cap 14 which is always pressed by impact absorption tip portion 12a of damper 12, and pressing surface 14e is formed on a position of a back surface side of the base of the projection portion of abutment end 14a, that is, on the rear surface side of flange portion 14b.

[0053] Damper cap 14 configured as described above is configured to slide and move with respect to damper holder 13 in the front and rear direction of heating chamber 2 (actual pressing direction of abutment end 14a with respect to door 3). Damper holder 13 is positioned by abutting on positioning projection 15 formed on heat insulation plate 20. Accordingly, damper holder 13 is reliably attached to a predetermined position of heat insulation plate 20.

[0054] Damper 12 used in damper unit 5 in the present embodiment is an oil damper and has a configuration in which impact absorption tip portion 12a moves in a contraction direction to attenuate the impact during the abutment. In the present disclosure, although an example in which an oil damper is used as damper 12 is described, the configuration of the present disclosure is not limited to the oil damper, and as long as a damper has an impact absorption function by which the impact during the abutment between door 3 and abutment end 14a is absorbed and door 3 can be slowly and smoothly shifted to the closed state, the damper is appropriately used in consideration of the specification, shape, and the like thereof.

[0055] As illustrated in FIG. 5, damper cap 14 having abutment end 14a is always pressed by impact absorption tip portion 12a of damper 12 and is in contact with the inside surface of heating chamber outer edge portion 10 which is an outer peripheral portion of heating chamber opening 2a, in the opened state of door 3. In the opened state of door 3, flange portion tip 14d formed at the front surface side end portion of slider 14c of damper cap 14 is reliably in contact with the inner surface of heating chamber outer edge portion 10.

[0056] As illustrated in FIG. 5, damper opening 10a which is formed in heating chamber outer edge portion 10 and from which abutment end 14a of damper cap 14 projects is formed by an edge portion thereof being bent inward. Flange portion 14b is formed so as to radially expand from the base of the projection portion of abutment end 14a that can project from damper opening 10a and flange portion tip 14d that projects toward door 3 side is formed on an outer peripheral edge of flange portion 14b so as to surround heating chamber outer edge portion 10 (see FIG. 6D). Since flange portion tip 14d projects in a direction of the inner surface of heating chamber outer edge portion 10 where damper opening 10a is formed, damper cap 14 is pressed by damper 12

and flange portion tip 14d is reliably in contact with the inner surface of heating chamber outer edge portion 10, in the opened state of door 3.

[0057] As described above, in the opened state of door 3, flange portion tip 14d is reliably in contact with the inner surface of heating chamber outer edge portion 10, and thus damper opening 10a is closed by flange portion 14b. Therefore, moisture and foreign matter due to steam or the like from heating chamber 2 are prevented from penetrating into the inside of heating chamber outer edge portion 10 through damper opening 10a, and in particular, from penetrating into damper unit 5. Accordingly, since damper opening 10a is reliably closed by flange portion 14b, damper 12 that suppresses vibration is configured so that penetration of the oil and foreign matter such as dust in addition to moisture that has a fear that the function thereof may be degraded is reliably prevented, in the opened state of door 3.

[0058] In damper unit 5 of heating cooker 50 of the present embodiment, the projection direction of impact absorption tip portion 12a of damper 12 is an upward inclined direction as viewed from the side. In addition, pressing surface 14e of damper cap 14 that is always pressed by impact absorption tip portion 12a of damper 12 is formed on a surface orthogonal to the projecting direction of impact absorption tip portion 12a. Therefore, pressing surface 14e is a surface inclined in the pressing direction (substantially horizontal direction) of abutment end 14a, which is the front and rear direction of heating chamber 2 of damper cap 14. In other words, pressing surface 14e is formed in an inclined surface shape in the sliding direction of damper cap 14. As described above, pressing surface 14e of damper cap 14 which is always pressed by the impact absorption tip portion 12a is set to a surface orthogonal to the projecting direction of impact absorption tip portion 12a, and is set to a surface inclined in the pressing direction of abutment end 14a. Accordingly, the heating cooker is configured to be capable of increasing the tolerance of the disposition position of damper unit 5 in a state where the impact absorption capability of damper 12 is maintained. It is preferable that pressing surface 14e of damper cap 14 is provided at an inclined angle of about ± 10 degrees in the pressing direction (substantially horizontal direction) of abutment end 14a.

[0059] FIG. 6A to FIG. 6E are views illustrating a specific configuration of damper unit 5 in heating cooker 50 according to the embodiment of the present disclosure. FIG. 6A is a front view, FIG. 6B is a top view, and FIG. 6C is a right side view thereof. In addition, FIG. 6D is a perspective view as viewed from the upper right side of the front surface side and FIG. 6E is a perspective view as viewed the right side surface from the upper side of the rear surface side.

[0060] As illustrated in FIGS. 6A to 6E, damper 12, damper holder 13, and damper cap 14 are unitized and miniaturized in damper unit 5 and are configured to be capable of being easily attached to a desired position. In

addition, in damper unit 5, damper holder 13 attached to heat insulation plate 20 is disposed between damper 12 and heat insulation plate 20 and the side surface portion of damper 12 on a side opposite to heat insulation plate 20 is widely opened. Accordingly, a configuration in which heat transfer from heating chamber 2 is prevented can be realized and the heating cooker is configured to be reliably cooled by fan 17 (see FIG. 7) which is a cooler that forms air flow flowing along heat insulation plate 20 which is a heat insulation member.

[0061] FIG. 7 is a view illustrating a cooling passage of the air flow from fan 17 which is a cooler in heating cooker 50 according to the embodiment of the present disclosure, as viewed from the right side.

[0062] FIG. 7 illustrates a state in which the cover of the casing of cooker body 1 on the right side surface of heating cooker 50 is removed. In the configuration of heating cooker 50 illustrated in FIG. 7, fan 17 which is a cooler, is provided on the rear surface side of the right side surface as viewed from the front surface. The air flow blown out from fan 17 passes through a duct provided on the rear surface side and is blown out from a plurality of duct air outlets 17a to a desired cooling passage. In FIG. 7, the air flow from duct air outlet 17a mainly flows in the cooling passage in the direction indicated by the arrow. Magnetron 16, an electric circuit including electronic components connected to latch switch unit 8, heat insulation plate 20, and damper unit 5 are disposed on the cooling passage.

[0063] In heating cooker 50 of the present embodiment configured as described above, unpleasant sound and vibration generated during the closing operation of door 3 can be reliably reduced and even in a state where the disposition space and the disposition position are limited, easy action can be performed. In addition, in the embodiment, in the closed state of door 3, there is a configuration in which penetration of moisture or the like into the inside portion of the casing via damper opening 10a of abutment end 14a of damper unit 5 is prevented. Therefore, the heating cooker 50 of the embodiment has an excellent operability, high safety, high reliability, and a small size.

[0064] As described above, in the heating cooker, since it is necessary to have a multifunctional high function and a small size and furthermore, there is a high heat region, there is a problem that the component disposition is greatly limited. However, in the heating cooker of the present disclosure, by providing a small-sized damper unit having a splash-proof and dust-proof effect and high placement tolerance with a simple configuration, a small-sized and highly reliable heating cooker can be configured.

[0065] As described above, in the heating cooker of the present disclosure, unpleasant sound generated during the closing operation of the door can be reliably reduced, vibrations during the closing operation of the door can be suppressed, easy action with respect to the limitation of the disposition space and the disposition position can be performed and further, penetration of foreign

matter into the inside portion of the casing can be prevented. Therefore, the heating cooker of the present disclosure is a small-sized heating cooker with high reliability, which has an operability by the user.

[0066] Hereinafter, although the present invention has been described in each embodiment in detail with a certain degree, the disclosure contents of these embodiments should be changed according to details of the composition, and combination of the elements in each embodiment and changes in order may be realized without departing from the scope and spirit of the invention as claimed.

INDUSTRIAL APPLICABILITY

[0067] As described above, according to the present disclosure, configurations that can reduce unpleasant sound generated during the closing operation of the door, suppress vibrations during the closing operation of the door, and perform easy action with respect to the limitation of the disposition space and the disposition position are provided, and thus special effects that have excellent operability by the user and have high reliability are obtained. Therefore, since the present disclosure can be applied to various heating cookers including a microwave oven which is a microwave heating apparatus and a small-sized and highly reliable heating cooker can be provided on the market, the heating cooker of the present disclosure is useful.

REFERENCE MARKS IN THE DRAWINGS

[0068]

35	1	cooker body
	2	heating chamber
	2a	heating chamber opening
	3	door
	3a	handle
40	4	operation portion
	5	damper unit
	6, 7	detector
	8	latch switch unit
	9	gasket
45	9A	disposition position
	10	heating chamber outer edge portion
	10a	damper opening
	11a, 11b	projection end
	12	damper
50	12a	impact absorption tip portion
	13	damper holder
	14	damper cap
	14a	abutment end
	14b	flange portion
55	14c	slider
	14d	flange portion tip
	14e	pressing surface
	15	positioning projection

16 magnetron (microwave generation means)
 17 fan (cooler)
 17a duct air outlet
 18, 19 heater
 20 heat insulation plate (heat insulation mem-
 ber)
 21 arm
 50 heating cooker

Claims

1. A heating cooker comprising:

a heating chamber;
 a cooker body that has the heating chamber;
 a door of the cooker body, the door performing
 an opening operation and a closing operation
 with respect to a heating chamber opening
 which is provided on a front surface of the heat-
 ing chamber; and
 a damper unit that is provided on the cooker
 body and comes into contact with the door be-
 fore the door abuts on the cooker body during
 the closing operation of the door,
 wherein the damper unit includes:

a damper that has an impact absorption tip
 portion which is contracted by impact;
 a damper holder that holds the damper and
 is attached to a heat insulation member
 which is disposed via space between the
 damper holder and a wall surface of the
 heating chamber; and
 a damper cap that is always pressed in a
 direction in which the damper cap abuts on
 the door by the impact absorption tip por-
 tion, abuts on the door during the closing
 operation of the door, and slides with the
 damper holder, and transfers impact during
 abutment on the door to the impact absorp-
 tion tip portion.

2. The heating cooker of Claim 1,

wherein the damper cap includes
 an abutment end that projects from a damper open-
 ing which is formed in a heating chamber outer edge
 portion which constitutes an outer peripheral portion
 of the heating chamber opening, in an opened state
 of the heating chamber;
 a flange portion that is formed at a base of a projec-
 tion portion of the abutment end and radially ex-
 pands; and
 a slider that slides with the damper holder along with
 a contraction operation of the impact absorption tip
 portion after the abutment end is abutted on the door,
 during the closing operation of the door, and
 wherein the damper opening is configured so as to

be closed by the flange portion by the abutment end
 projecting.

3. The heating cooker of Claim 2,

wherein a leakage prevention member is provided
 so as to surround the heating chamber opening be-
 tween the door and the heating chamber outer edge
 portion, in the closed state of the door, and
 wherein the damper opening is disposed outside the
 leakage prevention member as viewed from the front
 surface, in the closed state of the door.

4. The heating cooker of Claim 2 or 3, further compris- ing:

a latch switch unit that interlocks a heating op-
 eration of the heating cooker with the opening
 and closing operation of the door,
 wherein the latch switch unit is configured so
 that start of the heating operation is in a startable
 state after a detector of the latch switch unit and
 the door come into contact with each other, and
 is configured so that the door and the detectors
 of the latch switch unit come into contact with
 each other, in an impact absorption state after
 the door and the abutment end are abutted on
 each other, in the closing operation of the door.

5. The heating cooker of any one of Claims 1 to 4,

wherein a cooler that cools by air flow is disposed
 inside the cooker body,
 wherein the damper is held by the damper holder
 such that at least a portion of the damper is exposed,
 and
 wherein the damper is disposed on a cooling pas-
 sage of the air flow by the cooler.

FIG. 1

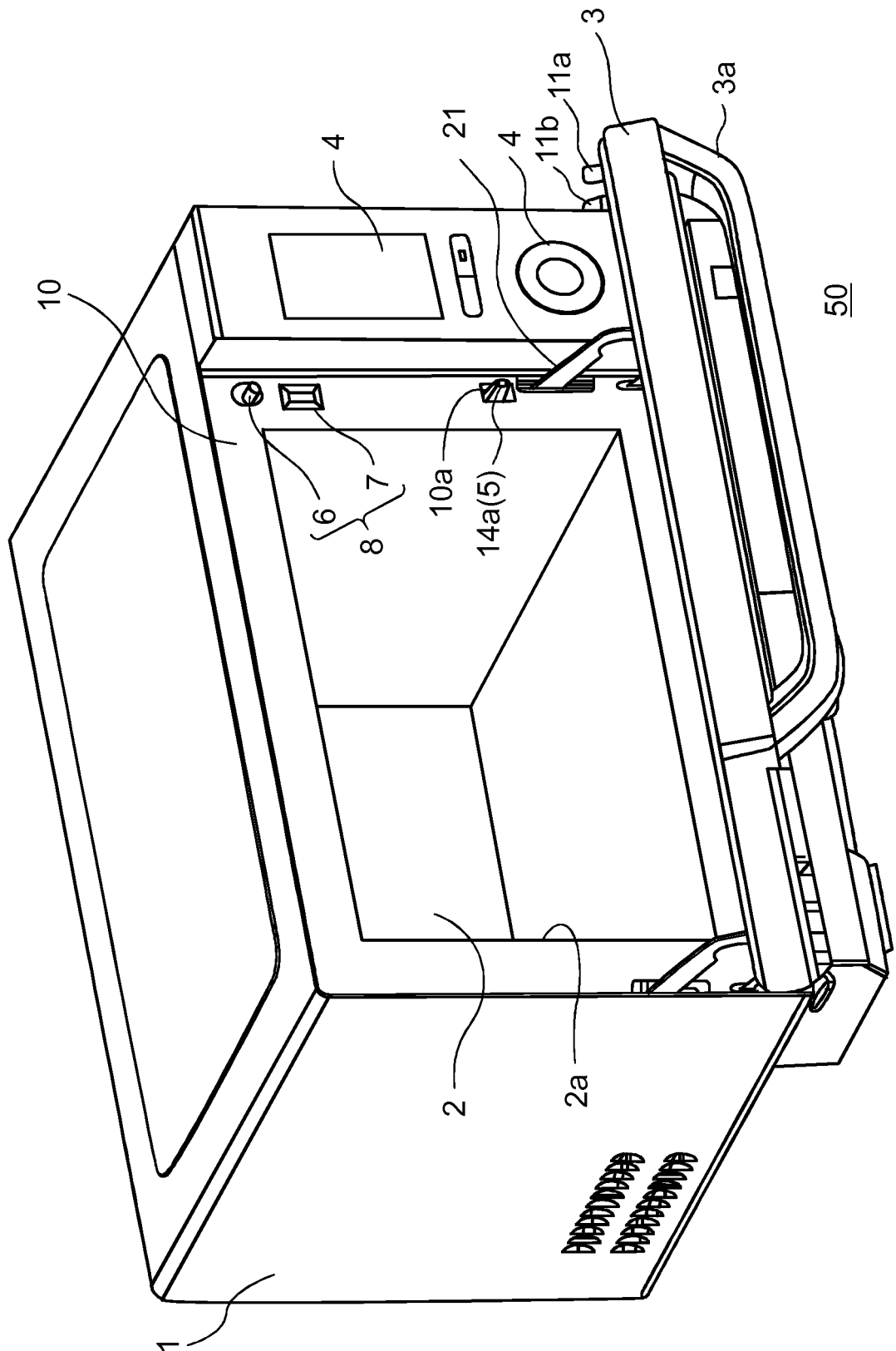


FIG. 2

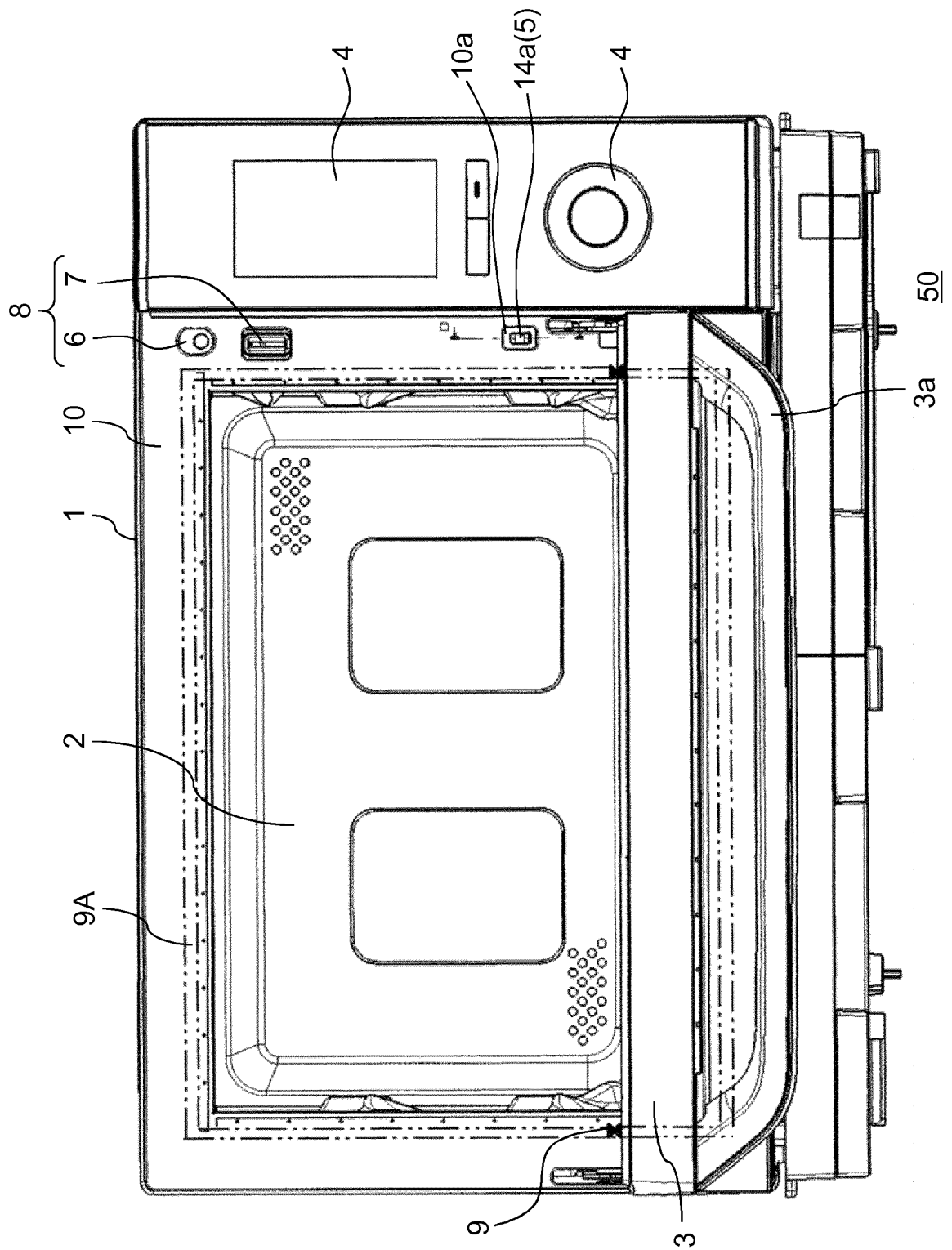


FIG. 3

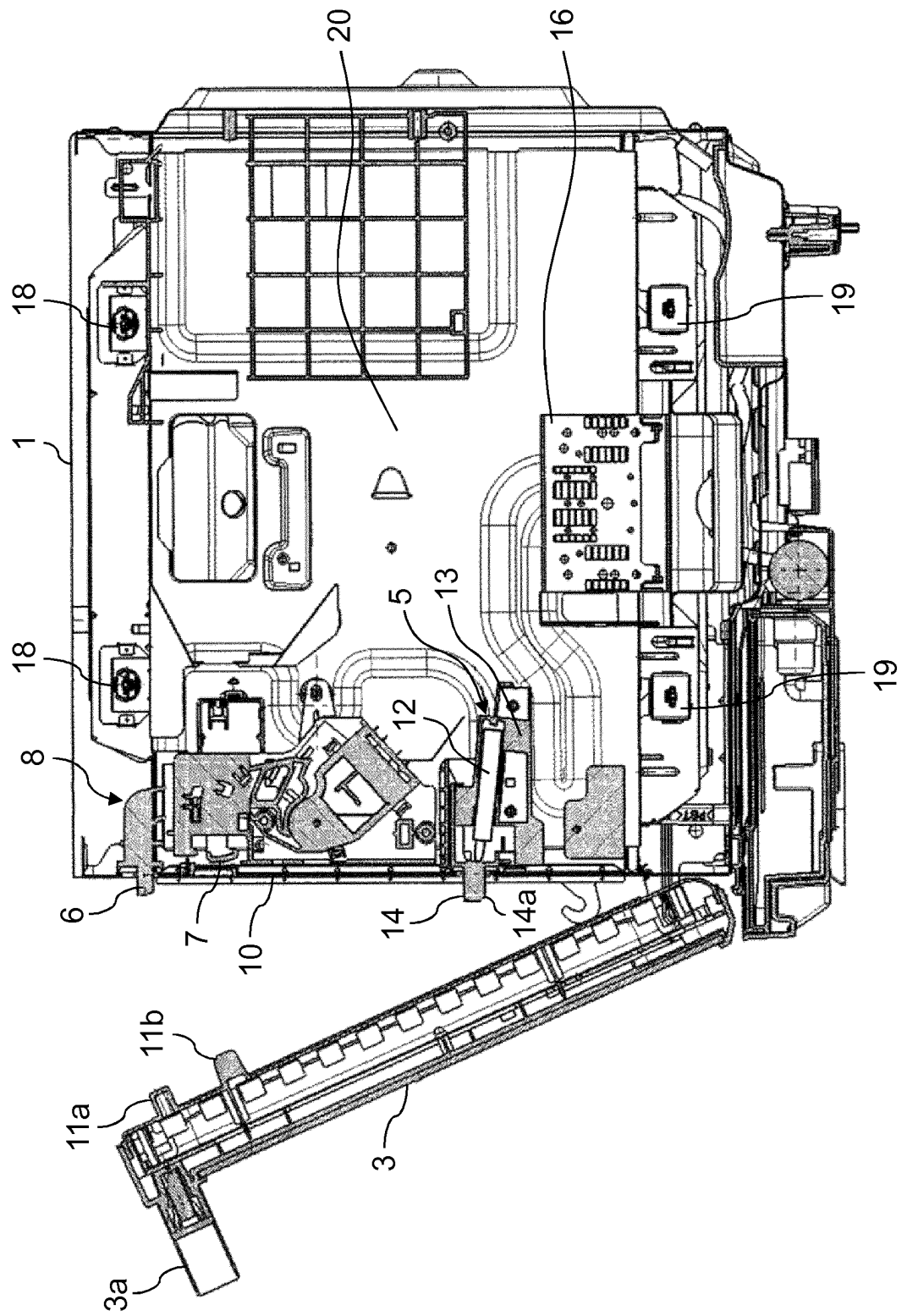


FIG. 4

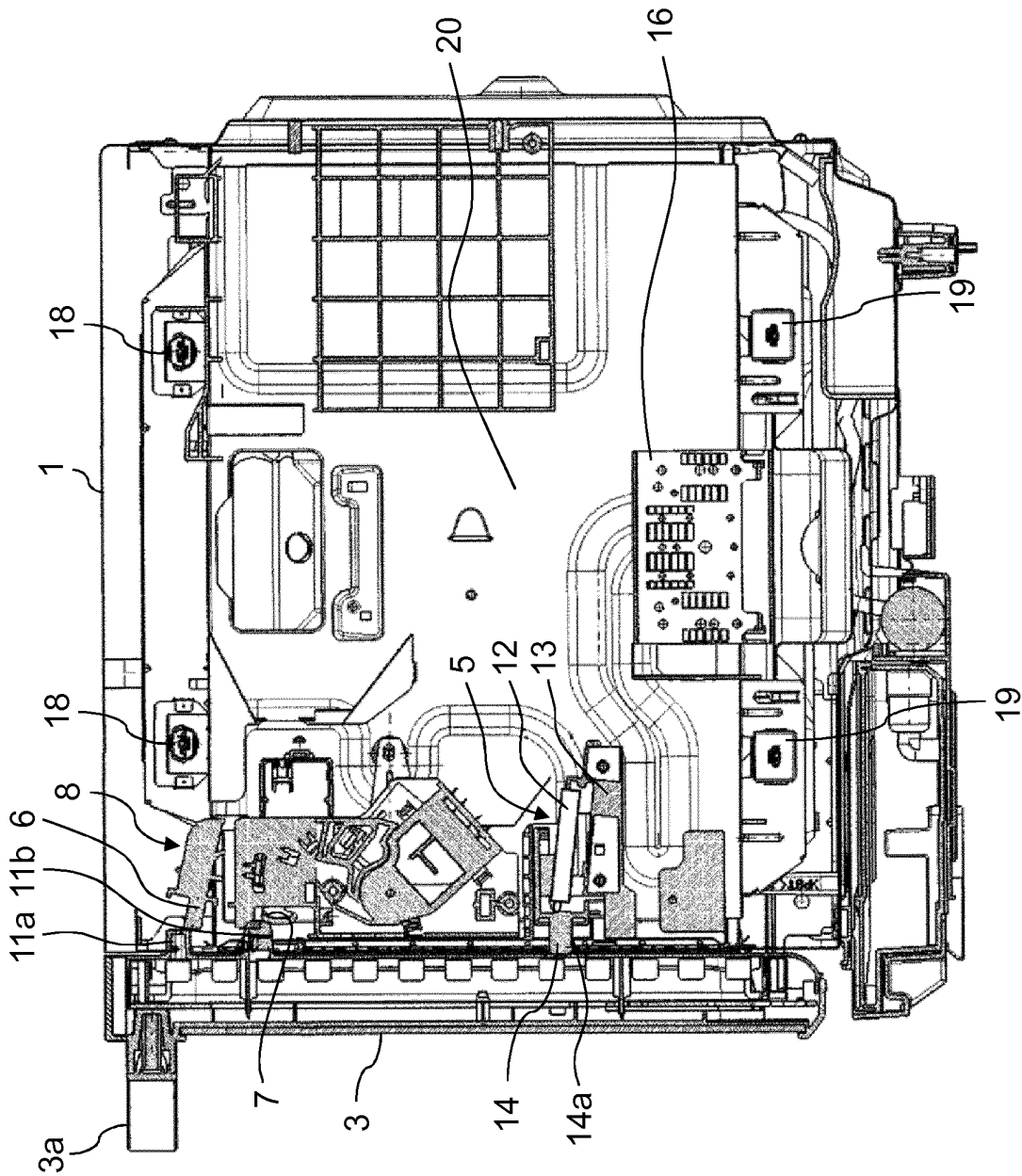


FIG. 5

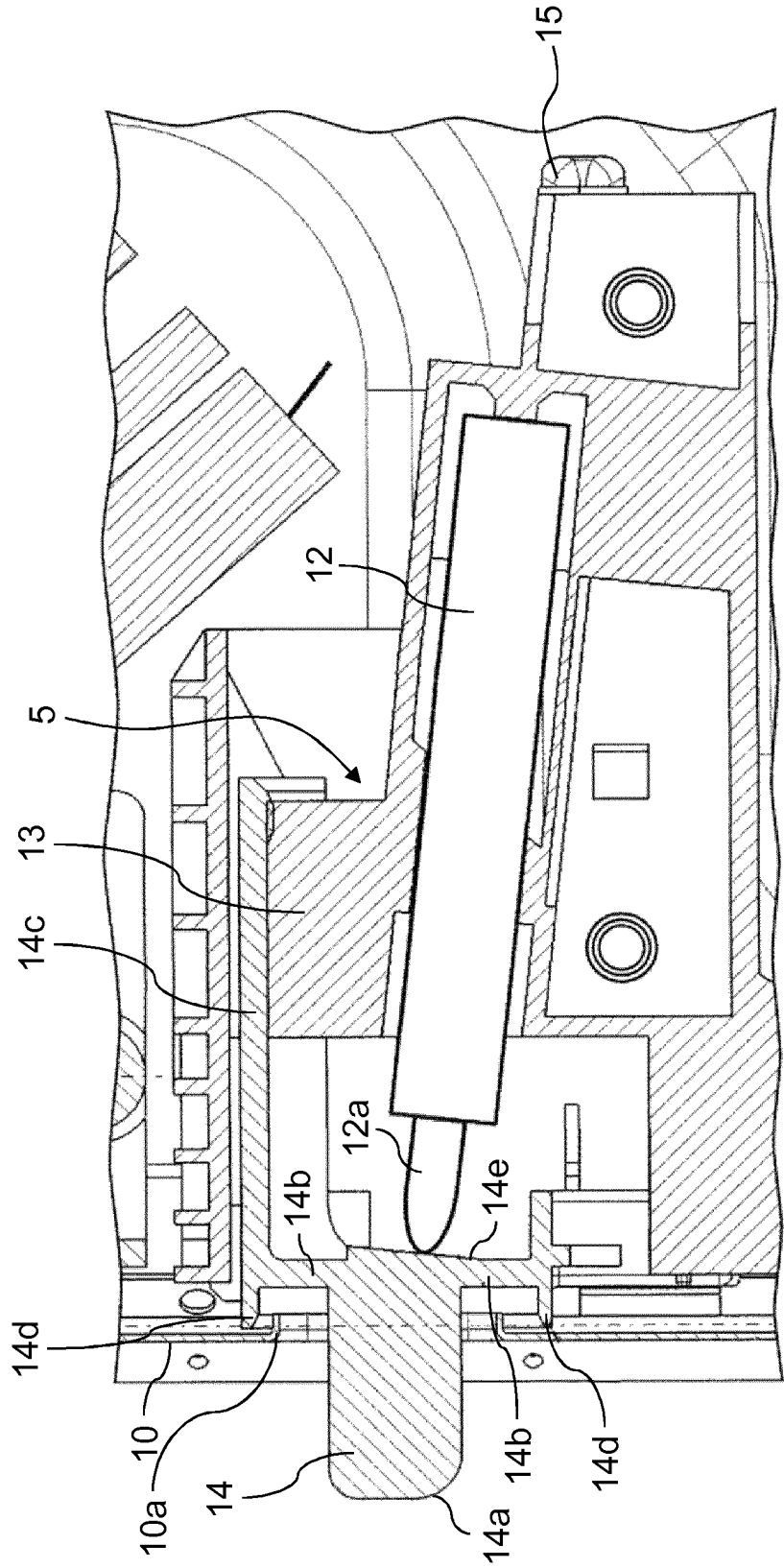


FIG. 6B

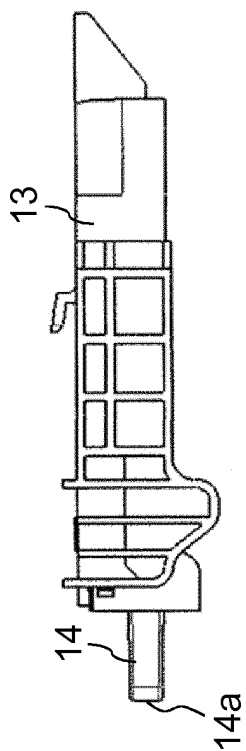


FIG. 6D

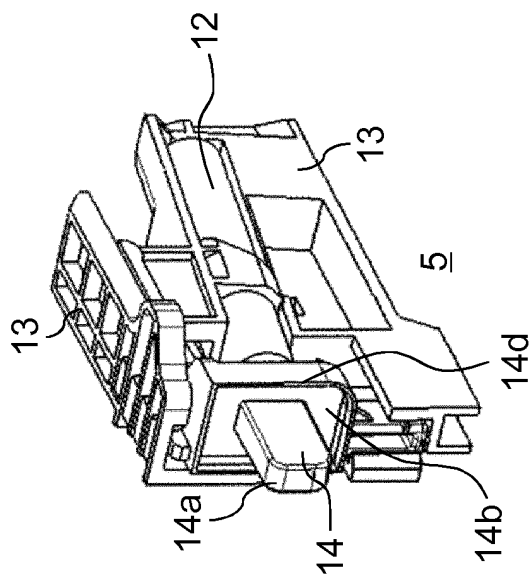


FIG. 6C

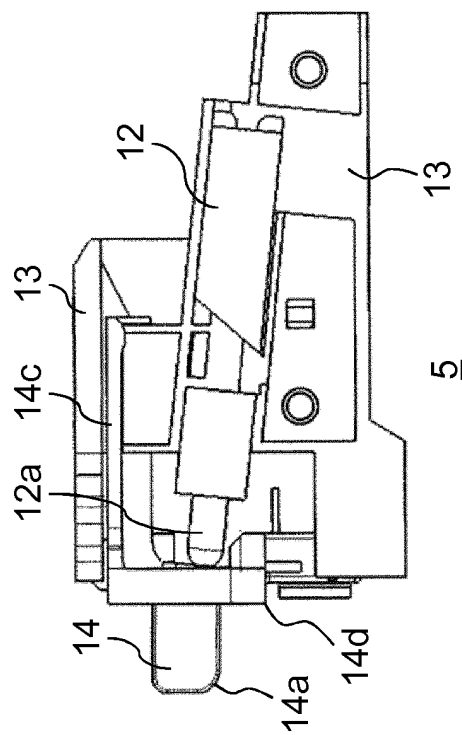


FIG. 6A

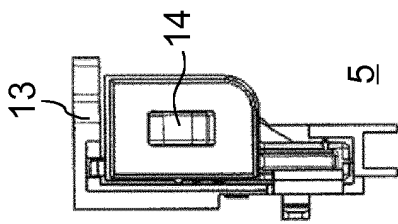


FIG. 6E

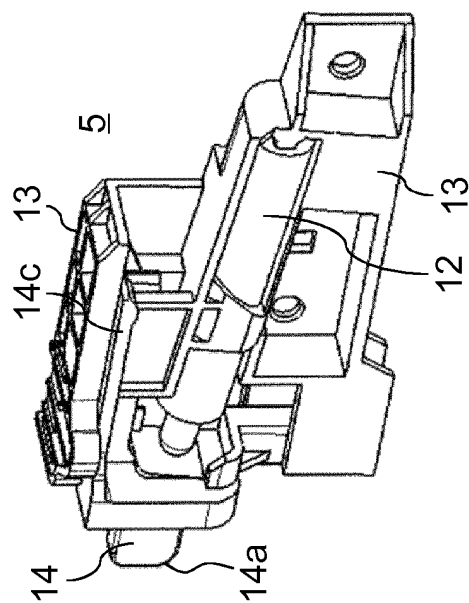
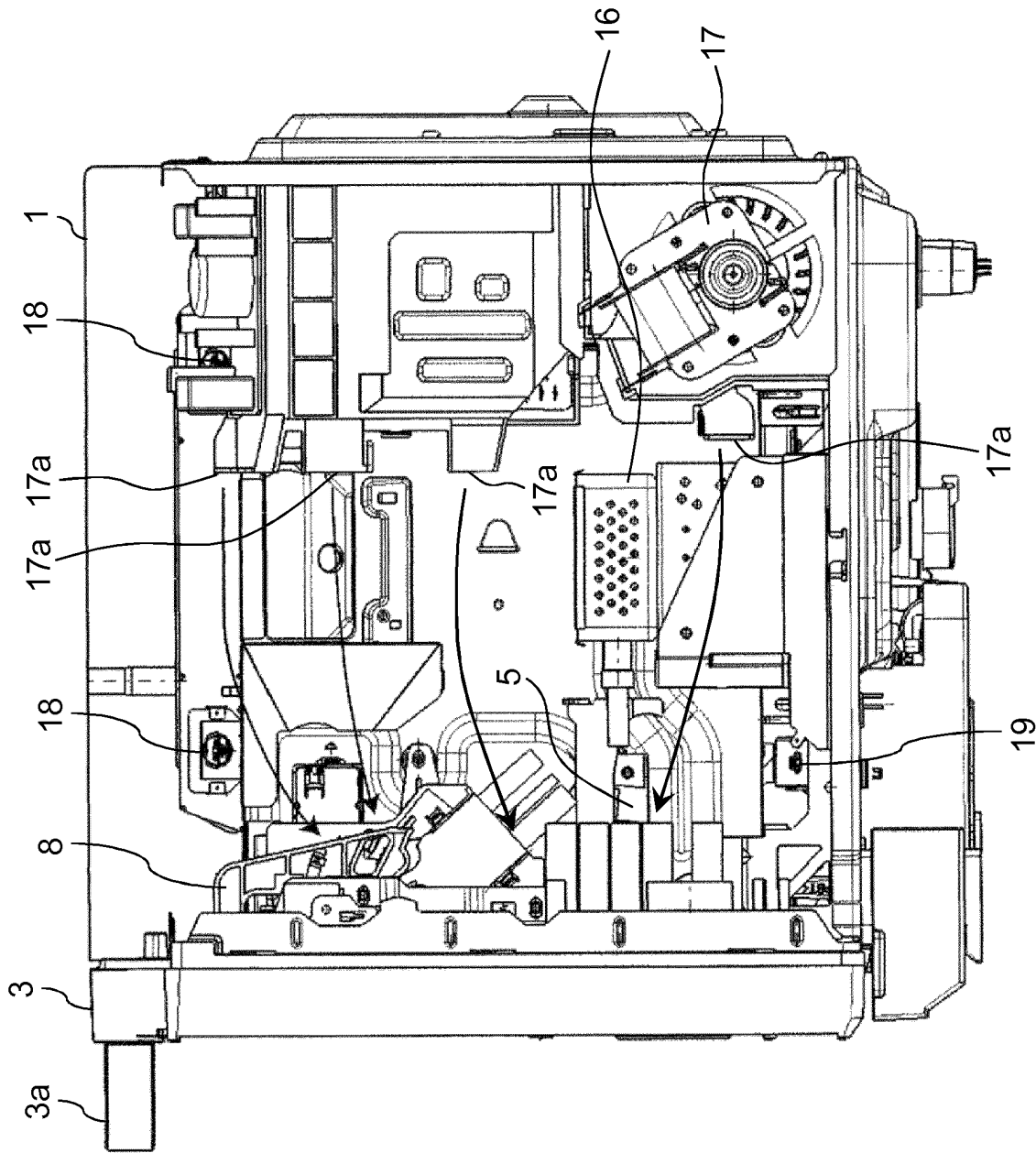


FIG. 7



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2016/002507

A. CLASSIFICATION OF SUBJECT MATTER

F24C7/02(2006.01)i, F24C15/02(2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F24C7/02, F24C15/02

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

Jitsuyo Shinan Koho	1922-1996	Jitsuyo Shinan Toroku Koho	1996-2016
Kokai Jitsuyo Shinan Koho	1971-2016	Toroku Jitsuyo Shinan Koho	1994-2016

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 A	JP 2002-039541 A (Matsushita Electric Industrial Co., Ltd.), 06 February 2002 (06.02.2002), paragraph [0003]; fig. 6 (Family: none)	1 2-5
Y A	JP 2011-042978 A (Murakoshi Mfg., Corp.), 03 March 2011 (03.03.2011), claim 8; fig. 6, 9 (Family: none)	1 2-5
A	JP 58-004289 A (Matsushita Electric Industrial Co., Ltd.), 11 January 1983 (11.01.1983), entire text; all drawings (Family: none)	1-5

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

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"&" document member of the same patent family

Date of the actual completion of the international search
09 August 2016 (09.08.16)Date of mailing of the international search report
23 August 2016 (23.08.16)Name and mailing address of the ISA/
Japan Patent Office
3-4-3, Kasumigaseki, Chiyoda-ku,
Tokyo 100-8915, Japan

Authorized officer

Telephone No.

REFERENCES CITED IN THE DESCRIPTION

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- JP 2002039541 A [0009]