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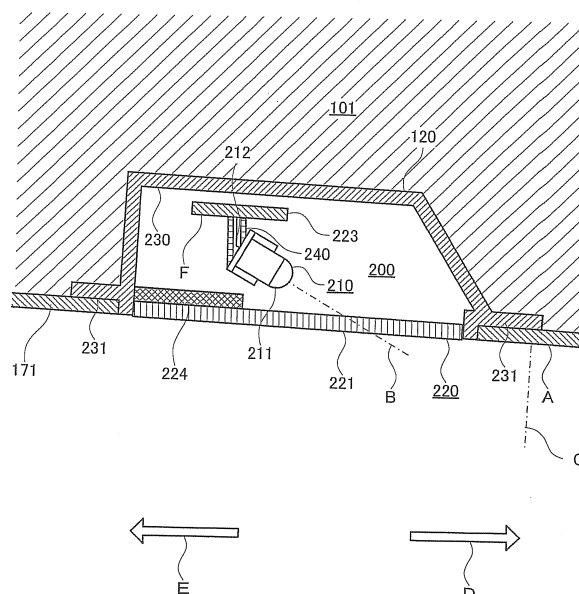
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(54) **REFRIGERATOR**

(57) The invention relates to a refrigerator (100) which includes: a main body (101) which includes an opening in a front face, and a semiconductor light-emitting device (210) which is disposed near the opening on an inner wall of the main body (101) and emits light toward a back of the main body (101). The refrigerator (100) comprises: a cover (220) which includes a light-transmission part (221) which transmits light emitted from the semiconductor light-emitting device (210), the cover (220) isolating the semiconductor light-emitting device (210) from an atmosphere inside the main body (101), and a blocking member (224) which is disposed closer to the opening of the refrigerator (100) than the light-transmission part (221) is, the blocking member (224) hindering a clear view of inside beyond the cover (220).

FIG. 11



Description**[Citation List]****[Technical Field]****[Patent Literature]**

[0001] The present invention relates to refrigerators, and particularly to a refrigerator including a semiconductor light-emitting device which illuminates the inside of the refrigerator.

5 **[0008]**

[PTL 1] Japanese Unexamined Patent Application Publication No. 2001-82869

[PTL 2] Japanese Unexamined Patent Application Publication No. 2007-187363

[Background Art]

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[0002] Conventionally, refrigerators including semiconductor light-emitting devices which irradiate the inside of the refrigerators with light are known. For example, PTL 1 discloses a refrigerator including a lighting device which has, on the top face of the inside of the refrigerator, a light-emitting diode that is a semiconductor light-emitting device. The semiconductor light-emitting device is disposed such that the light axis of the irradiated light is directed to the vertical direction. The light is emitted downward in the vertical direction, and thus it is possible to brightly illuminate the inside of the refrigerator.

[Summary of Invention]**[Technical Problem]**

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[0009] In order to improve visibility inside the refrigerator, many of the recent refrigerators adopt a structure in which the light is irradiated from the front side (opening-side) toward the back of the refrigerator. However, when such a structure is adopted, there is a case where a portion of the inside of the refrigerator is felt dark. Although the darkness inside the refrigerator can be removed by increasing the number of the semiconductor light-emitting devices arranged or emission intensity of the semiconductor light-emitting devices, increase in the power consumption is caused and thus it is not desirable.

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[0003] Furthermore, when the semiconductor light-emitting device is provided in the refrigerator, a cover is generally provided to protect the semiconductor light-emitting device from dew condensation and the like.

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[0004] Further, PTL 1 discloses a refrigerator including a lighting device which includes, on the top face of the inside of the refrigerator, a light-emitting diode that is a semiconductor light-emitting device. The semiconductor light-emitting device is attached to a board such that a board face on which the semiconductor light-emitting device is attached and a light axis of the semiconductor light-emitting device perpendicularly cross each other.

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[0005] Furthermore, for example, PTL 2 discloses a refrigerator including a lighting unit which includes: a plurality of light-emitting diodes that are the semiconductor light-emitting devices arranged in a vertical direction in a recessed part which is provided on a sidewall of the refrigerator; and a cover which covers the entire light-emitting diodes.

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[0010] In view of this, the inventors of the present invention have found the following phenomenon through diligent research and experiments. Specifically, in order to irradiate light from the front side (opening-side) toward the back of the refrigerator, the semiconductor light-emitting device is disposed so as to have a light axis which inclines toward the back of the refrigerator. On the other hand, the cover which covers the front of the semiconductor light-emitting device is disposed along a face of an inner wall. In this case, much of the light emitted from the semiconductor light-emitting device reflects off the cover. As a result, a quantity of light which irradiates the inside of the refrigerator decreases. Thus, the inside of the refrigerator is dark.

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[0006] The cover has a function to isolate the atmosphere around the light-emitting diodes from the atmosphere inside the refrigerator so that condensation is not formed on the light-emitting diodes and the board that are disposed inside the refrigerator that is kept in temperatures lower than a room temperature. On the other hand, the light emitted from the light-emitting diode needs to be transmitted so as to illuminate the inside of the refrigerator. Thus, the cover is formed with a transparent resin that transmits visible light.

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[0011] As described, the conventional refrigerator has a problem that the illuminance in the back is not increased, even when the semiconductor light-emitting device is disposed in a slanted state in order to increase the illuminance in the back.

[0012] The present invention has been conceived in view of the above, and has a first object to provide a refrigerator which includes a cover that can reduce the decrease in illuminance of light emitted from the semiconductor light-emitting device, even when the semiconductor light-emitting device is disposed in a slanted state.

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[0007] Furthermore, in the refrigerator described in PTL 2, the light-emitting diodes are arranged on the front side (opening-side) of the refrigerator in order to improve visibility inside the refrigerator. The structure in which the light is irradiated from the front side toward the back of the refrigerator has been widely adopted.

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[0013] Furthermore, when a semiconductor light-emitting device is attached to a board according to the conventional structure described above, the board needs to be slanted at a large angle.

[0014] In this case, the board projects into the inside of the refrigerator and thus an inner volume of a refrigerator is reduced. Furthermore, an action of taking an

item in and out of the refrigerator can be hindered. The projection of the board into the inside of the refrigerator can be reduced by providing a recessed part in an inner wall of the refrigerator and housing the slanted board. However, the recessed part needs to have a great depth to allow the board to be slanted sufficiently. This impairs heat-insulation properties of the refrigerator.

[0015] The present invention has been conceived in view of the above-described problems and has a second object to provide a refrigerator which can reduce the amount of projection of the board into the inside of the refrigerator and reduce the depth of the recessed part, even when the semiconductor light-emitting device is disposed in a slanted state.

[0016] Furthermore, when a structure in which a lighting unit is disposed near the opening of the refrigerator is adopted, the distance between the user of the refrigerator and the semiconductor light-emitting device is small. Thus, there is a case where the user feels that the light emitted from the semiconductor light-emitting device is too bright and find it difficult to see the items stored inside the refrigerator. Furthermore, the user can view the semiconductor light-emitting device, the board on which the semiconductor light-emitting device is attached, wiring, and the like. This is undesirable in the light of aesthetics of the refrigerator.

[0017] The present invention has been conceived in view of the above-described problems and has a third object to provide a refrigerator which does not cause the user of the refrigerator to feel that the light emitted from the semiconductor light-emitting device is too bright and which does not degrade the aesthetics appreciated when the door of the refrigerator is opened, even when the semiconductor light-emitting device is disposed near the opening of the refrigerator.

[Solution to Problem]

[0018] In order to achieve the aforementioned first object, the refrigerator according to the present invention is a refrigerator which includes: a main body which includes an opening in a front face; a semiconductor light-emitting device which is disposed on an inner wall of the main body and emits light toward an inside of the main body; and a cover which isolates the semiconductor light-emitting device from an atmosphere inside the main body, wherein the cover includes: a light-transmission part which is tabular-shaped, transmits light emitted from the semiconductor light-emitting device, and is disposed such that a transmission axis is inclined toward a back of the main body more than an inner wall axis is, the transmission axis being an axis perpendicular to an outer face of the light-transmission part that faces the inside of the main body, and the inner wall axis being an axis perpendicular to a face of the inner wall on which the semiconductor light-emitting device is disposed; and a support part which is attached to the main body and supports the light-transmission part with respect to the main

body, and the semiconductor light-emitting device is disposed so as to have a light axis which extends in the same direction as the transmission axis or is inclined toward the opening more than the transmission axis is.

[0019] With this, much of the light emitted from the light semiconductor light-emitting device is transmitted along the transmission axis of the light-transmission part and the back side of the refrigerator is irradiated. Thus, much of the light emitted from the semiconductor light-emitting device is not reflected off the cover, and thus the back side of the refrigerator is directly irradiated with light. This makes it possible to increase the brightness inside the refrigerator without increasing the power consumption.

[0020] Further, it is preferable that the refrigerator further include a recessed part which is a recess provided in the inner wall of the main body and in which the semiconductor light-emitting device is housed, wherein a portion of the light-transmission part in a depth direction is located inside the recessed part.

[0021] With this, the semiconductor light-emitting device is disposed in the recessed part. Thus, the semiconductor light-emitting device can be disposed without sacrificing the storage space inside the refrigerator. Furthermore, when the light axis of the semiconductor light-emitting device is inclined toward the opening more than the transmission axis of the light-transmission part is, the depth of the recessed part can be reduced. Thus, it is possible to reduce the degradation of the heat-insulation properties of the refrigerator. Further, although the cover including the light-transmission part which is slanted with respect to the inner wall is adopted, the amount of the cover that projects to the inside beyond the face of the inner wall can be reduced. Thus, the cover member is less likely to hinder the action of taking a storage item in and out of the refrigerator and it is possible to provide a large storage space in the refrigerator.

[0022] In order to achieve the aforementioned second object, the refrigerator according to the present invention is a refrigerator including: a main body which includes an opening in a front face; a semiconductor light-emitting device which is disposed near the opening on an inner wall of the main body and emits light toward an inside of the main body; and a cover which isolates the semiconductor light-emitting device from an atmosphere inside the main body, the refrigerator includes a board which is tabular-shaped and on which the semiconductor light-emitting device and wiring for supplying power to the semiconductor light-emitting device are provided, the board being disposed such that (i) a face of the inner wall on which the semiconductor light-emitting device is attached and (ii) a board face that is a face of the board on which the semiconductor light-emitting device is attached are parallel to each other, wherein the semiconductor light-emitting device is disposed so as to have a light axis which is inclined toward a back of the main body more than an inner wall axis is, the inner wall axis being an axis perpendicular to the face of the inner wall.

[0023] With this, even when the semiconductor light-

emitting device is disposed so as to have the light axis which inclines, from near the opening, toward the back of the refrigerator, it is possible to reduce the amount of projection of the board into the inside of the refrigerator because the board is disposed such that the board face is parallel to the face of the inner wall of the refrigerator. Furthermore, in the case where the recessed part is provided in the inner wall of the refrigerator and the board is disposed inside the recessed part, it is possible to reduce the depth of the recessed part.

[0024] The semiconductor light-emitting device may include: a light-emitting portion; and a lead wire provided to project from the light-emitting portion. The refrigerator may further include an intermediate member which protects the lead wire and fastens the light-emitting portion with respect to the board.

[0025] With this, even when the board and the light-emitting portion are arranged at a distance from each other and the board and the light-emitting portion are physically connected by the lead wire, the lead wire is protected by the intermediate member. This makes it possible to prevent a short circuit which occurs when some member unexpectedly contacts the lead wire. Furthermore, the intermediate member makes it possible to reduce large vibrations of the light-emitting portion caused by vibrations that are generated in the refrigerator by a compressor or the like.

[0026] In order to achieve the aforementioned third object, the refrigerator according to the present invention is a refrigerator including: a main body which includes an opening in a front face; and a semiconductor light-emitting device which is disposed near the opening on an inner wall of the main body and emits light toward a back of the main body, the refrigerator includes: a cover which includes a light-transmission part which transmits light emitted from the semiconductor light-emitting device, the cover isolating the semiconductor light-emitting device from an atmosphere inside the main body; and a blocking member which is disposed closer to the opening of the refrigerator than the light-transmission part is, the blocking member hindering a clear view of inside beyond the cover.

[0027] With this, the light emitted from the semiconductor light-emitting device and transmitted through the light-transmission part is irradiated from near the opening of the refrigerator toward the back of the refrigerator. Thus, the storage items inside the refrigerator can be brightly illuminated. On the other hand, the light that would directly hit the eyes of the user of the refrigerator is reduced by the blocking member. Thus, the user can see the items stored in the refrigerator without feeling that the light is too bright. Furthermore, the blocking member hinders a clear view of the inside beyond the cover for the user, and thus the degradation of the aesthetics due to the semiconductor light-emitting device and the like can be reduced. With the design of the blocking member, the aesthetics of the refrigerator when the door is opened can be maintained or improved.

[0028] Further, the refrigerator may include a base which is attached to the inner wall of the main body and integrally includes the blocking member, the base holding the semiconductor light-emitting device.

5 **[0029]** With this, it is possible to hinder a clear view of inside beyond the cover without increasing the number of components. Thus the above-described function and effect can be achieved at a low cost.

10 **[0030]** Furthermore, the blocking member may be formed integrally with the cover. In other words, the blocking member may be a portion of the cover.

[0031] With this, it is possible to hinder a clear view of inside beyond the cover without increasing the number of components. Thus the above-described function and effect can be achieved at a low cost.

15 **[0032]** Further, the blocking member may be a portion of a surface of the cover, the portion having depressions and projections which cause irregular reflection of light.

20 **[0033]** With this, the depressions and projections on the surface of the cover cause irregular reflection of light, and a clear view of inside beyond the cover is hindered. Thus, the similar function and effect as above can be produced. Further, a new design can be presented on the portion of the refrigerator which can easily catch the eye of the user of the refrigerator. This makes it possible to improve the aesthetics of the refrigerator at a low cost.

25 **[0034]** Furthermore, the blocking member may be made from a material different from the light-transmission part.

30 **[0035]** With this, for example, it is possible to form a portion of the cover with a material that transmits no light at all so that the portion serves as the blocking member. Thus, it is possible to hinder a clear view of inside beyond the cover with a state in which the line of sight of the user of the refrigerator is completely blocked. Furthermore, the blocking member can also be colored. Thus, it is possible to increase flexibility in creating a design and improve the aesthetics of the refrigerator when the door is opened.

[Advantageous Effects of Invention]

[0036] According to the present invention, the light emitted by a semiconductor light-emitting device can be efficiently transmitted to an inside of a refrigerator, and the inside of the refrigerator can be brightly illuminated without an increase in power consumption.

45 **[0037]** Furthermore, according to the present invention, a light axis of the semiconductor light-emitting device is disposed in a direction crossing a normal to a board face of a board. This makes it possible to reduce an amount of projection of the board to the inside of the refrigerator. In addition, it is possible to decrease the depth of a recessed part.

50 **[0038]** Furthermore, the present invention has an object to provide a refrigerator which does not cause the user of the refrigerator to feel that the light emitted from the semiconductor light-emitting device is too bright even

when the semiconductor light-emitting device is disposed near an opening of the refrigerator and which does not degrade the aesthetics appreciated when the door of the refrigerator is opened.

[Brief Description of Drawings]

[0039]

[FIG. 1] FIG. 1 is a plane view showing a front of a refrigerator according to an embodiment of the present invention.

[FIG. 2] FIG. 2 is a plane view showing a front of a sub-body which makes up a refrigerating compartment.

[FIG. 3] FIG. 3 is a plane view showing a cross section of the sub-body which makes up the refrigerating compartment as seen from the side.

[FIG. 4] FIG. 4 is a plane view showing, from above, a cross-section (corresponding to G-G line shown in FIG. 3) of the sub-body which makes up the refrigerating compartment.

[FIG. 5] FIG. 5 is a plane view showing, from above, a cross-section of a lighting unit disposed on an inner wall of the main body.

[FIG. 6] FIG. 6 is a perspective view showing a cover.

[FIG. 7] FIG. 7 is a plane view showing, from above, a cross-section of a lighting unit disposed on an inner wall of the main body.

[FIG. 8] FIG. 8 is a plane view showing, from above, a cross-section of a lighting unit disposed on an inner wall of the main body.

[FIG. 9] FIG. 9 is a plane view showing a front of a sub-body which makes up a refrigerating compartment.

[FIG. 10] FIG. 10 is a plane view showing a cross section of the sub-body which makes up the refrigerating compartment as seen from the side.

[FIG. 11] FIG. 11 is a plane view showing a cross section of a lighting unit disposed in the inner wall of the main body as seen from the side.

[FIG. 12] FIG. 12 is a partially cut away plane view schematically showing, from the side, a state in which a board and a semiconductor light-emitting device are connected.

[FIG. 13] FIG. 13 is a diagram showing an intermediate member. (a) in FIG. 13 is a plane view showing a cross section (the direction shown in FIG. 12) of the intermediate member as seen from the side. (b) in FIG. 13 is a plane view showing the intermediate member as seen from the front.

[FIG. 14] FIG. 14 is a plane view showing a cross section of a lighting unit disposed in the inner wall of the main body as seen from the side.

[FIG. 15] FIG. 15 is a plane view showing a front of a sub-body which makes up the refrigerating compartment.

[FIG. 16] FIG. 16 is a plane view showing, from

above, a cross-section of the sub-body which makes up the refrigerating compartment.

[FIG. 17] FIG. 17 is a plane view showing, from above, a cross-section of a lighting unit disposed on an inner wall of a main body.

[FIG. 18] FIG. 18 is a perspective view showing a cover.

[FIG. 19] FIG. 19 is a plane view showing, from above, a cross-section of a lighting unit disposed in the inner wall of the main body.

[FIG. 20] FIG. 20 is a perspective view schematically showing a state of a lighting unit and the vicinity of the lighting unit, before a main body is assembled.

[FIG. 21] FIG. 21 is a plane view showing, from above, a cross-section of a lighting unit disposed in the inner wall of the main body.

[FIG. 22] FIG. 22 is a plane view showing, from above, a cross-section of a lighting unit disposed in the inner wall of the main body according to another embodiment.

[Description of Embodiments]

(Embodiment 1)

[0040] The following describes an embodiment of a refrigerator according to the present invention with reference to the drawings.

[0041] FIG. 1 is a plane view showing the front of the refrigerator according to an embodiment of the present invention.

[0042] As shown in the drawing, a refrigerator 100 according to this embodiment includes a main body 101 which has an opening in a front face. Furthermore, the main body 101 includes a plurality of sub-bodies which are formed by partitioning the inside of the main body 101 into compartments.

[0043] Here, the main body 101 is a body that has an opening in the front face, and has heat-insulation properties that shut off heat coming in and out of the refrigerator 100. As the cross-section shown in the circle in the drawing shows, the main body 101 includes: an inner case 171 that is a vacuum formed body of resin such as ABS; an outer case 172 using a metal material such as precoated steel plate; and a heat-insulating material 173 which is provided between the inner case 171 and the outer case 172.

[0044] The each of the sub-bodies included in the refrigerator 100 forms, according to the function (cooling temperature), one of a refrigerating compartment 102, an ice compartment 105, a switchable compartment 106 provided beside the ice compartment 105 and which allows switching of inside temperature, a vegetable compartment 104, and a freezing compartment 103.

[0045] At the front opening of the refrigerating compartment 102, a rotational heat-insulating door 107 filled with foam insulation such as urethane is provided. Note that, as with the main body 101, the heat-insulating door

107 is configured of: an inner plate made of resin (not shown); an outer plate made of metal (not shown); and a heat-insulating material provided between the inner plate and the outer plate (not shown).

[0046] Furthermore, a drawer is provided for each of the front opening of the ice compartment 105, the switchable compartment 106, the vegetable compartment 104, and the freezing compartment 103. The ice compartment 105, the switchable compartment 106, the vegetable compartment 104, and the freezing compartment 103 are respectively sealed, in a manner which allows opening and closing, by a front panel 108 having heat-insulation properties so that cool air does not leak out.

[0047] FIG. 2 is a plane view showing the front of the sub-body which makes up the refrigerating compartment.

[0048] FIG. 3 is a plane view showing a cross section of the sub-body which makes up the refrigerating compartment as seen from the side.

[0049] As shown in these drawings, the refrigerator 100 includes a lighting unit 200 which is disposed in the inner wall of the main body 101 and illuminates the inside of the main body 101 from near the opening of the main body 101 toward the back of the main body. Furthermore, inside the main body 101, the refrigerator 100 includes, in a detachable and attachable manner, shelf plates 110 on which storage items are placed. Specifically, five shelf plates 110 each of which is tabular-shaped and made of glass are provided in the refrigerating compartment 102.

[0050] FIG. 4 is a plane view showing, from above, a cross-section (a cross section taken along G-G line shown in FIG. 3) of the sub-body which makes up the refrigerating compartment.

[0051] As shown in the drawing, the lighting unit 200 is buried in a recessed part 120. The recessed part 120 is provided in each of the side walls each of which is one of the inner walls of the main body 101.

[0052] FIG. 5 is a plane view showing, from above, a cross-section of a lighting unit disposed in the inner wall of the main body.

[0053] As shown in the drawing, the lighting unit 200 is a unit which illuminates inside of the main body 101 and includes a semiconductor light-emitting device 210 and a cover 220.

[0054] FIG. 6 is a perspective view showing a cover.

[0055] The cover 220 is a member which isolates the semiconductor light-emitting device 210 from the atmosphere inside the main body 101. With this, even when damp air enters inside of the main body 101, it is possible to prevent dew from adhering to the semiconductor light-emitting device 210 and a board 223 on which the semiconductor light-emitting device 210 is attached. In this embodiment, the cover 220 is a tabular-shaped member which covers the inside of the main body 101 side of the semiconductor light-emitting device 210. The cover 220 is obtained by molding a resin and includes a light-transmission part 221 and a support part 222.

[0056] The light-transmission part 221 is a portion of the cover 220 and transmits light which is emitted from

the semiconductor light-emitting device 210. As shown in FIG. 5, the light-transmission part 221 is a portion which is disposed such that a transmission axis A is inclined toward a back (arrow D side in FIG. 5) more than an inner wall axis C is. The transmission axis A is an axis perpendicular to an outer face of the light-transmission part that faces the inside of the main body, and the inner wall axis C is an axis perpendicular to a face of the inner wall of the refrigerating compartment 102 on which the semiconductor light-emitting device 210 is disposed. The light-transmission part 221 is made of a transparent resin which allows visible light to be transmitted.

[0057] The support part 222 is a portion of the cover 220 attached to the main body 101 and supports the light-transmission part 221 with respect to the main body 101. In this embodiment, the support part 222 is formed integrally with the light-transmission part 221 by molding a resin.

[0058] Furthermore, the support part 222 positioned closer to the back of the main body 101 is shaped so as to be in close contact with the inner wall that forms the recessed part 120. With this, in a state in which the cover 220 is attached, the light is not transmitted through the support part 222 that is disposed along the shape of the recessed part 120.

[0059] Note that the support part 222 need not be formed integrally with the light-transmission part 221, but may be a member which supports the light-transmission part 221 which is provided as a separate unit.

[0060] The semiconductor light-emitting device 210 is a light-emitting device which generates light and emits the light toward the inside of the main body 101. In this embodiment, a light emitting diode (LED) is adopted as the semiconductor light-emitting device 210. A plurality of the semiconductor light-emitting devices 210 are arranged on the board 223 which has a thin, elongated rectangular shape.

[0061] In this embodiment, the semiconductor light-emitting device 210 is disposed so as to be housed in the recessed part 120 (see FIG. 5) which is a recess provided in an inner wall of the main body 101. Furthermore, the semiconductor light-emitting device 210 is disposed such that a light axis B inclines toward the opening (arrow E in FIG. 5) more than a transmission axis A is. The light axis B is the center axis of light emitted from the semiconductor light-emitting device 210, and the transmission axis A is a normal to the outer surface of the light-transmission part 221.

[0062] Furthermore, the semiconductor light-emitting devices 210 are arranged in a vertical line at predetermined intervals, and are disposed closer to the opening than the shelf plate 110 is (see FIG. 3). Furthermore, at least some of the semiconductor light-emitting devices 210 are arranged at the same height as the height at which the shelf plates 110 are positioned, so that the light axis B is oriented to the shelf plate 110 (see FIG. 3). With this, it is possible to reduce darkness inside the refrigerator caused by a generation of a shadow of the shelf

plate 110. More specifically, the shelf plate 110 is made from a transparent material such as glass. However, there is a case where a perimeter of the shelf plate 110 is surrounded by a frame which does not transmit light well. When the height of the semiconductor light-emitting device 210 approximately agrees with the height of the shelf plate 110, the shadow of the frame made by the light emitted from the semiconductor light-emitting device 210 is cast along the shelf plate 110 and is not cast over other shelf plate or the like.

[0063] Note that it is preferable that at least the height of the shelf plate 110 positioned at the highest position and the semiconductor light-emitting device 210 positioned at the highest position be the same. With this, the shadow of the frame in the front of the shelf plate 110 positioned at the highest position is less likely to be cast over the top face inside the refrigerator 100. This allows greater quantity of light to reflect off the top face of the refrigerator 100, and thus the whole area inside the refrigerator can be brightly illuminated.

[0064] Here, it is preferable that the semiconductor light-emitting device 210 be disposed so as to have a light axis B which extends in the same direction as the transmission axis A or is inclined toward the opening more than the transmission axis A is. This is because a portion of the light emitted from the semiconductor light-emitting device 210 is blocked by the support part 222 of the cover 220 and thus the inside of the main body 101 cannot be efficiently illuminated, when the semiconductor light-emitting device 210 is disposed such that the light axis B has a greater incline toward the back (arrow D in FIG. 5) than the transmission axis A is. Furthermore, it is possible to dispose the semiconductor light-emitting device 210 in the recessed part 120 even when the depth of the recessed part 120 is small, by disposing the semiconductor light-emitting device 210 so as to have the light axis B which is inclined toward the opening more than the transmission axis A is. This makes it possible to reduce the degradation of heat-insulation properties of the refrigerator 100.

[0065] The light which is emitted from the semiconductor light-emitting device 210 can be efficiently transmitted and the inside of the main body 101 can be brightly illuminated, by providing in the cover 220, which covers the semiconductor light-emitting device 210 having the light axis B which inclines, from near the opening of the main body 101, toward the back of the main body, the light-transmission part 221 having the transmission axis A which is inclined toward the back of the main body more than the light axis B is. Furthermore, since the whole part of the light-transmission part 221 is disposed in the recessed part 120, the cover 220 does not project beyond the face of the inner wall of the main body 101. Thus, it is possible to provide a large space in the main body 101 and prevent the light-transmission part 221 and the support part 222 from becoming an obstacle at the time of taking a storage item in and out of the main body 101.

[0066] Furthermore, the support part 222 that is posi-

tioned closer to the back is disposed so as to be in close contact with the inner wall which forms the recessed part 120. Thus, a shadow is less likely to be made by the support part 222. As a result, the light emitted from the semiconductor light-emitting device 210 efficiently illuminates the inside of the refrigerator compartment 102, and the inside of the refrigerator can be brightly illuminated.

[0067] Furthermore, since the light axis B of the semiconductor light-emitting device 210 is inclined toward the opening more than the transmission axis A of the light-transmission part 221 is, it is possible to reduce the depth of the recessed part 120 and thus it is possible to reduce degradation of the heat-insulation properties of the refrigerator.

[0068] Note that the present invention is not limited to the embodiment described above. For example, as shown in FIG. 7, the semiconductor light-emitting device 210 may be disposed without providing the recessed part 120 in the face of the inner wall of the main body 101, and the area around the semiconductor light-emitting device 210 may be covered by the cover 220. In this case, too, the light-transmission part 221 is disposed such that the transmission axis A is inclined toward the back D more than an inner wall axis C is. Furthermore, the light-transmission part 221 is disposed such that the transmission axis A is inclined toward the back D more than the light axis B of the semiconductor light-emitting device 210 is.

[0069] Such a structure also can efficiently illuminate the inside of the refrigerator 100 due to the cooperation between the semiconductor light-emitting device 210 and the light-transmission part 221.

[0070] Furthermore, as shown in FIG. 8, one end in the depth direction of the light-transmission part 221 may be disposed inside the recessed part 120. With such a structure, the length of the light-transmission part 221 or the like which projects to the inside of the refrigerator 100 can be reduced. Thus, it is possible to provide a large space in the main body 101. Furthermore, the light-transmission part 221 and the support part 222 are less likely to be obstacles at the time of taking a storage item in and out of the main body 101.

[0071] Furthermore, the position at which the semiconductor light-emitting device 210 and the cover 220 are arranged is not limited to the examples described in this embodiment. The semiconductor light-emitting device 210 and the cover 220 may be arranged on the inner wall such as an inner wall which corresponds to the ceiling, the side wall, and the floor. Furthermore, the semiconductor light-emitting device 210 and the cover 220 may be disposed not only in the refrigerating compartment 102, but also in the freezing compartment 103, the vegetable compartment 104, the ice compartment 105, and the switchable compartment 106.

[0072] Furthermore, the terms "perpendicular" and the like used here allow for a margin of error within a scope that does not depart from the essence of the present invention.

(Embodiment 2)

[0073] FIG. 9 is a plane view showing the front of a sub-body which makes up the refrigerating compartment.

[0074] FIG. 10 is a plane view showing a cross section of the sub-body which makes up the refrigerating compartment as seen from the side.

[0075] FIG. 11 is a plane view showing a cross section of a lighting unit disposed in the inner wall of the main body as seen from the side.

[0076] As shown in the drawing, a lighting unit 200 is a unit which illuminates the inside of a main body 101 and includes a semiconductor light-emitting device 210, a board 223, an intermediate member 240, and a cover 220.

[0077] The cover 220 is a member which isolates the semiconductor light-emitting device 210 from the atmosphere inside the main body 101. With this, even when damp air enters inside of the main body 101, it is possible to prevent dew from adhering to the semiconductor light-emitting device 210 and the board 223 on which the semiconductor light-emitting device 210 is attached. In this embodiment, the cover 220 is a tabular-shaped member which covers the inside of the main body 101 side of the semiconductor light-emitting device 210. The cover 220 is obtained by molding a resin.

[0078] A base 230 is a member which is attached to the inner wall of the main body 101, and holds the semiconductor light-emitting device 210 via the board 223. In this embodiment, the base 230 integrally includes a blocking member 224. In FIG. 11, note that the blocking member 224 is indicated by hatching different from the other portion of the base 230 to clarify the portion which serves as the blocking member 224, and the different hatching does not indicate that the blocking member 224 is made from a material different from the material of the other portion of the base 230.

[0079] Furthermore, the base 230 has a flange 231 that projects to the outside. The flange 231 is a portion which is in contact with and connected to the rim of a hole 232 provided in the inner case 171, when manufacturing the main body 101. This allows the shape of the inner case 171 to be easy to form. On the other hand, the base 230 is relatively small, which makes it possible to easily form a complex shape, and the base 230 can be easily formed integrally with the blocking member 224. Note that, when manufacturing the main body 101, a heat-insulating material (not shown) is injected between an inner case 171 to which the base 230 is already attached and an outer case (not shown). The flange 231 withstands force when the heat-insulating material is injected and foamed.

[0080] The board 223 is a tabular-shaped member on which the semiconductor light-emitting device 210 is attached and is a member on which wiring for supplying power to the semiconductor light-emitting device 210 is provided. The board 223 is disposed such that (i) an inner wall face A on which the semiconductor light-emitting de-

vice 210 is attached and (ii) a board face F that is a face of the board 223 on which the semiconductor light-emitting device 210 is attached are parallel to each other.

[0081] In this embodiment, the board 223 has an elongated band shape and disposed so as to extend in a width direction of a refrigerator 100. A plurality of the semiconductor light-emitting devices 210 are attached on the board 223.

[0082] The semiconductor light-emitting device 210 is a light-emitting device which generates light and emits the light toward the inside of the main body 101. The semiconductor light-emitting device 210 is disposed such that a light axis B, which is the center axis of the light emitted from the semiconductor light-emitting device 210, is inclined toward the back (arrow D in FIG. 11) of the refrigerator 100 more than an inner wall axis C is. The inner wall axis C is an axis perpendicular to an inner wall face A.

[0083] In this embodiment, a light emitting diode (LED) is adopted as the semiconductor light-emitting device 210. The semiconductor light-emitting devices 210 includes: a light-emitting portion 211, a lead wire 212 provided to project from the light-emitting portion 211. The semiconductor light-emitting device 210 is disposed so as to be housed in a recessed part 120 which is a recess provided in a ceiling part that is one of the inner walls of the main body 101.

[0084] In this embodiment, the semiconductor light-emitting device 210 is provided in a state in which two lead wires 212 (only one lead wire is shown in the drawing) extend along the light axis B from the bottom of the light-emitting portion 211 which is in a bullet shape. When the semiconductor light-emitting device 210 is attached on the board 223, the lead wire 212 is bent as shown in FIG. 12.

[0085] When the light-emitting portion 211 of the semiconductor light-emitting device 210 extends along the light axis B as described, especially, it is possible to reduce the thickness as a whole in a state in which the semiconductor light-emitting device 210 is attached on the board 223. Thus, the thickness of the lighting unit 200 as a whole also can be reduced. Therefore, the amount of decrease in the inner volume of the refrigerator 100 by attaching the lighting unit 200 can be reduced. Furthermore, in the case where the lighting unit 200 is buried in the inner wall of the refrigerator 100, degradation of heat-insulation properties of the refrigerator 100 can be reduced.

[0086] FIG. 13 is a diagram showing an intermediate member. Shown in (a) is a plane view showing a cross section (the direction shown in FIG. 12) of the intermediate member as seen from the side. Shown in (b) is a plane view which shows the intermediate member as seen from the front.

[0087] An intermediate member 240 is a member which protects the lead wire 212 of the semiconductor light-emitting device 210 and fastens the light-emitting portion 211 with respect to the board 223. In this embod-

iment, the semiconductor light-emitting device 210 including two lead wires 212 that extend from the light-emitting portion 211 is adopted. Thus, the intermediate member 240 includes two through holes 243 so that the two lead wires 212 are separately inserted. Inserting a plurality of the lead wires 212 to their respective through holes 243 makes it possible to prevent an occurrence of a short-circuit between the lead wires 212. Note that although the through hole 243 has a greater diameter than the lead wire 212 in the drawing, in actuality, the through hole 243 has almost no gap when the lead wire 212 is inserted. As the intermediate member 240 holds the lead wire 212 in such a manner, it is possible to prevent disconnection or the like of the lead wire 212.

[0088] Furthermore, the intermediate member 240 has, on one face, a first face 241 in contact with a board face F of the board 223, and has, on the other face, a second face 242 which is in contact with the light-emitting portion 211 and which determines the direction of the light axis B of the semiconductor light-emitting device 210. With this, as the intermediate member 240 is located between the board 223 and the light-emitting portion 211, the inclination of the light axis B relative to the board 223 is determined by the angle of the second face 242 relative to the first face 241.

[0089] Furthermore, as the intermediate member 240 is located between the board 223 and the light-emitting portion 211, the position of the light-emitting portion 211 relative to the board 223 is fixed. With this, it is possible to prevent a large vibration of the light-emitting portion 211 with respect to the board 223. For example, even when the refrigerator 100 vibrates due to the vibration of a compressor or the like, unexpected vibration of the light-emitting portion 211 can be prevented, and the inside of the refrigerator 100 can be illuminated in a stable state. Furthermore, the positional relationship between the board 223 and the light-emitting portion 211 becomes stable. Thus, it is possible to reduce a dynamic load applied to the lead wire 212 which is provided in a bridging manner between the board 223 and the light-emitting portion 211. Thus, it is possible to reduce the chance of occurrence of breaking of the lead wire 212.

[0090] As described, when the board 223 is disposed parallel to the inner wall face A, it is possible to reduce (i) the decrease in the inner volume of the refrigerator 100 and (ii) the degradation of heat-insulation properties when the board 223 is disposed in the recessed part 120. Furthermore, by disposing the semiconductor light-emitting device 210 so as to have the light axis B which is inclined with respect to the board face F of the board 223, it is possible to irradiate light, from near the opening, toward the back of the refrigerator 100 while achieving the above-described function and effect. Further, use of the intermediate member 240 makes it possible to protect the lead wire 212 and to stabilize the light-emitting portion 211 with respect to the board 223. With this, unexpected breaking and short-circuit of the lead wire 212 can be prevented, and a flickering of lighting or the like which

occurs when the light-emitting portion 211 is largely vibrated due to the vibration of the compressor or the like also can be prevented.

[0091] Note that the present invention is not limited to the embodiment described above. For example, as shown in FIG. 14, the semiconductor light-emitting device 210 may be disposed without providing the recessed part 120 in the face of the inner wall of the main body 101 and an area around the semiconductor light-emitting device 210 may be covered by the cover 220. In this case, too, the board 223 is attached so as to be parallel to the inner wall face A, and the semiconductor light-emitting device 210 is disposed so as to have the light axis B which is inclined toward the back (arrow D in FIG. 14) more than the inner wall axis C of the inner wall face A is.

[0092] Such a structure also can produce the function and effect similar to the function and effect described above.

[0093] Furthermore, the semiconductor light-emitting device 210 is not limited to the semiconductor light-emitting device 210 having the lead wire 212 which is bent and connected to the board 223, but may be the semiconductor light-emitting device 210 of a chip type that is surface mounted to the board 223. In this case, the semiconductor light-emitting device 210 is attached perpendicular to a board face of the board 223. However, the semiconductor light-emitting device 210 may be selected such that the semiconductor light-emitting device 210 has the light axis B which is inclined toward the back (arrow D in FIG. 14) more than the normal to the board face F of the board 223 is.

[0094] Furthermore, in the case of the lighting unit 200 as shown in FIG. 14, it may be considered that the intermediate member 240 does not exist or the intermediate member 240 is integral with the light-emitting portion 211 of the semiconductor light-emitting device 210.

[0095] Furthermore, the position at which the semiconductor light-emitting device 210 and the cover 220 are arranged is not limited to the examples described in this embodiment. The semiconductor light-emitting device 210 and the cover 220 may be arranged on the inner wall such as an inner wall which corresponds to the ceiling, the side wall, and the floor. Furthermore, the semiconductor light-emitting device 210 and the cover 220 may be disposed not only in a refrigerating compartment 102, but also in a freezing compartment 103, a vegetable compartment 104, an ice compartment 105, and a switchable compartment 106.

[0096] Furthermore, the terms "parallel", "perpendicular", and the like used here allow for a margin of error within a scope that does not depart from the essence of the present invention.

(Embodiment 3)

[0097] FIG. 15 is a plane view showing the front of sub-bodies which makes up a refrigerating compartment.

[0098] FIG. 16 is a plane view showing, from above, a

cross-section of the sub-body which makes up the refrigerating compartment.

[0099] As shown in the drawing, a lighting unit 200 is buried in a recessed part 120. The recessed part 120 is provided on each of the side walls each of which is one of inner walls of a main body 101.

[0100] FIG. 17 is a plane view showing, from above, a cross-section of the lighting unit disposed in the inner wall of the main body.

[0101] As shown in the drawing, the lighting unit 200 is a unit which illuminates inside of the main body 101 and includes a semiconductor light-emitting device 210 and a cover 220.

[0102] FIG. 18 is a perspective view showing the inner side of the cover.

[0103] The cover 220 is a member which isolates the semiconductor light-emitting device 210 from the atmosphere inside the main body 101. With this, even when damp air enters inside of the main body 101, it is possible to prevent dew from adhering to the semiconductor light-emitting device 210 and a board 223 on which the semiconductor light-emitting device 210 is attached. In this embodiment, the cover 220 is a tabular-shaped member which covers the inside of the main body 101 side of the semiconductor light-emitting device 210. The cover 220 is obtained by molding a resin. The cover 220 includes: a light-transmission part 221, a blocking member 224, and a support part 222.

[0104] The light-transmission part 221 is a portion of the cover 220 and transmits light which is emitted from the semiconductor light-emitting device 210. As shown in FIG. 17, the light-transmission part 221 is a portion which is disposed such that an axis perpendicular to an outer face of the light-transmission part that faces the inside of the main body is inclined toward a back (arrow D side in FIG. 17) more than an axis perpendicular to a face of the inner wall on which the semiconductor light-emitting device 210 is disposed. The light-transmission part 221 is made of a transparent resin which allows visible light to transmit.

[0105] The blocking member 224 is disposed closer to the opening (arrow E side in FIG. 17) of a refrigerator 100 than the light-transmission part 221 is, and hinders a clear view of inside beyond the cover 220 for the user of the refrigerator. In this embodiment, the blocking member 224 is integral with the cover 220 and also has a function of supporting the light-transmission part 221 with respect to the main body 101.

[0106] The blocking member 224 is manufactured in two-color molding with the light-transmission part 221 and an after-mentioned support part 222. The blocking member 224 is integral with the light-transmission part 221. Unlike the light-transmission part 221, the blocking member 224 is made from a material which does not transmit visible light.

[0107] As described, it is possible to hinder a clear view of inside beyond the cover 220 in a state in which the line of sight of the user of the refrigerator 100 is completely

blocked, by forming the blocking member 224 integrally with the cover 220, that is, a portion of the cover 220 is made from a material which does not transmit visible light and serves as the blocking member 224. Furthermore, the blocking member can also be colored. Thus, it is possible to increase flexibility in creating a design and improve the aesthetics of the refrigerator when the door is opened. Since the blocking member 224 blocks the light which is emitted from the semiconductor light-emitting device 210 that reaches the eyes of the user of the refrigerator 100, user is less likely to feel that the light is too bright and it is possible to show the items stored inside the refrigerator 100 more brightly.

[0108] Further, the blocking member 224 includes a raised portion 225 (see FIG. 17) which projects to the inside beyond the inner wall face A of the refrigerator 100. The raised portion 225 makes it possible to hinder a clear view of inside beyond the cover 220 in a wide range, even when the eye line of the user and the position at which the user of the refrigerator 100 stands are different. Furthermore, it is possible to increase the area in which the user does not feel that the light is too bright.

[0109] The support part 222 is a portion of the cover 220, attached to the main body 101, and supports the light-transmission part 221 with respect to the main body 101. The support part 222 is formed integrally with the light-transmission part 221 by molding a resin.

[0110] The semiconductor light-emitting device 210 is a light-emitting device which generates light and emits the light toward the inside of the main body 101. In this embodiment, a light emitting diode (LED) is adopted as the semiconductor light-emitting device 210. A plurality of semiconductor light-emitting devices 210 are arranged on the board 223 which has a thin, elongated rectangular shape.

[0111] In this embodiment, the semiconductor light-emitting device 210 is disposed so as to be housed in the recessed part 120 (see FIG. 17) which is a recess provided in the inner wall of the main body 101. Furthermore, the semiconductor light-emitting device 210 is disposed such that a light axis, which is the center axis of the light emitted from the semiconductor light-emitting device 210, inclines toward the front (arrow E in FIG. 17) more than a normal to the outer surface of the light-transmission part 221 is.

[0112] Here, it is preferable that the semiconductor light-emitting device 210 be disposed so as to have the light axis which extends in the same direction as the normal or is inclined toward a front (arrow E in FIG. 17) more than the normal is. This is because a portion of the light emitted from the semiconductor light-emitting device 210 is blocked by the support part 222 of the cover 220 and thus the inside of the main body 101 cannot be efficiently illuminated, when the semiconductor light-emitting device 210 is disposed so as to have the light axis which is inclined toward the back (arrow D in FIG. 17) more than the normal is. Furthermore, when the semiconductor light-emitting device 210 is disposed so as to have the

light axis which is inclined toward the front more than the normal is, it is possible to dispose the semiconductor light-emitting device 210 in the recessed part 120 even when the depth of the recessed part 120 is decreased. Thus, it is possible to reduce the degradation of heat-insulation properties of the refrigerator 100.

[0113] As described, it is possible to block the line of sight of the user of the refrigerator 100 from reaching the inside beyond the cover 220, by providing the blocking member 224, which blocks visible light, integrally with the cover 220 which covers the semiconductor light-emitting device 210 which has the light axis that inclines, from near the opening of the main body 101, toward the back of the main body 101. Thus, it is possible to prevent the aesthetics of the refrigerator 100 from being degraded in a state in which a heat-insulating door 107 is opened. Furthermore, it is possible to prevent the light from the lighting unit 200 from directly entering the eyes of the user who watches the items stored in the refrigerator 100. Thus, it is possible to avoid the situation in which the pupils of the user shrunk unnecessarily and the stored items can be shown brightly.

(Embodiment 4)

[0114] Next, another embodiment of a refrigerator 100 according to the present invention is described. Note that the portions having the similar function as those in Embodiment 3 described above are assigned the same reference numeral and the description thereof may be omitted. Note that the elements and portions having the similar function as those in Embodiment 3 described above are assigned the same reference numeral and the description thereof may be omitted.

[0115] FIG. 19 is a plane view showing, from above, a cross-section of a lighting unit disposed in the inner wall of the main body.

[0116] FIG. 20 is a perspective view schematically showing a state of a lighting unit and the vicinity of the lighting unit, before the main body is assembled.

[0117] As shown in the drawings, a lighting unit 200 includes: a semiconductor light-emitting device 210, a cover 220, and a base 230.

[0118] In this embodiment, the cover 220 is a tabular-shaped member made of a resin which transmits visible light. Thus, the portion which allows the light emitted from the semiconductor light-emitting device 210 to transmit is a light-transmission part 221. Note that a portion of the cover 220, which is attached to an inner wall of the refrigerator 100, is covered by a blocking member 224 (see FIG. 19), and thus the portion which is not covered by the blocking member 224 is the light-transmission part 221.

[0119] A base 230 is a member which is attached to the inner wall of a main body 101, and holds the semiconductor light-emitting device 210. In this embodiment, the base 230 is integrally provided with the blocking member 224. In FIG. 19, note that the blocking member 224

is indicated by hatching different from the other portion of the base 230 to clarify the portion which serves as the blocking member 224, and the different hatching does not indicate that the blocking member 224 is made from a material different from the material of the other portion of the base 230.

[0120] Furthermore, the base 230 includes a flange 231 that projects to the outside. As shown in FIG. 20, the flange 231 is a portion which is in contact with and connected to the rim of a hole 232 that is provided in an inner case 171, when manufacturing the main body 101. This allows the shape of the inner case 171 to be easy to form. On the other hand, the base 230 is relatively small, which makes it possible to easily form a complex shape, and the base 230 can be easily formed integrally with the blocking member 224. Note that, when manufacturing the main body 101, a heat-insulating material 173 is injected between the inner case 171 to which the base 230 is already attached and an outer case 172. The flange 231 withstands force generated when the heat-insulating material 173 is injected and foamed.

[0121] In this embodiment, the position of the light-transmission part 221 is determined by the position of the blocking member 224. However, the blocking member 224 is still disposed closer to the opening (arrow E side in FIG. 19) of the refrigerator 100 than the light-transmission part 221 is. Furthermore, the blocking member 224 is integral with the base 230 and also serves as a support for attaching the cover 220.

[0122] The blocking member 224 is molded integrally with the base 230. Both the base 230 and the blocking member 224 are made from a material which does not transmit visible light.

[0123] As described, by forming the base 230 such that a portion of the base 230 serves as the blocking member 224, it is possible to produce the following advantageous effects in addition to the function and effect described in Embodiment 1 described above. More specifically, when the blocking member 224 is provided in the base 230 that is generally used, the number of parts of the refrigerator 100 can be reduced. Thus, it is possible to contribute to the reduction in man-hour for assembling and the cost of the refrigerator 100.

[0124] Note that the present invention is not limited to the above-described embodiments. For example, as shown in FIG. 21, the semiconductor light-emitting device 210 may be disposed without providing a recessed part 120 in the face of the inner wall of the main body 101, and the area around the semiconductor light-emitting device 210 may be covered by the cover 220. In this case, too, the blocking member 224 which hinders a clear view of inside beyond the cover 220 may be provided closer to the opening of the refrigerator 100 than the light-transmission part 221 is. Furthermore, a portion of the cover 220 having, on the surface, depressions and projections which cause irregular reflections of light may be used as the blocking member 224, without changing the material of the blocking member 224 at all from the material of

the cover 220. For example, when the cover 220, which is transparent in whole, has a portion having a satin finished surface, the portion having the satin finished surface serves as the blocking member 224. Note that, to obtain the satin finished surface on the portion of the cover 220, a mold for molding the cover 220 may have a satin finished surface on a corresponding portion such that the satin finished surface of the mold is imprinted. Furthermore, the satin finished surface may also be obtained by performing shot peening or the like on the cover 220 having a smooth surface such that a portion of the surface of the cover 220 is coarsen.

[0125] Furthermore, as shown in FIG. 22, a sidewall, which is closer to the opening, of the base 230 may be slanted toward the inside of the recessed part 120, and the blocking member 224 which projects toward the opening from the end portion of the sidewall may be provided. With this, the capacity of the recessed part 120 can be reduced, and it is possible to reduce degradation of heat-insulation properties of the refrigerator 100.

[0126] Furthermore, the position at which the semiconductor light-emitting device 210 and the cover 220 are arranged is not limited to the examples described in this embodiment. The semiconductor light-emitting device 210 and the cover 220 may be arranged on the inner wall such as an inner wall which corresponds to the side wall, ceiling, and the floor. Furthermore, the semiconductor light-emitting device 210 and the cover 220 may be disposed not only in a refrigerating compartment 102, but also in a freezing compartment 103, a vegetable compartment 104, an ice compartment 105, and a switchable compartment 106.

[0127] Another embodiment that is realized by combining any elements described in this Description may be an example of the present invention. Furthermore, the present invention also includes modifications of the present invention obtained by applying, to the above-described embodiments, various changes that can be conceived by a person skilled in the art without departing from the scope that is the meaning indicated by words described in CLAIMS of the present invention.

[Industrial Applicability]

[0128] The present invention is applicable to refrigerators.

[Reference Signs List]

[0129]

100 Refrigerator
101 Main body
102 Refrigerating compartment
103 Freezing compartment
104 Vegetable compartment
105 Ice compartment
106 Switchable compartment

107 Heat-insulating door
108 Front panel
110 Shelf plate
120 Recessed part
5 171 Inner case
172 Outer case
173 Heat-insulating material
200 Lighting unit
210 Semiconductor light-emitting device
10 211 Light-emitting portion
212 Lead wire
220 Cover
221 Light-transmission part
222 Support part
15 223 Board
224 Blocking member
225 Raised portion
230 Base
231 Flange
20 232 Hole
240 Intermediate member
241 First face
242 Second face
243 Through hole
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Claims

1. A refrigerator (100) which includes: a main body (101) which includes an opening in a front face; and a semiconductor light-emitting device (210) which is disposed near the opening on an inner wall of the main body (101) and emits light toward a back of the main body (101), the refrigerator (100) comprising:
 - a cover (220) which includes a light-transmission part (221) which transmits light emitted from the semiconductor light-emitting device (210), the cover (220) isolating the semiconductor light-emitting device (210) from an atmosphere inside the main body (101);
 - and a blocking member (224) which is disposed closer to the opening of the refrigerator (100) than the light-transmission part (221) is, the blocking member (224) hindering a clear view of inside beyond the cover (220).
2. The refrigerator (100) according to claim 1, further comprising
 - a base (230) which is attached to the inner wall of the main body (101) and integrally includes the blocking member (224), the base (230) holding the semiconductor light-emitting device (210).
3. The refrigerator (100) according to claim 1, wherein the blocking member (224) is formed integrally with the cover (220).

4. The refrigerator (100) according to claim 3, wherein the blocking member (224) is a portion of a surface of the cover, (220) the portion having depressions and projections which cause irregular reflection of light.

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5. The refrigerator (100) according to claim 3, wherein the blocking member (224) is made from a material different from the light-transmission part (221).

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FIG. 1

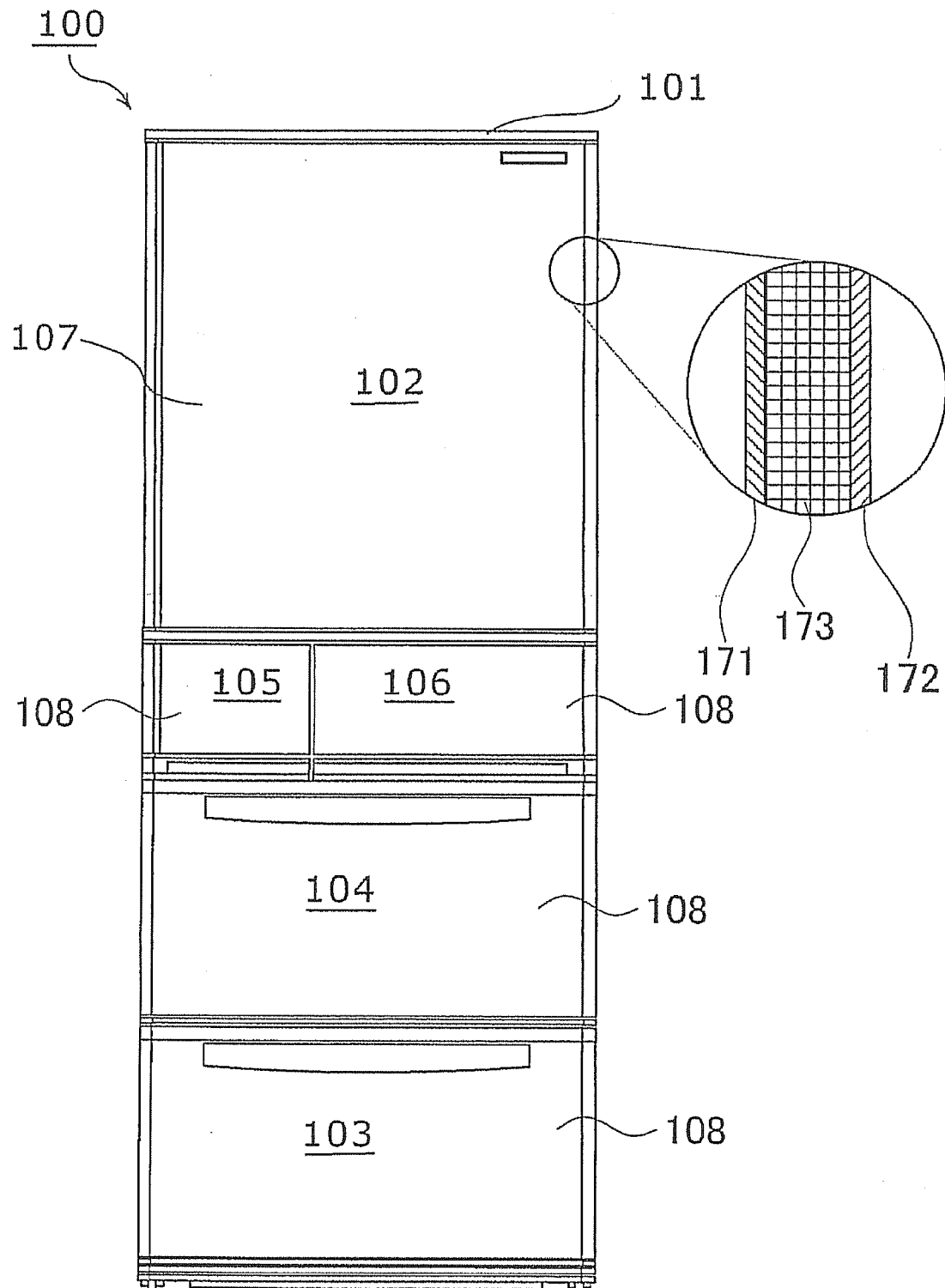


FIG. 2

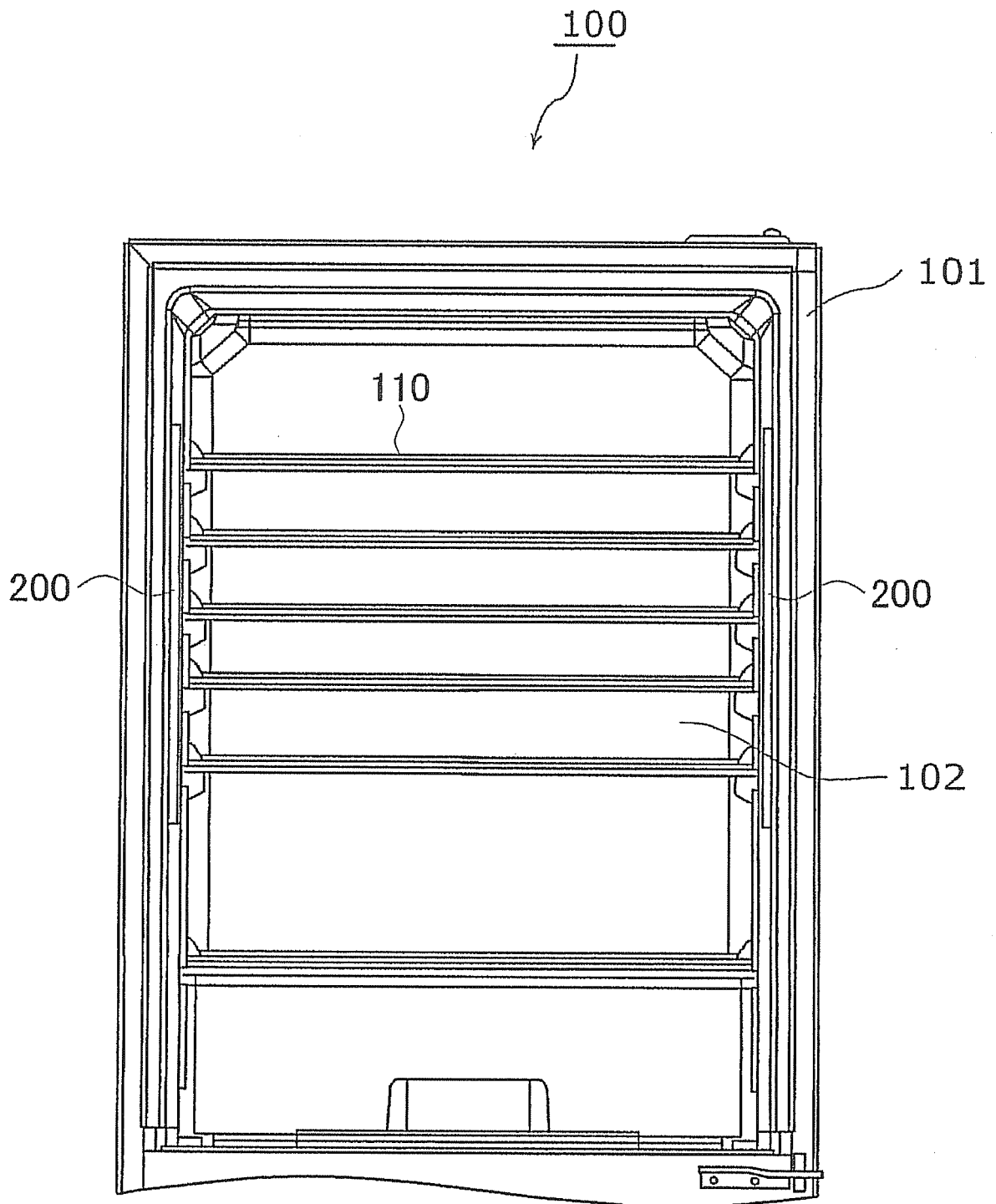


FIG. 3

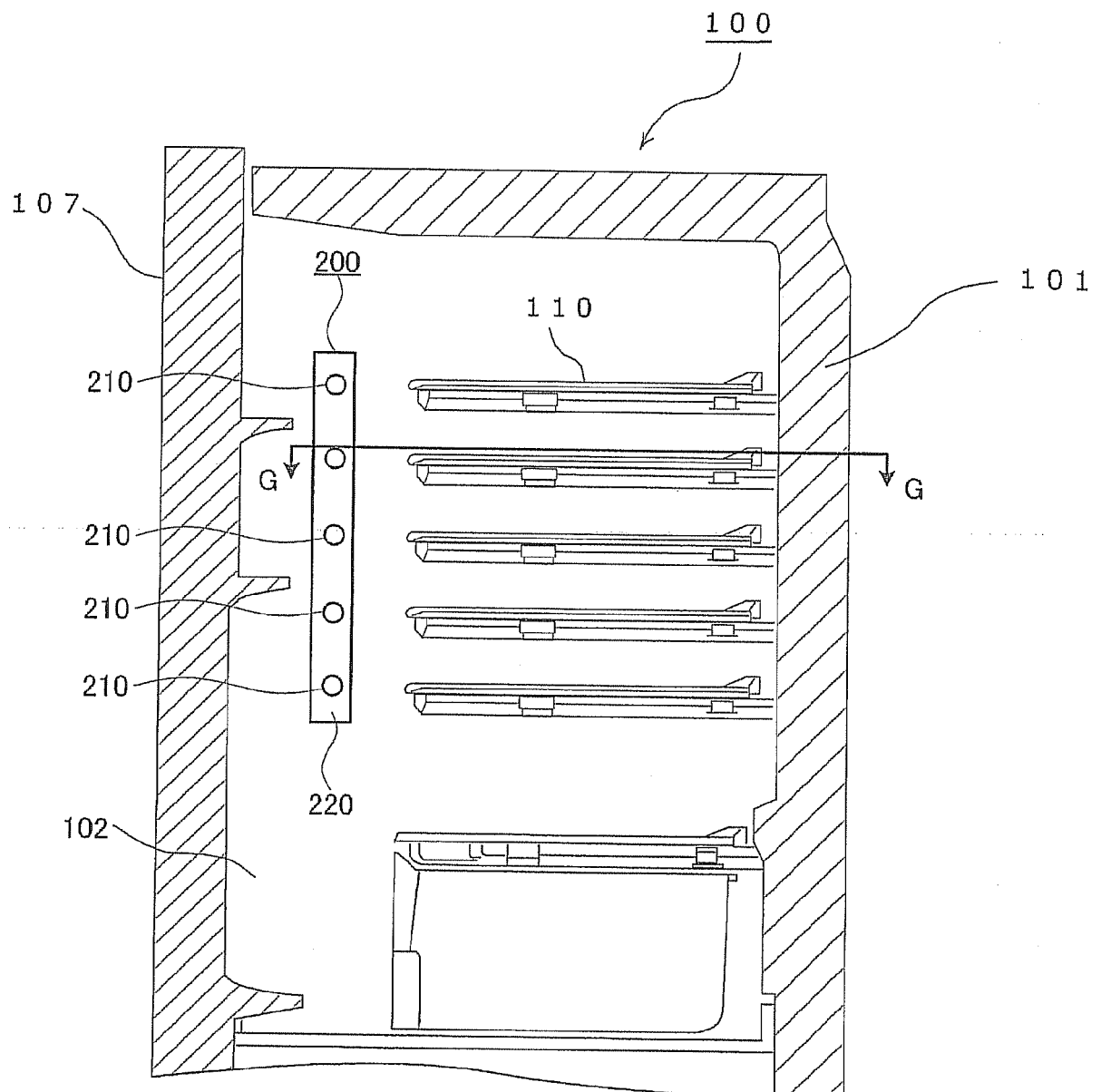


FIG. 4

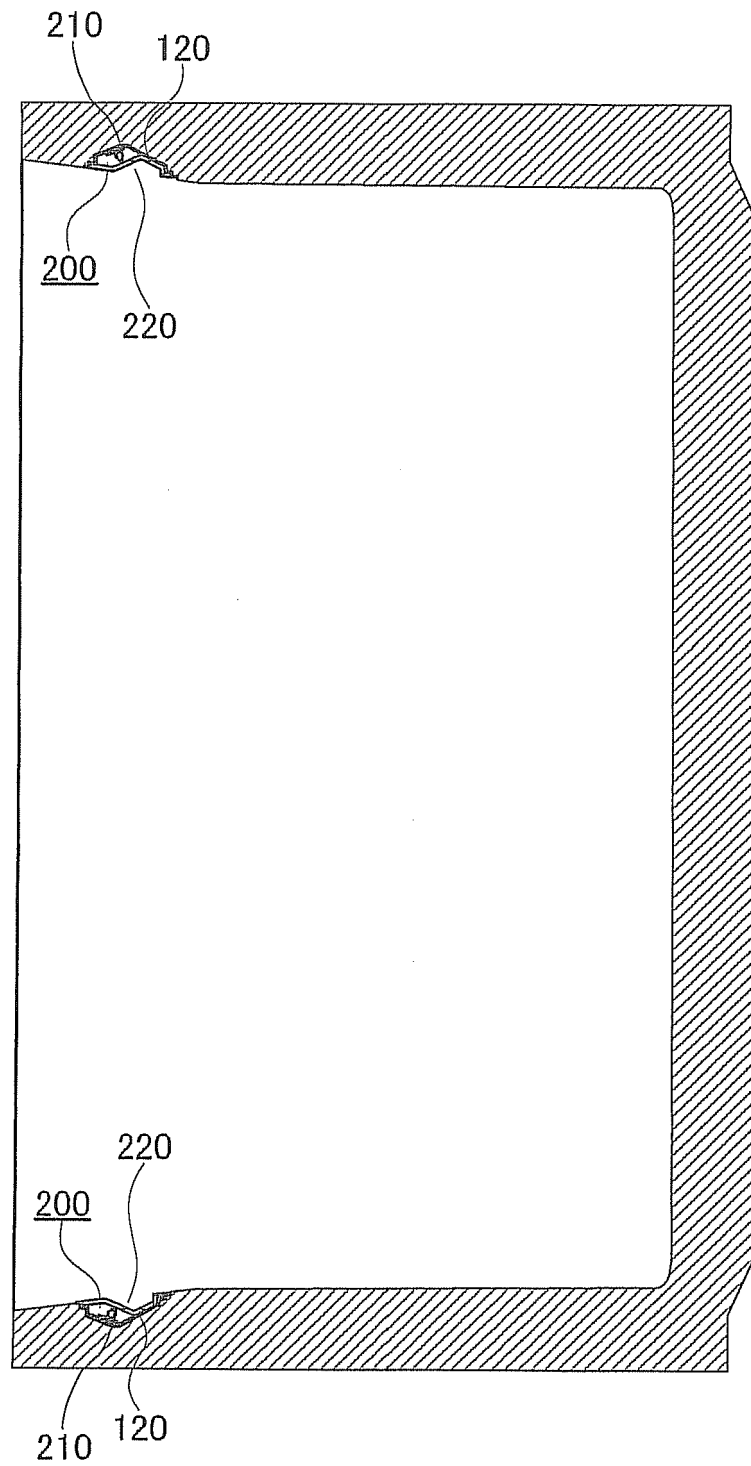


FIG. 5

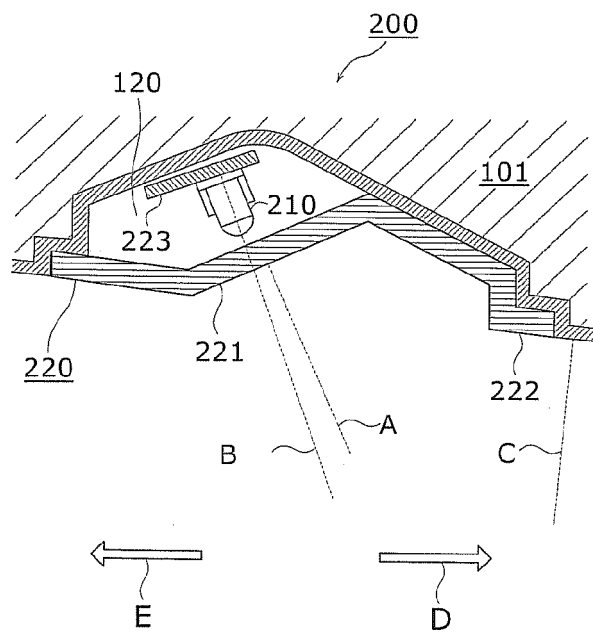


FIG. 6

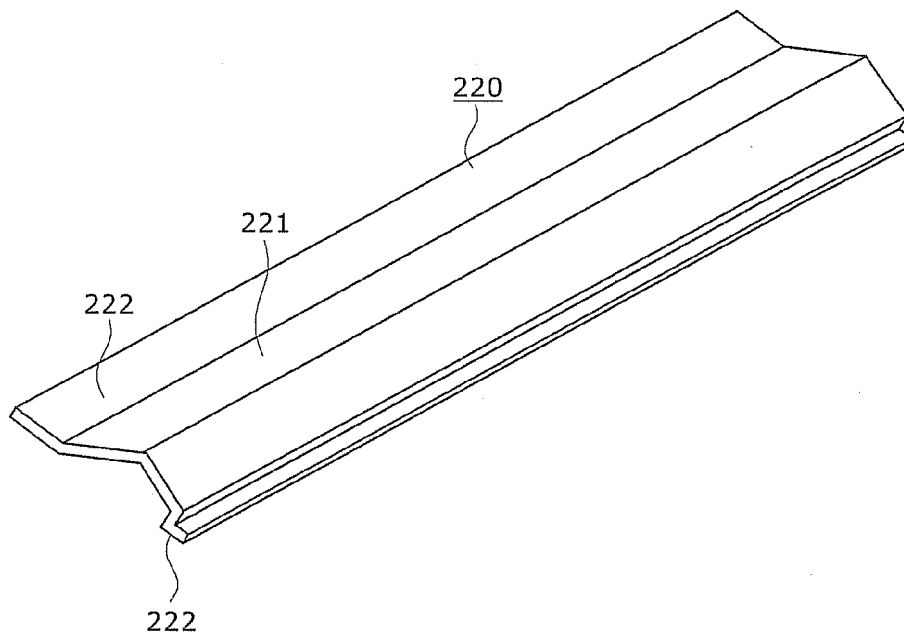


FIG. 7

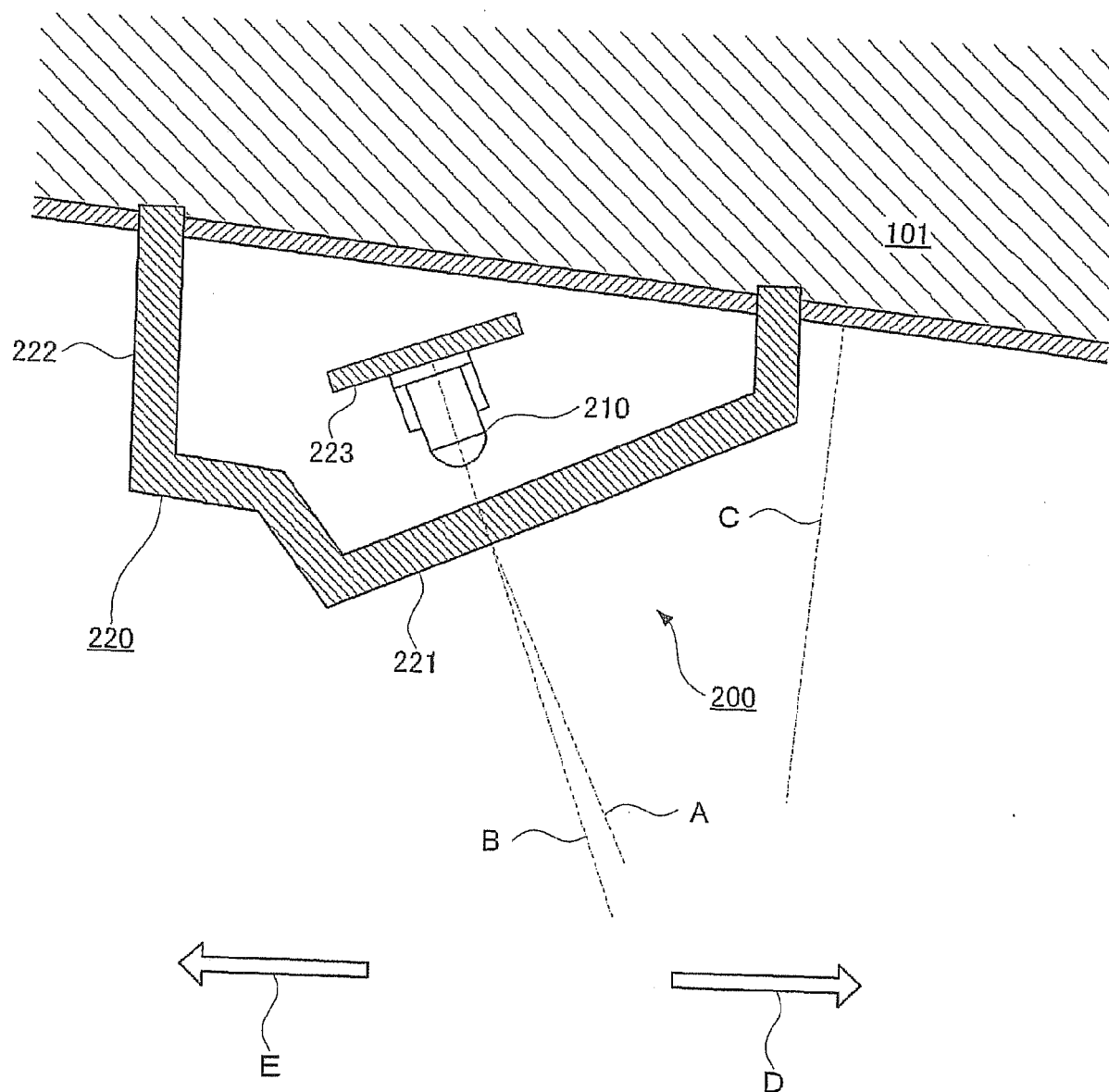


FIG. 8

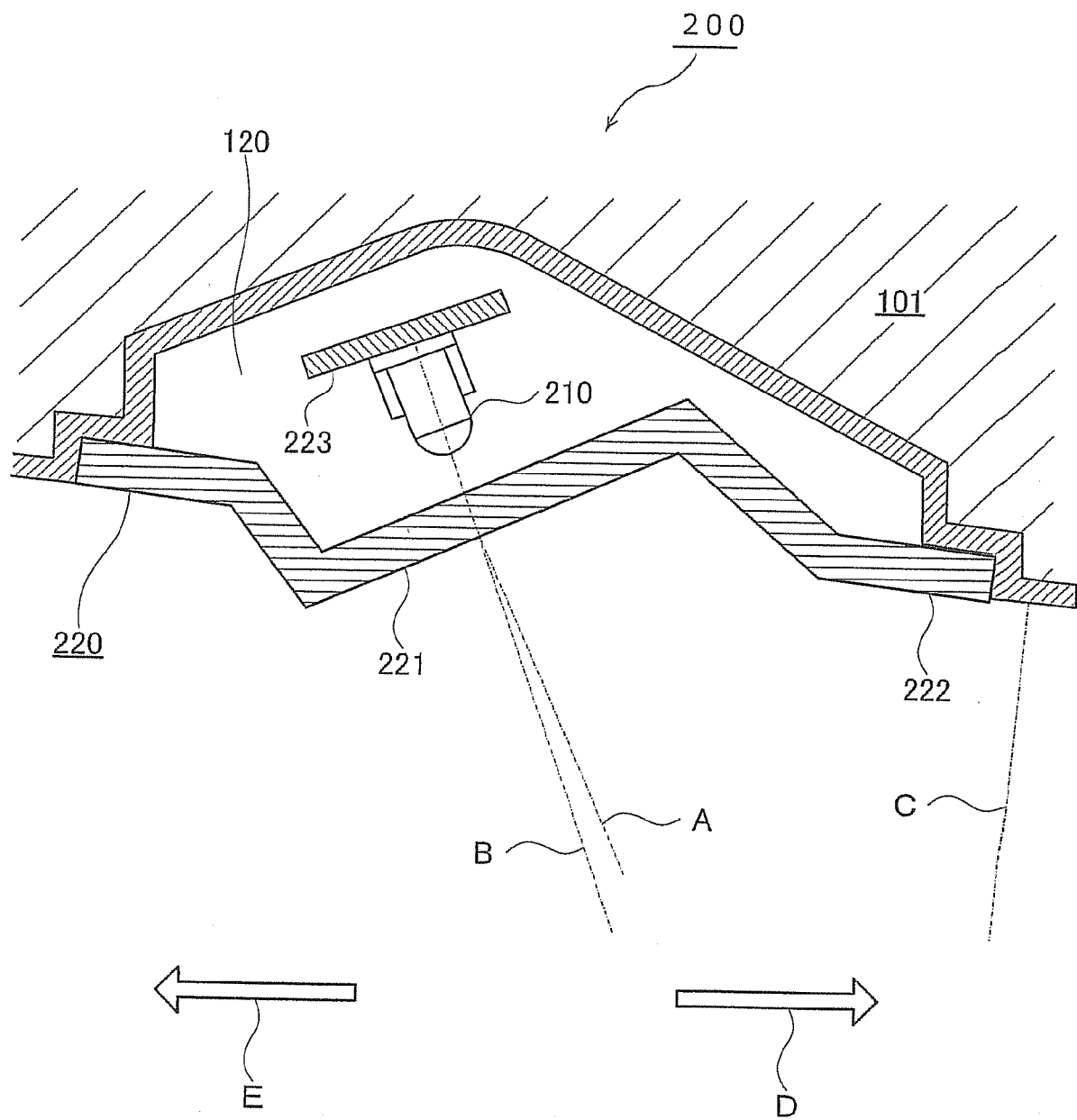


FIG. 10

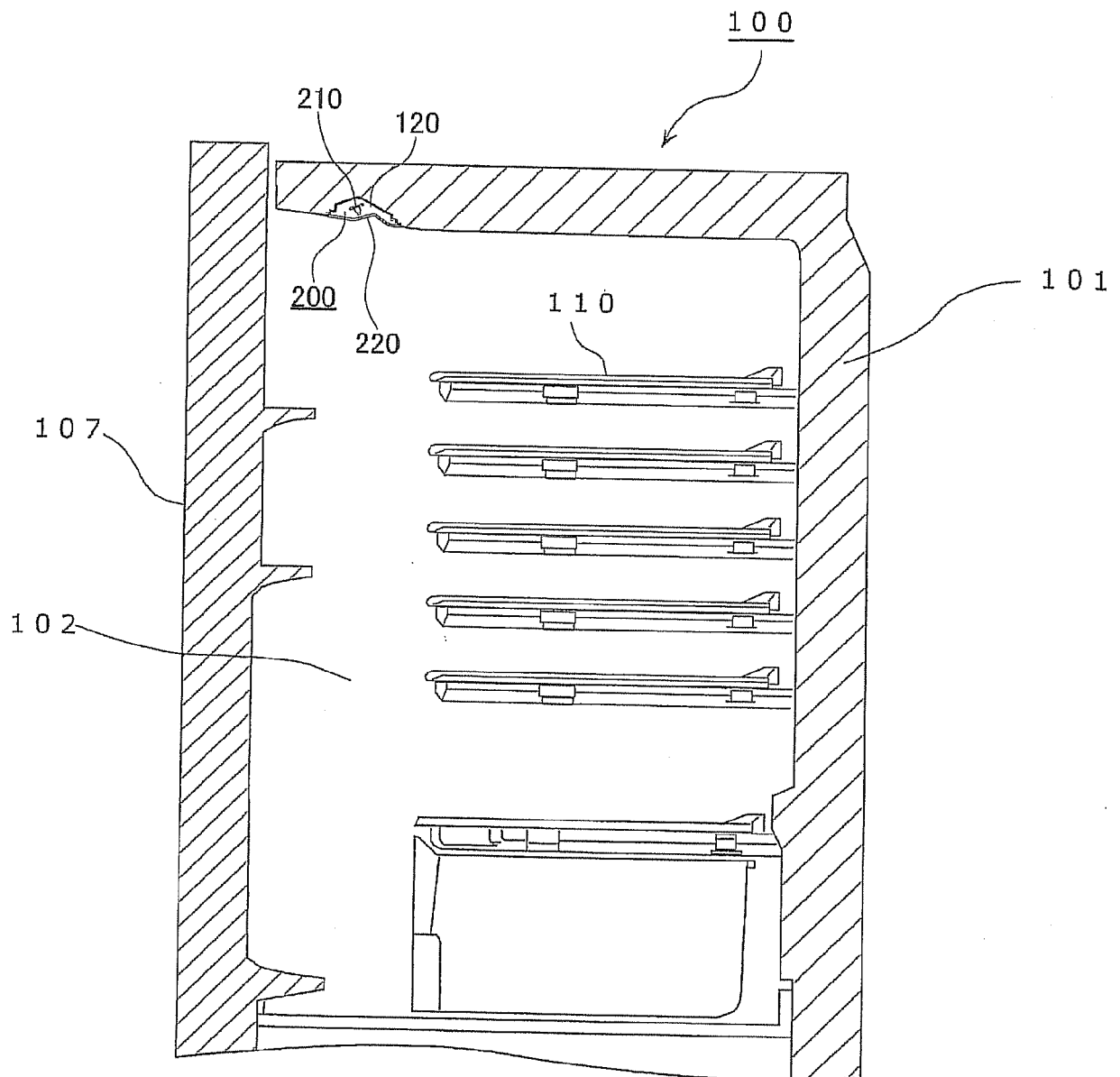


FIG. 11

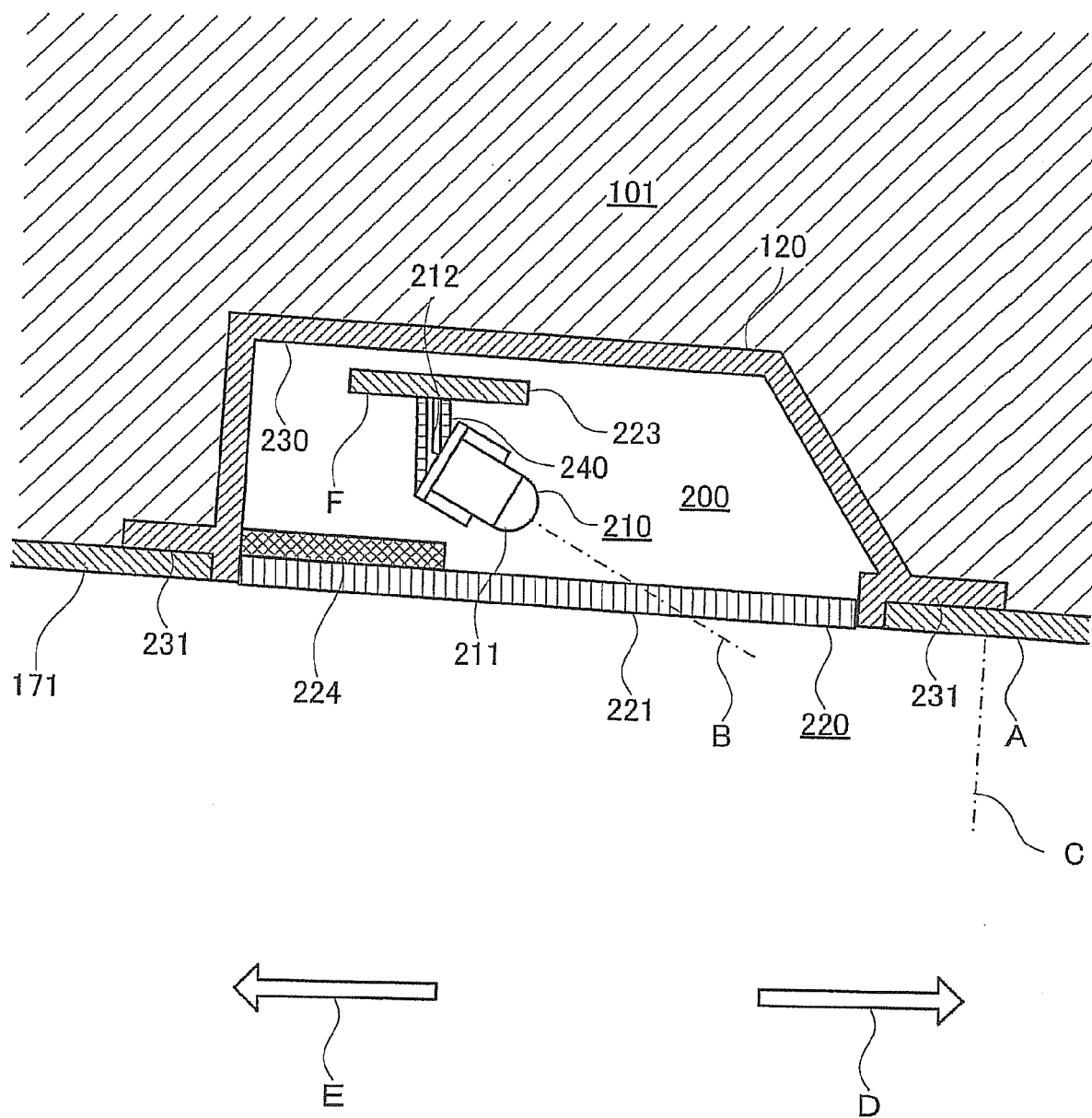


FIG. 12

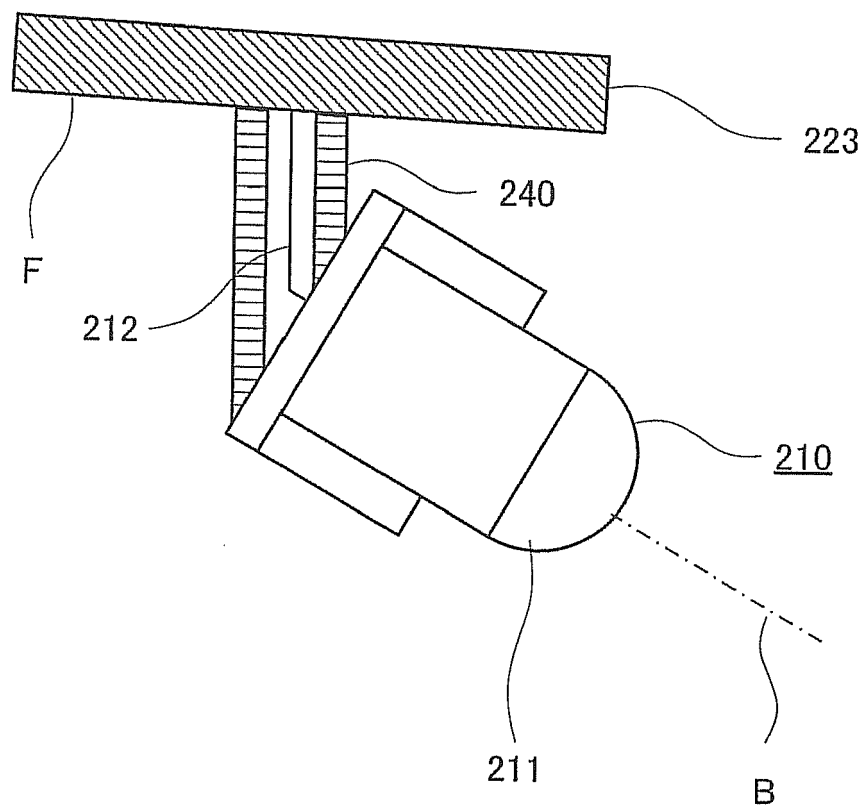


FIG. 13

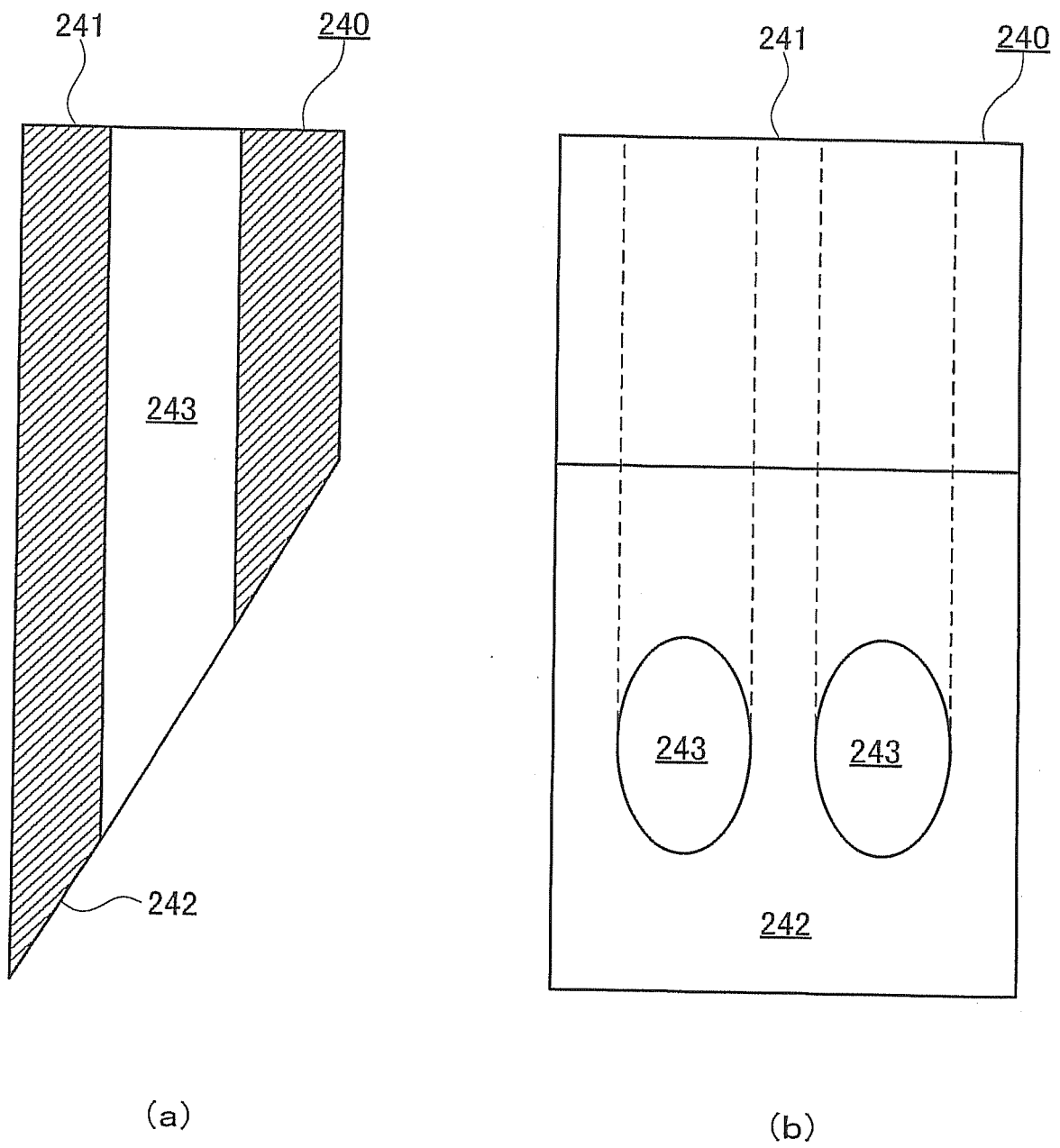


FIG. 14

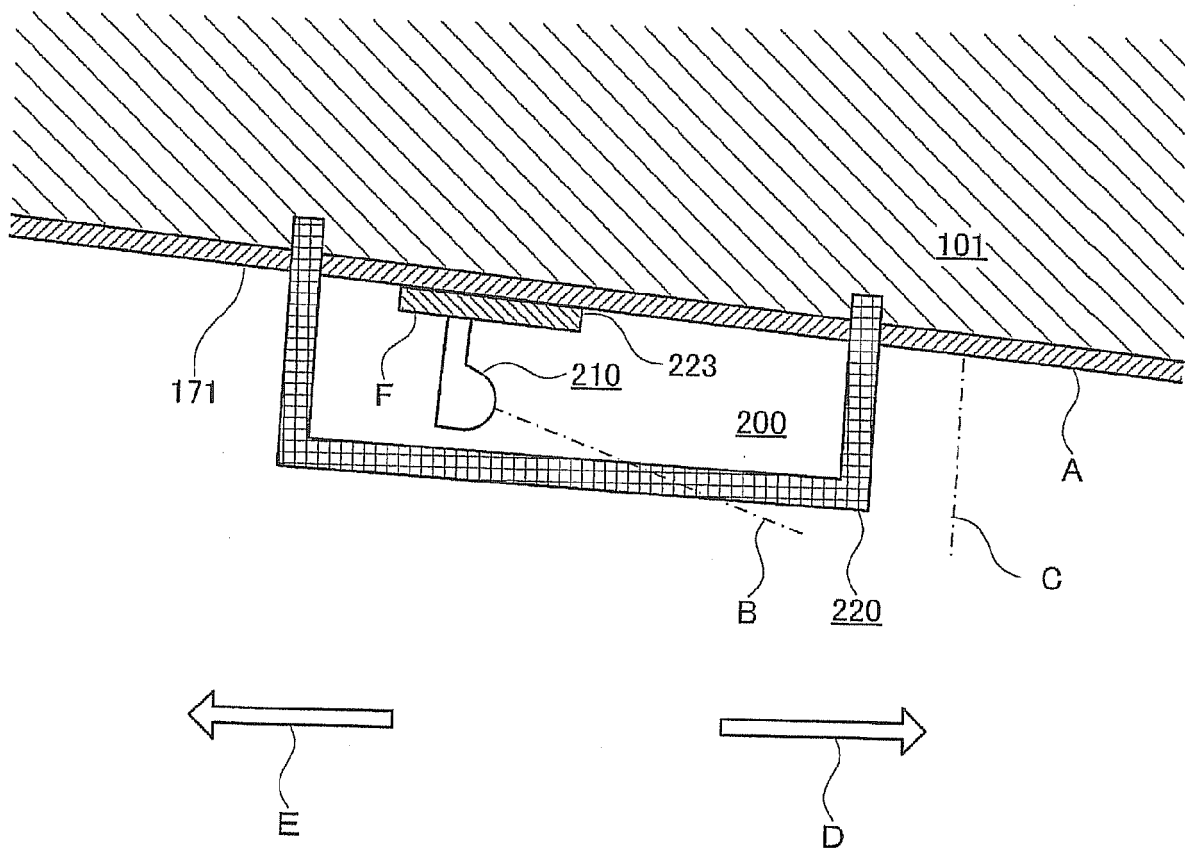


FIG. 15

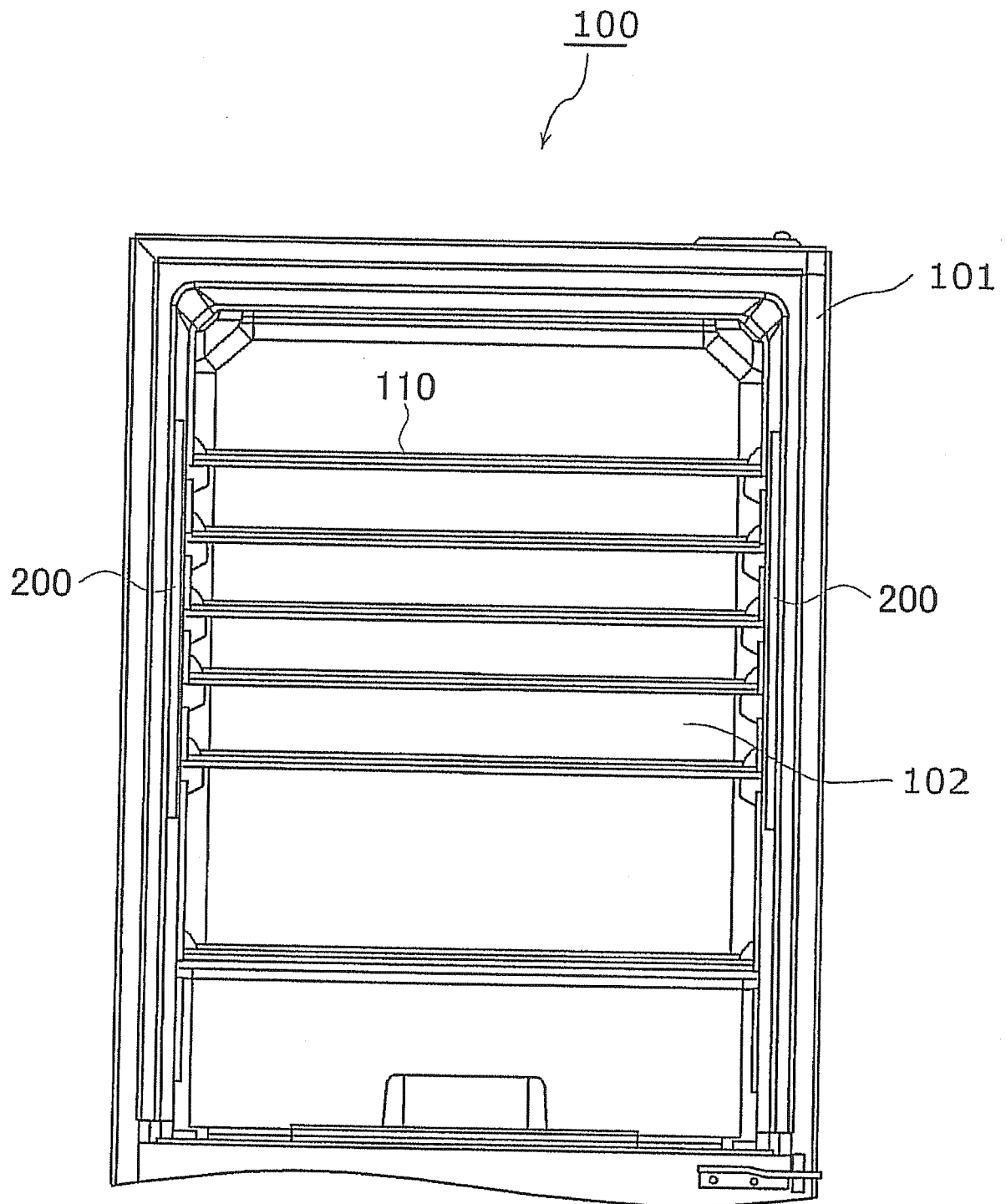


FIG. 16

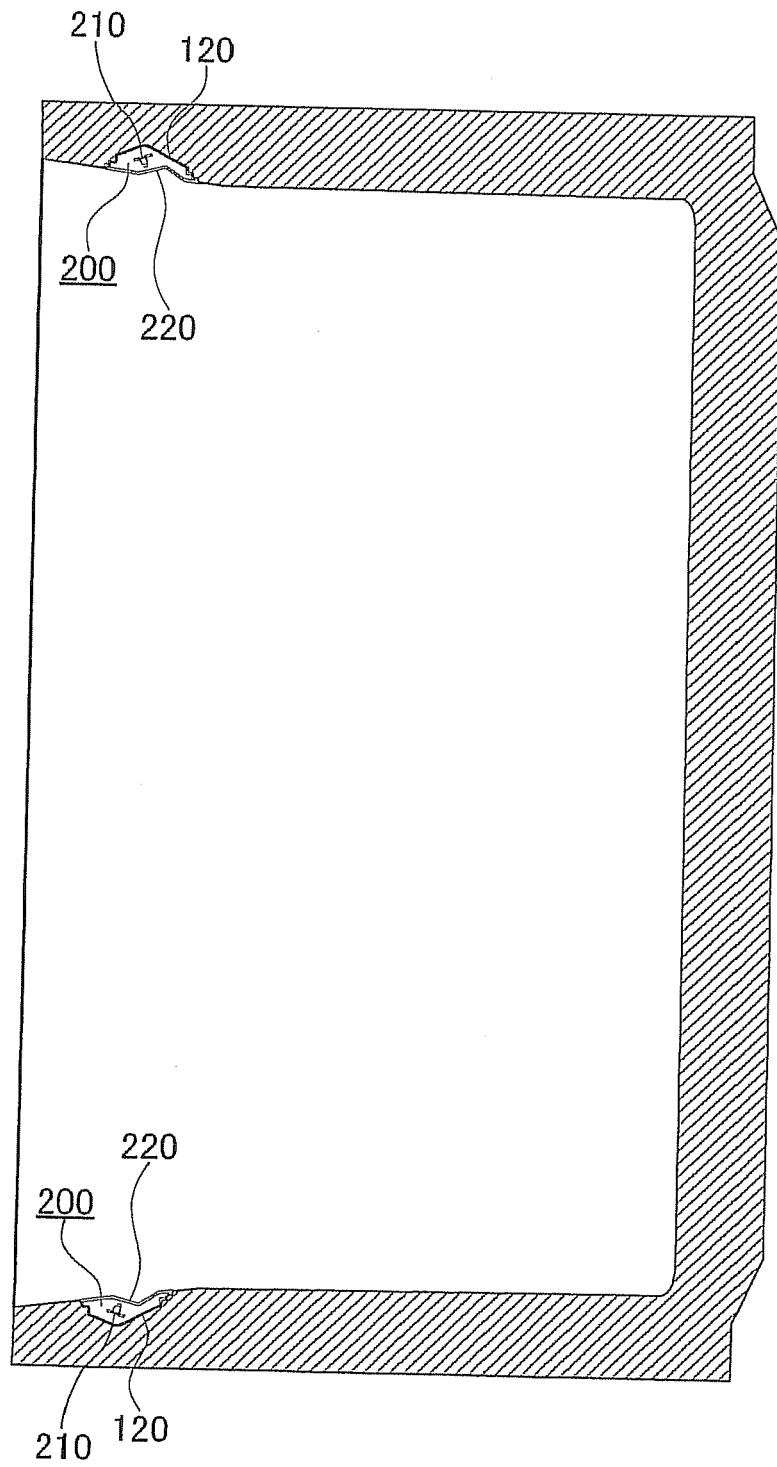


FIG. 17

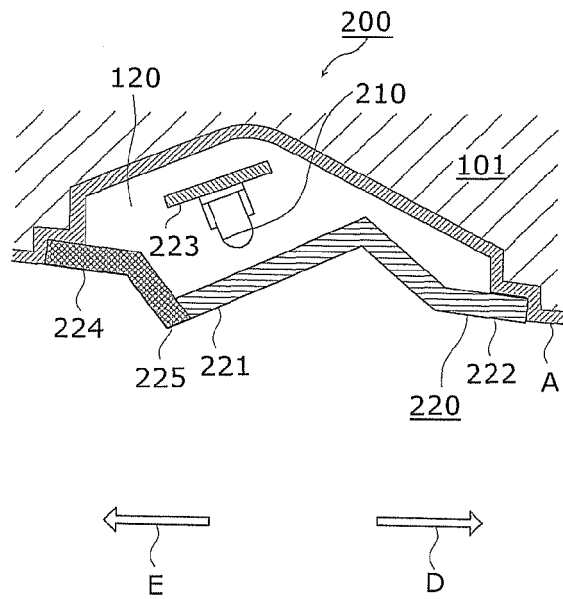


FIG. 18

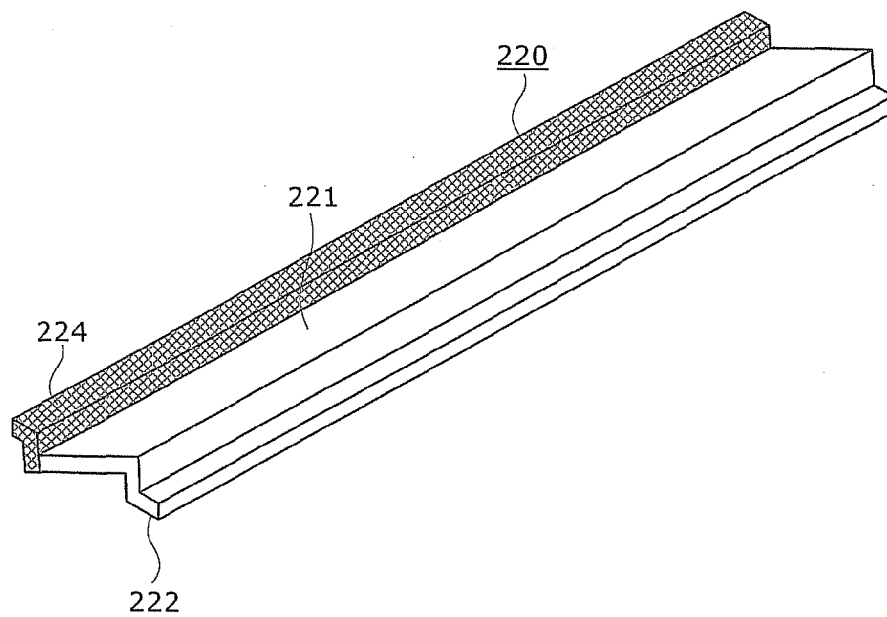


FIG. 19

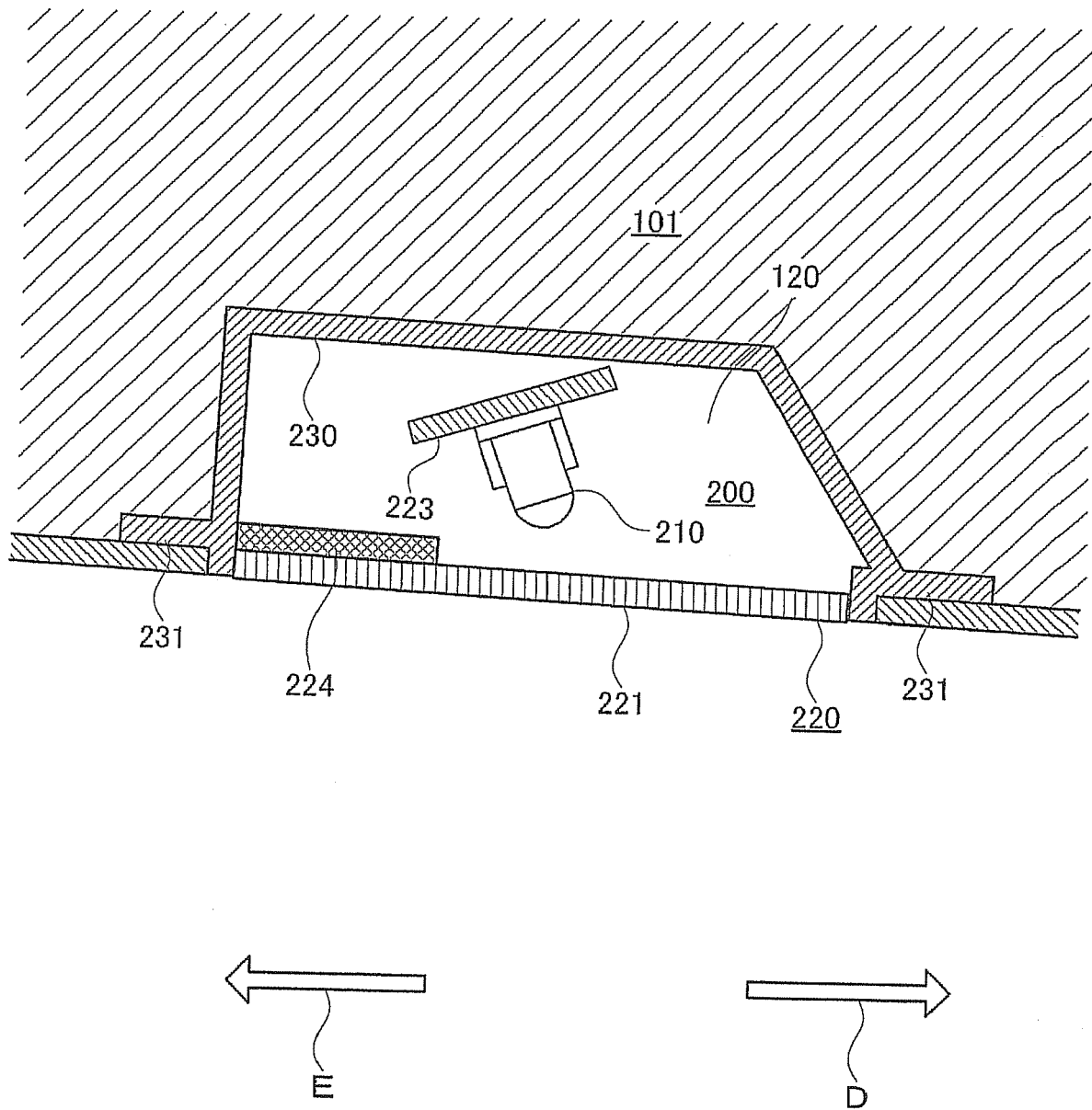


FIG. 20

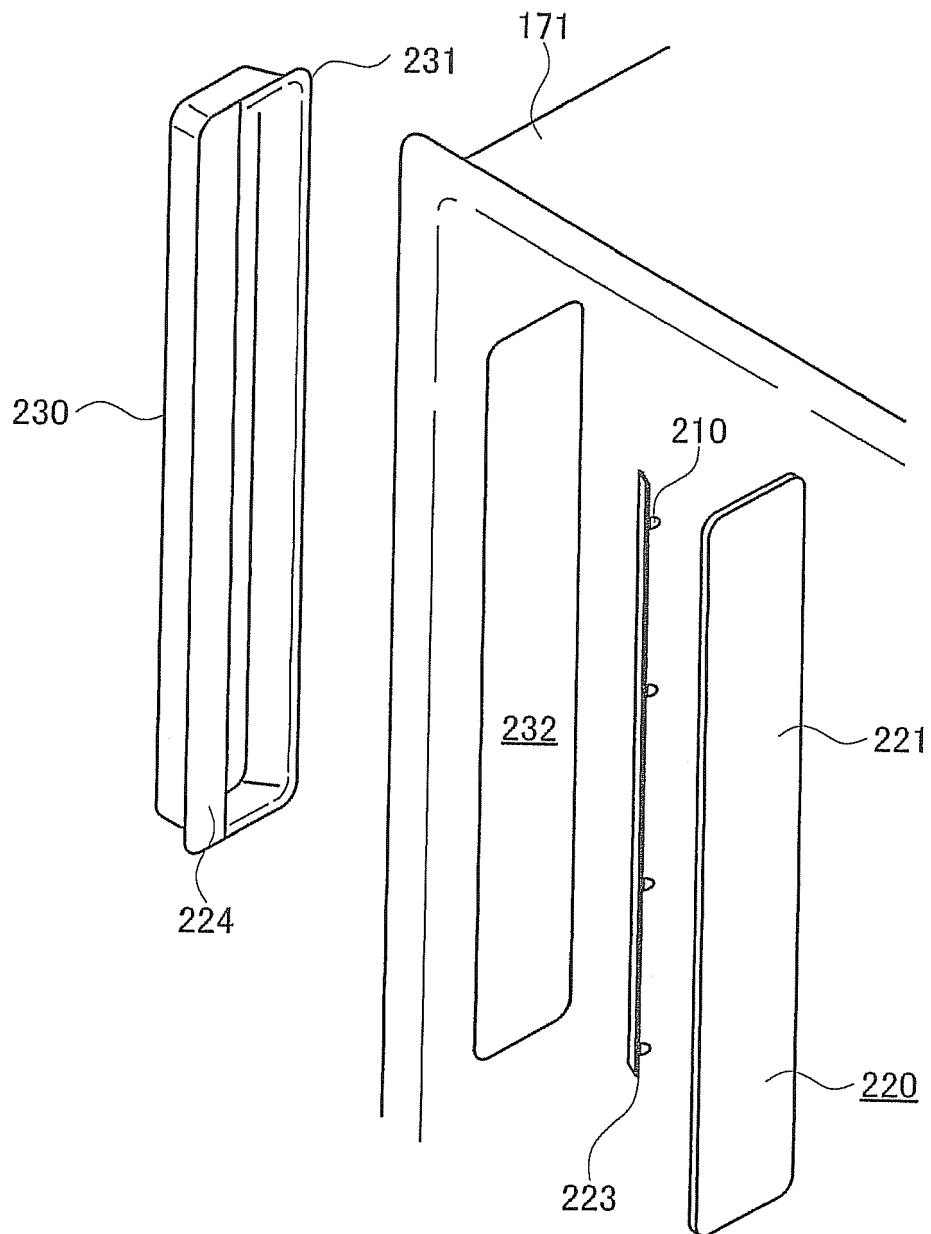


FIG. 21

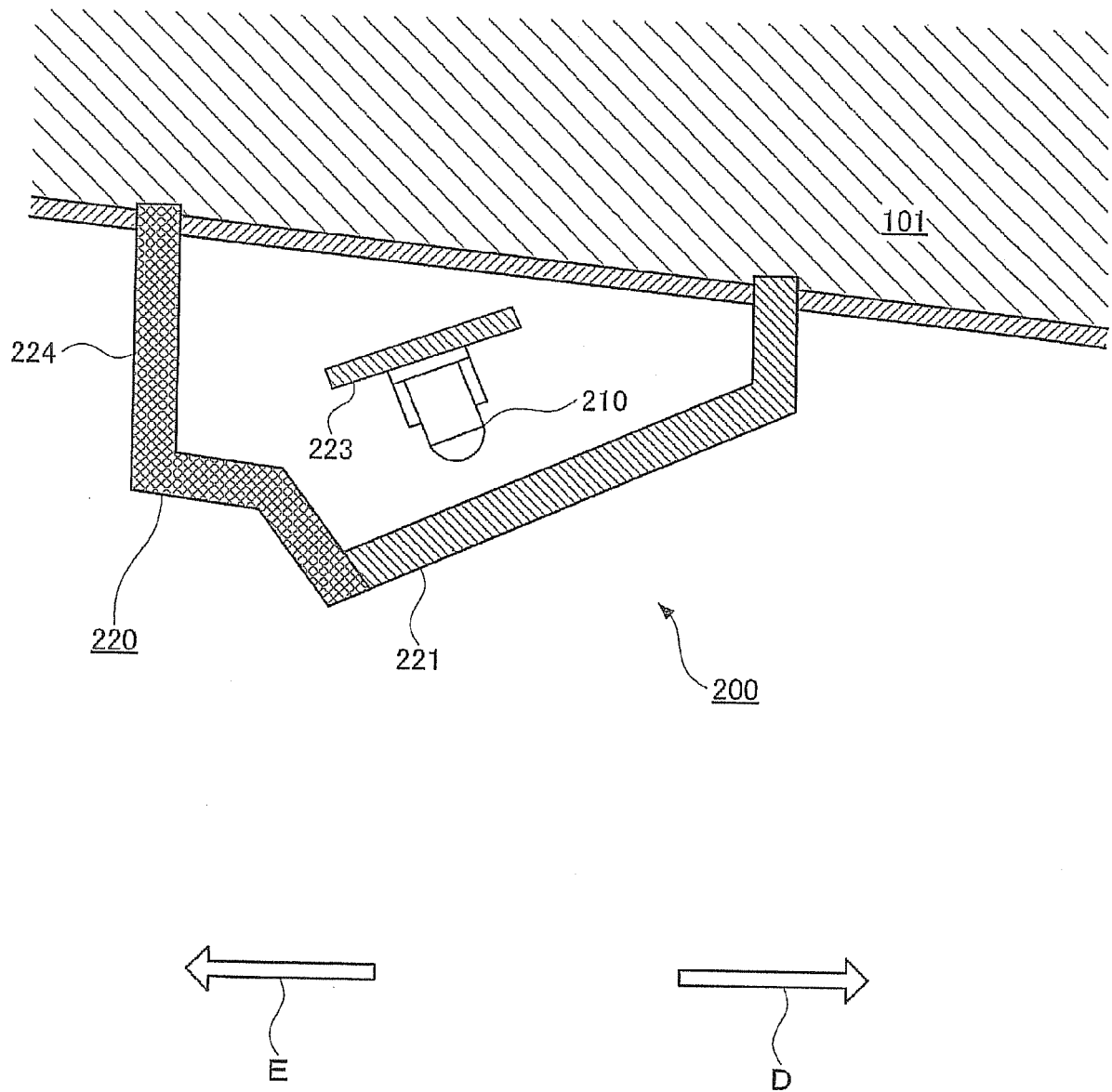
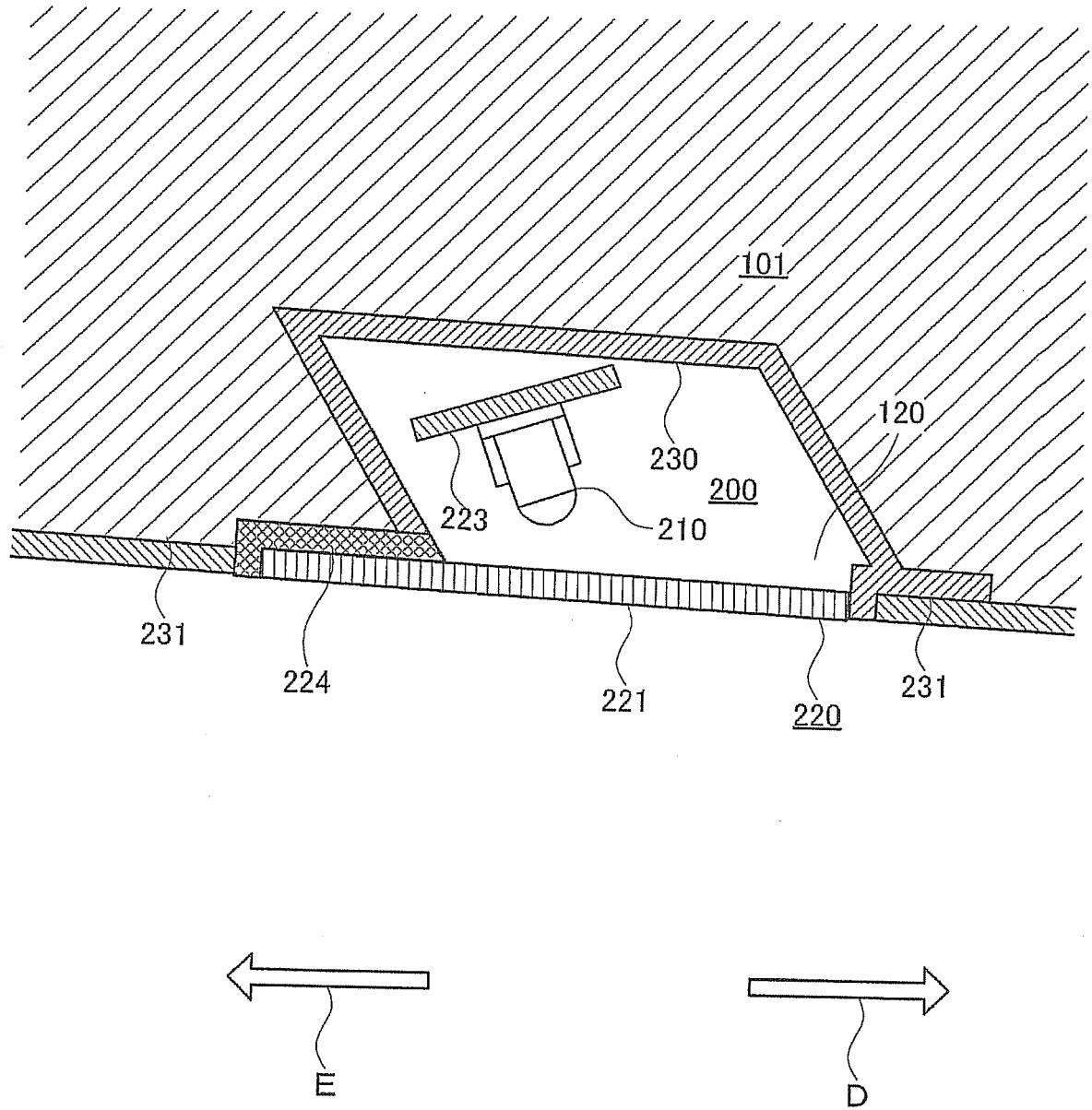


FIG. 22





EUROPEAN SEARCH REPORT

Application Number
EP 16 16 3000

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	JP 2008 075935 A (MATSUSHITA ELECTRIC IND CO LTD) 3 April 2008 (2008-04-03) * paragraph [0029] - paragraph [0049]; figures 1-6 * -----	1-5	INV. F25D27/00 F21S8/02 F21V5/00
			TECHNICAL FIELDS SEARCHED (IPC)
			F25D
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 18 August 2016	Examiner Jessen, Flemming
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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