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(54) **REFRIGERATOR**

KÜHLSCHRANK

RÉFRIGÉRATEUR

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Description

Patent Document 1: Japanese Patent No. 2728318

Patent Document 2: Japanese Patent Application

Publication No. JP-A-H06-147744

Technical Field

[0001] Embodiments of the present invention relate to a refrigerator.

Background Art

[0002] For example, interior volumes of household refrigerators have recently had an increasing tendency. The increase in the interior volume has been tried to be realized by reducing a thickness of peripheral wall of a heat insulation box which is a refrigerator body, but not by increasing the size of the insulation box. In this case, a sufficient insulation performance needs to be ensured even when the peripheral wall is rendered thinner. For this purpose, a vacuum insulation panel is used in addition to filling the peripheral wall of the insulation box with foam insulation.

[0003] The vacuum insulation panel comprises a core material made by forming, for example, glass wool as a flock of fine glass fiber into a mat shape, by putting the core material into a gas barrier container made of a laminate film comprising aluminum foil and synthetic resin, and by evacuating an interior of the gas barrier container and closing an opening. As a result, the vacuum insulation panel maintains the container interior in an evacuated state. The vacuum insulation panel has a low heat conductivity, in other words, high insulation properties even though thin. Accordingly, the use of the vacuum insulation panel can allow the peripheral wall of the insulation box to have high heat insulation properties.

Prior Art Document

[0004] US 2002/100250 discloses a heat insulating walling including an outer casing that is vacuum tight as far as possible and with an inner lining being vacuum tight as far as possible and spaced from the latter. The inner lining and the outer casing are connected to one another, vacuum tightly, by a connecting profile. The connecting profile has an at least approximately U-shaped cross-section and has a diaphragm-like base. The connecting profile, together with the outer casing and the inner lining, surrounds an interspace filled with heat insulation material. The U-shaped connecting profile can engage with its legs over the outer casing and the inner lining. The legs can be vacuum-tightly secured to the inner lining and the outer casing.

[0005] The preamble of independent claim 1 is disclosed by EP 2 789 949 A1. Relevant prior art can also be found in EP 1 338 854 A1 A1.

Patent Document

[0006]

Summary of the Invention**Problem to be overcome by the Invention**

[0007] A refrigerating cycle of the refrigerator necessitates a number of pipes and tubes including a condenser pipe, a capillary tube and a suction pipe. The capillary tube interconnects the condenser pipe and an evaporator or a cooler, and the suction pipe interconnects the evaporator and a compressor. The capillary tube and the suction pipe are routed in a storage space or an interior of the insulation box since the evaporator is disposed in the storage space. This reduces a substantial interior volume of the storage space, resulting in a reduction in a storage volume for food or the like.

[0008] Therefore, an object is to provide a refrigerator which can suppress the narrowing of the storage space of the insulation box by piping.

Means for Overcoming the Problem

[0009] The invention is defined in the appended claims.

Brief Description of the Drawings

[0010]

FIG. 1 is a partial transverse section of an insulation box according to one embodiment;

FIG. 2 is a side view of the insulation box;

FIG. 3 is a perspective view of the insulation box as viewed from the front;

FIG. 4 is a perspective view of the insulation box as viewed from the rear;

FIG. 5 is an exploded perspective view of the insulation box; and

FIGS. 6A and 6B are an exploded perspective view of the vacuum insulation panel and a sectional view of the vacuum insulation panel, respectively.

FIG. 7 is a view similar to FIG. 1, showing a second embodiment;

FIG. 8 is a partial longitudinal section of the insulation box according to a third embodiment;

FIG. 9 is a view similar to FIG. 4, showing a fourth example, not part of the invention; and

FIG. 10 is a view similar to FIG. 1.

Best Mode for Carrying Out the Invention

[0011] Several embodiments will be described with reference to the drawings. A refrigerator has a side where doors are located, and the side is referred to as "front" and a right side as viewed from the front is referred to as "right."

First Embodiment

[0012] A first embodiment will be described with reference to FIGS. 1 to 6. FIGS. 3 and 4 illustrate a heat insulation box 1 constituting a refrigerator body. The insulation box 1 includes an outer box 2, an inner box 3 and a vacuum insulation panel 4 serving as an insulation panel and provided between the outer and inner boxes 2 and 3. The insulation box 1 is generally formed into the shape of a vertically long box or a rectangular parallelepiped having an open front. The insulation box 1 has an interior serving as a storage space 2.

[0013] A ceiling wall 1a, a bottom wall 1b, a left sidewall 1c, a right sidewall 1d and a rear wall 1e are separately manufactured as a peripheral wall as shown in FIG. 5. The insulation box 1 is constructed by combining the walls or insulation walls 1a to 1e. In this case, each one of the bottom wall 1b, the left sidewall 1c, the right sidewall 1d and the rear wall 1e is formed into a rectangular flat plate shape. The ceiling wall 1a has a rear part which is lower than the other part thereof, so that the ceiling wall 1a is formed into a stepped shape. As a result, a component chamber 6 is formed in the upper rear of the insulation box 1 when the walls 1a to 1e are combined together to be constructed into the insulation box 1. A compressor constituting the refrigerating cycle (not shown) and the like are disposed in the component chamber 6.

[0014] The construction of the walls 1a to 1e will now be described. The walls 1a to 1e are provided with respective vacuum insulation panels 4 to provide an insulation performance. The vacuum insulation panel 4 includes a core material 7 and a gas barrier container 8 as shown in FIG. 6A. The core material 7 is made by forming, for example, glass wool as a flock of fine glass fiber into a mat shape. The gas barrier container 8 is made of a laminate film comprising aluminum foil and synthetic resin. The core material 7 is put into the gas barrier container 8, and an interior of the gas barrier container 8 is evacuated and an opening is closed. As a result, the vacuum insulation panel 4 maintains the interior of the gas barrier container 8 in an evacuated state.

[0015] Each of the walls 1a to 1e is constructed by interposing the vacuum insulation panel 4 between an outer shell 9 made of a metal such as steel plate and an inner shell 10 made of plastic, for example, as shown in FIGS. 6A and 6B. The vacuum insulation panel 4 is fixed to at least either one of the outer shell 9 and the inner shell 10 by an adhesive agent or the like. Although each wall is shown as a flat plate in FIGS. 6A and 6B, the ceiling wall 1a is formed into a stepped shape.

[0016] The inner shell 10 has smaller vertical and horizontal dimensions than the outer shell 9 in each of the walls 1a to 1e. Further, the vacuum insulation panel 4 has smaller vertical and horizontal dimensions than the inner shell 10. Accordingly, four sides or ends of the vacuum insulation panel 4 do not reach four sides or ends of the outer shell 9, being located inside the four sides

of the outer shell 9. Further, predetermined sides of the outer shell 9 of each one of the walls 1a to 1e have respective connecting pieces 11 bent at a right angle. The connecting pieces 11 formed on the predetermined sides of each one of the walls 1a to 1e are used to connect the outer shells 9 of the adjacent walls by screws or the like.

[0017] When the walls 1a to 1e are combined together, the outer shell 9 of the walls 1a to 1e constitutes the outer box 2, and the inner shell 10 of the walls 1a to 1e constitutes the inner box 3. As a result, the insulation box 1 having a lower heat conductivity, namely, a higher insulation performance than the urethane foam is constructed between the outer and inner boxes 2 and 3.

[0018] FIG. 1 is a transverse section of a right rear corner of the insulation box 1, showing a connection between the right sidewall 1d and the rear wall 1e. In order that the vacuum insulation panel 4, the outer shell 9 and the inner shell 10 constituting the right sidewall 1d may be distinguished from the vacuum insulation panel 4, the outer shell 9 and the inner shell 10 of the rear wall 1e, suffix "d" is added to the vacuum insulation panel 4, the outer shell 9 and the inner shell 10 of the right sidewall 1d. Suffix "e" is added to the vacuum insulation panel 4, the outer shell 9 and the inner shell 10 of the rear wall 1e.

[0019] No connecting piece 11 is provided on a right end of the outer shell 9e of the rear wall 1e although the connecting piece 11 is provided on the rear end of the outer shell 9d of the right sidewall 1d. The connecting piece 11 of the outer shell 9d of the right sidewall 1d is abutted on an inner surface of a right end of the outer shell 7d of the rear wall 1d. Further, a right end of the inner shell 10 of the rear wall 1e is abutted on a rear end surface of the inner shell 10d of the right sidewall 1d. The connecting piece 11 of the right sidewall 1d and the right end of the outer shell 9e of the rear wall 1e are fastened to each other by a screw (not shown). The right end of the inner shell 10e of the rear wall 1e and the inner shell 10d of the right sidewall 1d are sealed and connected together by a sealing agent and a corner member having a triangular section.

[0020] Three horizontal frames 12, 13 and 14 are mounted on the front of the insulation box 1 so as to partition the front in the up-down direction. A vertical frame 15 is mounted between the middle horizontal frame 13 and the lower horizontal frame 14 of the insulation box 1. Although not shown, insulation walls or partition plates are provided in the rear of the horizontal frames 12 to 14 and in the rear of the vertical frame 15. The storage space 5 is partitioned by the insulation walls and the partition plates into a refrigerating compartment 5a, a vegetable compartment 5b, an ice-making compartment 5c, a mode changeable compartment 5d and a freezing compartment 5e. The ice-making compartment 5c and the mode changeable compartment 5d are juxtaposed to each other.

[0021] The refrigerator is provided with two evaporators for refrigeration and freezing, as coolers. The refriger-

erating evaporator is disposed in a cooling compartment formed in a rear interior of the refrigerating compartment 5a. The freezing evaporator is disposed in a cooling compartment formed in a rear interior of the freezing compartment 5e. Cold air cooled by the refrigerating evaporator is supplied by a fan into the refrigerating compartment 5a and the vegetable compartment 5b. As a result, atmospheres in the refrigerating compartment 5a and the vegetable compartment 5b are cooled to a refrigeration temperature. Cold air cooled by the freezing evaporator is supplied by a fan into the ice-making compartment 5c, the mode changeable compartment 5d and the freezing compartment 5e. As a result, atmospheres in the ice-making compartment 5c, the mode changeable compartment 5d and the freezing compartment 5e are cooled to a freezing temperature.

[0022] A condenser pipe 16 is mounted on the insulation box 1 to liquefy the refrigerant compressed by the compressor. The condenser pipe 16 is mounted on an inner surface of the outer shell 9 of all or a part of the walls 1a to 1e of the insulation box 1 or surfaces located at the vacuum insulation panel 4 side. The condenser pipe 16 is configured to release condensation heat with the outer shell 9 serving as a radiator plate. A part of the condenser pipe 16 is mounted on backsides of a peripheral edge of the front opening of the insulation box 1, the horizontal frames 12, 13 and 14 and the vertical frame 15. The condenser pipe 16 warms the peripheral edge of the front opening of the insulation box 1, the horizontal frames 12, 13 and 14 and the vertical frame 15, thereby suppressing dew condensation.

[0023] The refrigerant condensed by the condenser pipe 16 is supplied via the refrigerating and freezing capillary tubes 17 to the refrigerating and freezing evaporators. The refrigerant evaporated by the evaporators is drawn via the suction pipes 18 and 19 to the compressor. The capillary tubes 17 and the suction pipes 18 and 19 are provided outside the storage space 5 relative to the insulation box 1. In the embodiment, the capillary tubes 17 and the suction pipes 18 and 19 are provided in the walls 1a to 1e of the insulation box 1, for example, an interior of a right rear corner of the insulation box 1, which is a connection of the right sidewall 1d and the rear wall 1e, more specifically, the corner interior of the insulation box 1 where ends of the right sidewall 1d and the rear wall 1d intersect with each other.

[0024] The positions of the capillary tubes 17 and the suction pipes 18 and 19 will be described in relation to the vacuum insulation panels 4d and 4e. The capillary tubes 17 and the suction pipes 18 and 19 are disposed on an extension of or outside the rear end of the vacuum insulation panel 4d of the right sidewall 1d and inside the end of the outer box 2, that is, the outer shell 9d of the right sidewall 1d, and outside an extension of the right end of the vacuum insulation panel 4e of the rear wall 1e and inside the end of the outer box 2, that is, the connecting piece 11 of the right sidewall 1d. In this case, the rear end of vacuum insulation panel 4d where the capil-

lary tubes 17 and the suction pipes 18 and 19 are disposed will be referred to as "end at pipe disposition side." The right end of the vacuum insulation panel 4e where the capillary tubes 17 and the suction pipes 18 and 19 are disposed will be also referred to as "end at pipe disposition side."

[0025] The rear end of the vacuum insulation panel 4d of the right sidewall 1d is located inside the connecting piece 11 which is an end of the right sidewall 1d, that is, a rear end of the outer shell 9d, being spaced from the connecting piece 11. Further, the right end of the vacuum insulation panel 4e of the rear wall 1e is located inside the end of the rear wall 1e, that is, the right end of the outer shell 9e, being spaced from the end. As a result, a space is defined between both vacuum insulation panels 4d and 4e, and the capillary tubes 17 and the suction pipes 18 and 19 are disposed in the space.

[0026] In this case, for example, a rigid rectangular bar-shaped insulator 20 made of expandable plastic is enclosed in the corner of the right rear side of the insulation box 1. The two suction pipes 18 and 19 are inserted into a groove 20a formed in the bar-shaped insulator 20, together with the capillary tubes 17. For example, a spongy insulation material 21 is provided between the bar-shaped insulator 20 and the right end of the vacuum insulation panel 4e. Accordingly, the suction pipes 18 and 19 and the capillary tubes 17 are insulated by the bar-shaped insulator 20 and the spongy insulation material 21.

[0027] The inner shell 10d of the right sidewall 1d extends over the inner shell 10e of the rear wall 1e in the rear of the inner shell 10e. Accordingly, a space defined in the rear of the vacuum insulation panel 4d in the right sidewall 1d is partially separated from a space defined in the right of the vacuum insulation panel 4e in the rear wall 1e. The capillary tubes 17 and the suction pipes 18 and 19 put in the bar-shaped insulator 20 are disposed in the space defined in the rear of the vacuum insulation panel 4d in the right sidewall 1d.

[0028] The bar-shaped insulator 20 is formed to have the rectangular section sized such that the bar-shaped insulator 20 fills a space between the rear end of the vacuum insulation panel 4d of the right sidewall 1d and the connecting piece 11 of the outer shell 9d. Further, the bar-shaped insulator 20 has a vertical dimension set to a length from a lower end of the right sidewall 1d to the rear lower part of the ceiling wall 1a.

[0029] The suction pipes 18 and 19 and the capillary tubes 17 are assembled to be disposed in the corner at the right rear side of the insulation box 1 in the following manner. The following assembling manner is a mere example and should not be restrictive. Firstly, the capillary tubes 17 and the suction pipes 18 and 19 are inserted into the groove 20a of the bar-shaped insulator 20, so as to be unitized or integrated with the bar-shaped insulator 20. In this case, the capillary tubes 17 and the suction pipes 18 and 19 may be secured to the bar-shaped insulator 20 by an adhesive agent in order to be integrated

with the bar-shaped insulator 20 more strongly. Upper ends of the capillary tubes 17 and the suction pipes 18 and 19 are then caused to protrude upward from an upper end of the bar-shaped insulator 20 by a predetermined length as shown in FIG. 2. Subsequently, lower ends of the capillary tubes 17 and the suction pipes 18 and 19 are caused to protrude laterally from a middle part of the bar-shaped insulator 20 by a predetermined length according to the location of the evaporator in the insulation box 1.

[0030] Next, the unitized bar-shaped insulator 20 is bonded to an inner surface of the outer shell 9d of the right sidewall 1d so as to contact with the connecting piece 11 located at the rear end thereof. Subsequently, the vacuum insulation panel 4d is bonded to the inner surface of the outer shell 9d while the rear end of the vacuum insulation panel 4d is in contact with the bar-shaped insulator 20. The inner shell 10d is then bonded to the vacuum insulation panel 4. In this case, the suction pipes 18 and 19 and the capillary tubes 17 extending from the lower end of the bar-shaped insulator 20 are caused to further protrude to the storage space side through a cutout formed in the inner shell 10d.

[0031] The right sidewall 1d and the rear wall 1e are coupled together, and the capillary tubes 17 and the suction pipes 18 and 19 integrated with the bar-shaped insulator 20 are put into the right rear corner of the insulation box 1. Subsequently, when the ceiling wall 1a is combined with the right sidewall 1d and rear wall 1e, the capillary tubes 17 and the suction pipes 18 and 19 protruding upward from the upper end of the bar-shaped insulator 20, that is, the upper end of the right sidewall 1d are drawn into the component chamber 6 through a through hole (not shown) formed in the ceiling wall 1a.

[0032] The capillary tubes 17 drawn into the component chamber 6 are connected to a termination of the condenser pipe 16 via a three-way valve disposed in the component chamber 6. The suction pipes 18 and 19 are connected via joints to an inlet of the compressor. Refrigerant discharged from the compressor is supplied through the condenser pipe 16 to the refrigerating or freezing evaporator by the operation of the three-way valve. The refrigerant evaporated by either evaporator is suctioned via the suction pipe 18 or 19 into the compressor.

[0033] As understood from the foregoing, the capillary tubes 17 and the suction pipes 18 and 19 all serving as piping are disposed outside the storage space 5. Accordingly, differing from the case where the piping is disposed in the storage space 5, narrowing the storage space 5 by the piping can be suppressed. As a result, the storage space 5 can be used for food storage more widely.

[0034] Further, the low-temperature refrigerant flows through the suction pipes 18 and 19. However, since the capillary tubes 17 and the suction pipes 18 and 19 are covered by the insulator 20 and the insulation material 21, occurrence of dew condensation can be suppressed.

[0035] Further, since the capillary tubes 17, the suction

pipes 18 and 19 and the foam insulator 20 are unitized, the capillary tubes 17, the suction pipes 18 and 19 and the foam insulator 20 can be handled more easily in the assembly or the like. Moreover, since the foam insulator 20 has a predetermined rigidity, the foam insulator 20 is easier to handle as compared with the case where the foam insulation is soft. Consequently, the capillary tubes 17 and the suction pipes 18 and 19 can be put into the groove 20a more easily.

[0036] Further, the insulation box 1 is constructed by combining a plurality of walls 1a to 1e. Accordingly, the capillary tubes 17 and the suction pipes 18 and 19 can be put into the connection, namely, the corner of the right sidewall 1d and the rear wall 1e. This is particularly advantageous when each of the right and left walls 1s and 1d has a thickness of not more than 35 mm. In the embodiment, the vacuum insulation panel 4 has a thickness set to about 20 mm. A total thickness of the outer shell 9 and the inner shell 10 is set to about 1.5 mm. In this case, a total thickness of the vacuum insulation panel 4, the outer shell 9 and the inner shell 10 becomes 21.5 mm. Thus, the thickness of each of the right and left walls 1c and 1d is not more than 25 mm which value is further advantageous.

Second Embodiment

[0037] FIG. 7 illustrates a second embodiment. The second embodiment differs from the first embodiment in the arrangement of the capillary tubes 17 and the suction pipes 18 and 19. More specifically, in the second embodiment, the groove 20a of the bar-shaped insulator 20 with the rectangular section is formed on a diagonal line extending from the corner of the inner box 3 to the corner of the outer box 2. A plurality of pipes or tubes, in this case, two capillary tubes 17 and two suction pipes 18 and 19 are arranged in the groove 20a.

[0038] Thus, the suction pipes 18 and 19 having larger diameters than the capillary tubes 17 are arranged on the diagonal line in the corner of the insulation box 1, with the result that the suction pipes 18 and 19 can be enclosed in the corner of the insulation box 1 even when the suction pipes 18 and 19 have respective larger diameters than the thickness of the vacuum insulation panel 4.

Third Embodiment

[0039] FIG. 8 illustrates a third embodiment. In the first embodiment, the suction pipes 18 and 19 are disposed in the corner where two walls intersect. On the other hand, in the third embodiment, the suction pipes 18 and 19 are disposed in an end of one of the walls, for example, in the front end interior of the bottom wall 1b.

[0040] More specifically, the connecting piece 11 of the bottom wall 1b is formed by upwardly bending a front end of the outer shell 9b serving as a front end of the outer box 2. The vacuum insulation panel 4b of the bottom wall 1b has a front end which does not reach the front

end of the outer box 2 and is spaced rearward from the connecting piece 11. A bar-shaped insulator 22 is provided between the connecting piece 11 and the front end of the vacuum insulation panel 4. The bar-shaped insulator 22 is formed with a groove 22a. The suction pipes 18 and 19 are inserted into the groove 22a of the bar-shaped insulator 22 together with the capillary tubes 17.

Fourth Example

[0041] FIGS. 9 and 10 illustrate a fourth example, not part of the invention. In the fourth example, the capillary tubes 17 and the suction pipes 18 and 19 are disposed outside the storage space 5, more specifically, outside the outer box 2 of the insulation box 1.

[0042] More specifically, as shown in FIG. 9, the covering member 23 is mounted outside the right rear corner of the insulation box 1, for example. The covering member 23 has two sides 23a and 23b intersecting at a right angle, so that the covering member 23 has an L-shaped section. The sides 23a and 23b have respective distal ends bent inward with the result that each of the sides 23a and 23b has a generally container-shaped section.

[0043] Spaces inside the sides 23a and 23b are filled with foam insulation 24. The foam insulation 24 inside the side 23b is formed with a groove 24a. The two suction pipes 18 and 19 and the capillary tubes 17 are enclosed in the groove 24a.

[0044] The side 23a of the covering member 23 has a plurality of recesses 25a formed intermittently in the up-down direction. In the same manner, the side 23b of the covering member 23 has a plurality of recesses 25a formed intermittently in the up-down direction. Self-tapping screws 26a are passed through the recesses 25a of the side 23a respectively. The self-tapping screws 26a are then screwed into the outer shell 9d of the right sidewall 1d. Further, self-tapping screws 26b are passed through the recesses 25b of the side 23b respectively. The self-tapping screws 26b are then screwed through through-holes (not shown) formed in the outer shell 9 of the rear wall 1e into the connecting piece 11 of the outer shell 9 of the right sidewall 1d. Thus, the covering member 23 is fixed to the outside of the right rear corner of the insulation box 1.

Other Embodiments

[0045] While certain embodiments have been described, these embodiments have been presented by way of example only, and are not intended to limit the scope of the invention.

[0046] For example, the insulation wall may be constructed by filling a space between the inner and outer shells with the vacuum insulation panel and foam insulation located inside or outside the vacuum insulation panel.

[0047] The insulation box may be constructed by combining a box-shaped outer box and a box-shaped inner

box. In this case, the vacuum insulation panel is attached to an inner surface of the outer box or an outer surface of the inner box before combining the outer and inner boxes, whereby the vacuum insulation panel is provided between the outer and inner boxes.

[0048] When the piping is provided inside the walls 1a to 1e, the piping may be provided in a space between the right end of the vacuum insulation panel 4e of the rear wall 1e and the inner shell 10d of the right sidewall 1d as well as the corner inside constituting the connection of two walls, for example, as shown in FIG. 1.

[0049] The bar-shaped insulators 20 and 22 may be soft spongy insulators.

[0050] The piping should not be limited to the capillary tubes and the suction pipes.

Claims

1. A refrigerator comprising a heat insulation box (1) comprising a plurality of vacuum insulation panels (4) between an outer box and an inner box and comprising a ceiling wall (1a), a bottom wall (1b), a left sidewall (1c), a right sidewall (1d) and a rear wall (1e), wherein the vacuum insulation panels (4) are provided inside the walls (1a, 1b, 1c, 1d, 1e) respectively;
the insulation box (1) is provided with piping (17, 18, 19) located outside the storage space, the piping (17, 18, 19) being provided inside ends of the walls (1a, 1b, 1c, 1d, 1e) provided with the respective vacuum insulation panels (4) ;
a member (20, 22, 23) is provided inside the end of the wall (1a, 1b, 1c, 1d, 1e) provided with the vacuum insulation panel (4), the piping (17, 18, 19) being inserted into the member (20, 22, 23) and spaced from the vacuum insulation panel (4); and
the member (20, 22, 23) into which the piping (17, 18, 19) is inserted is a bar-shaped insulator,
the member (20, 22, 23) into which the piping (17, 18, 19) is inserted has rigidity, **characterised in that** the piping (17, 18, 19) and the member (20, 22, 23) are unitized, and the piping (17, 18, 19) has an end protruding out of the member (20, 22, 23).
2. The refrigerator according to claim 1, wherein the insulation box (1) is constructed by combining the insulation walls (1a, 1b, 1c, 1d, 1e).
3. The refrigerator according to any one of claims 1 or 2, wherein the piping (17, 18, 19) is provided inside a corner of the insulation box (1), in which corner ends of two walls (1a, 1b, 1c, 1d, 1e) adjacent to each other intersect.

Patentansprüche

1. Kühlschrank, umfassend eine Wärmedämmbox (1), die eine Mehrzahl von Vakuumdämmplatten (4) zwischen einer äußeren Box und einer inneren Box umfasst und eine Deckenwand (1a), eine Bodenwand (1b), eine linke Seitenwand (1c), eine rechte Seitenwand (1d) und eine Rückwand (1e) umfasst, wobei die Vakuumdämmplatten (4) jeweils innerhalb der Wände (1a, 1b, 1c 1d, 1e) vorgesehen sind; die Wärmedämmbox (1) mit einer Verrohrung (17, 18, 19) versehen ist, die sich außerhalb des Stauraums befindet, wobei die Verrohrung (17, 18, 19) innerhalb von Enden der Wände (1a, 1b, 1c 1d, 1e) vorgesehen ist, in denen die jeweiligen Vakuumdämmplatten (4) vorgesehen sind; ein Teil (20, 22, 23) innerhalb des Endes der Wand (1a, 1b, 1c 1d, 1e) vorgesehen ist, die mit der Vakuumdämmplatte (4) versehen ist, wobei die Verrohrung (17, 18, 19) in das Teil (20, 22, 23) eingeführt ist und sich in einem Abstand von der Vakuumdämmplatten (4) befindet; und das Teil (20, 22, 23), in welches die Verrohrung (17, 18, 19) eingeführt ist, ein stabförmiger Dämmkörper ist, das Teil (20, 22, 23), in welches die Verrohrung (17, 18, 19) eingeführt ist, eine Steifigkeit hat, **dadurch gekennzeichnet, dass** die Verrohrung (17, 18, 19) und das Teil (20, 22, 23) modularisiert sind, und dass die Verrohrung (17,18,19) ein Ende hat, das aus dem Teil (20, 22, 23) vorsteht.
2. Kühlschrank nach Anspruch 1, wobei die Wärmedämmbox (1) durch Kombination der Dämmwände (1a, 1b, 1c 1d, 1e) konstruiert ist.
3. Kühlschrank nach einem der Ansprüche 1 oder 2, wobei die Verrohrung (17, 18, 19) innerhalb einer Ecke der Wärmedämmbox (1) vorgesehen ist, in welcher Ecke sich Enden zweier benachbarter Wände (1a, 1b, 1c 1d, 1e) schneiden.

Revendications

1. Réfrigérateur comprenant un compartiment d'isolation thermique (1) comprenant une pluralité de panneaux d'isolation sous vide (4) entre un compartiment extérieur et un compartiment intérieur et comprenant une paroi supérieure (1a), une paroi inférieure (1b), une paroi latérale gauche (1c), une paroi latérale droite (1d) et une paroi arrière (1e), dans lequel les panneaux d'isolation sous vide (4) sont prévus à l'intérieur des parois (1a, 1b, 1c, 1d, 1e) respectivement ; le compartiment d'isolation (1) est pourvu de con-

duites (17, 18, 19) situées à l'extérieur de l'espace de stockage, les conduites (17, 18, 19) étant prévues à l'intérieur d'extrémités des parois (1a, 1b, 1c, 1d, 1e) pourvues des panneaux d'isolation sous vide (4) respectifs ;

un élément (20, 22, 23) est prévu à l'intérieur de l'extrémité de la paroi (1a, 1b, 1c, 1d, 1e) pourvue du panneau d'isolation sous vide (4), les conduites (17, 18, 19) étant insérées dans l'élément (20, 22, 23) et espacées du panneau d'isolation sous vide (4) ; et l'élément (20, 22, 23) dans lequel les conduites (17, 18, 19) sont insérées est un isolant en forme de barre,

l'élément (20, 22, 23) dans lequel les conduites (17,18, 19) sont insérées présente une rigidité, **caractérisé en ce que**

les conduites (17, 18, 19) et l'élément (20, 22, 23) sont unifiés, et les conduites (17,18,19) possèdent une extrémité faisant saillie hors de l'élément (20, 22, 23).

2. Réfrigérateur selon la revendication 1, dans lequel le compartiment d'isolation (1) est construit en combinant les parois d'isolation (1a, 1b, 1c, 1d, 1e).

3. Réfrigérateur selon l'une quelconque des revendications 1 ou 2, dans lequel les conduites (17, 18, 19) sont prévues à l'intérieur d'un coin du compartiment d'isolation (1), dans lequel des extrémités de coin de deux parois (1a, 1b, 1c, 1d, 1e) adjacentes l'une à l'autre se croisent.

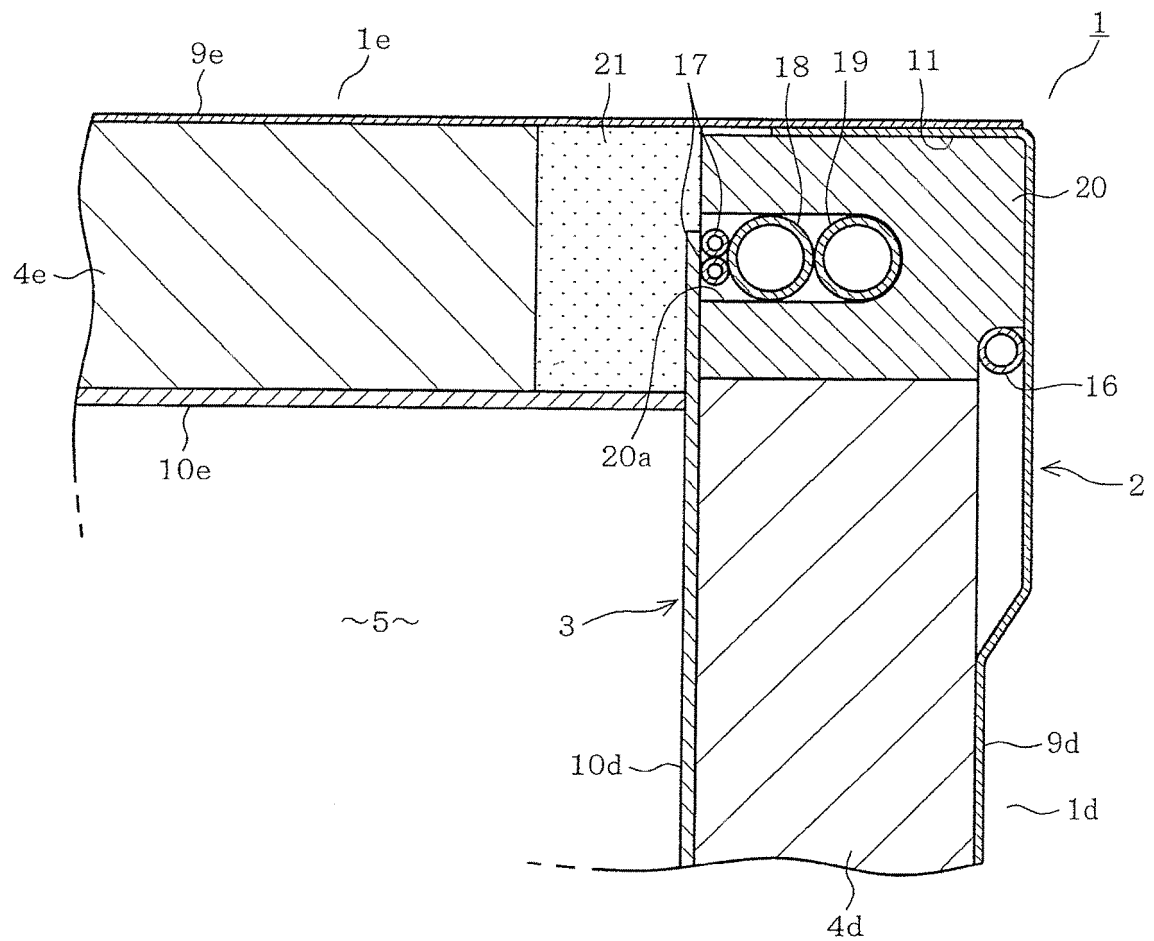


FIG. 1

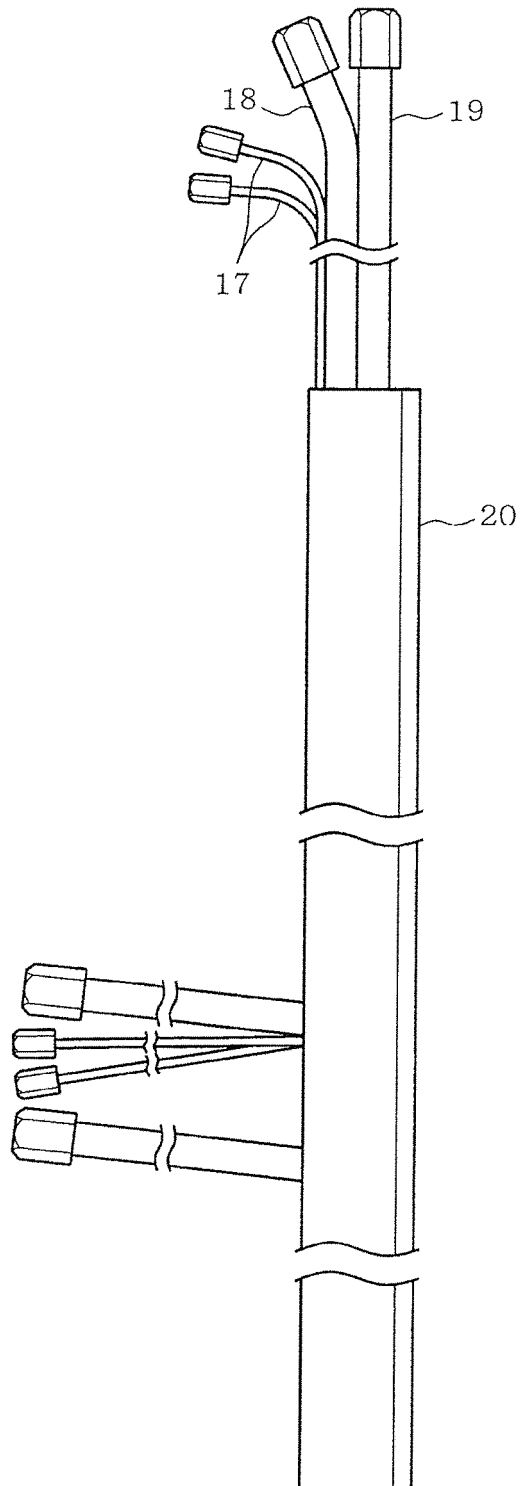


FIG. 2

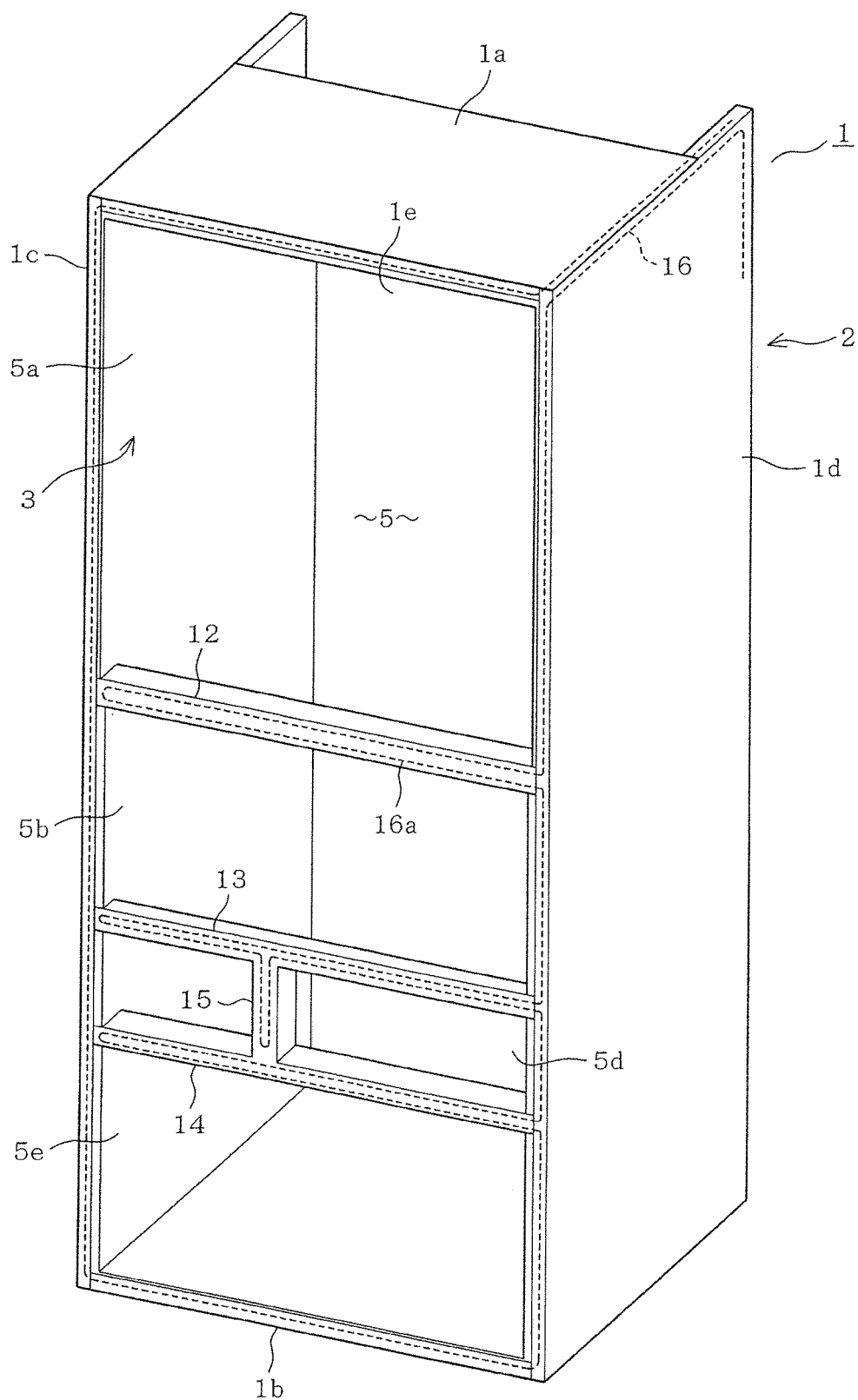


FIG. 3

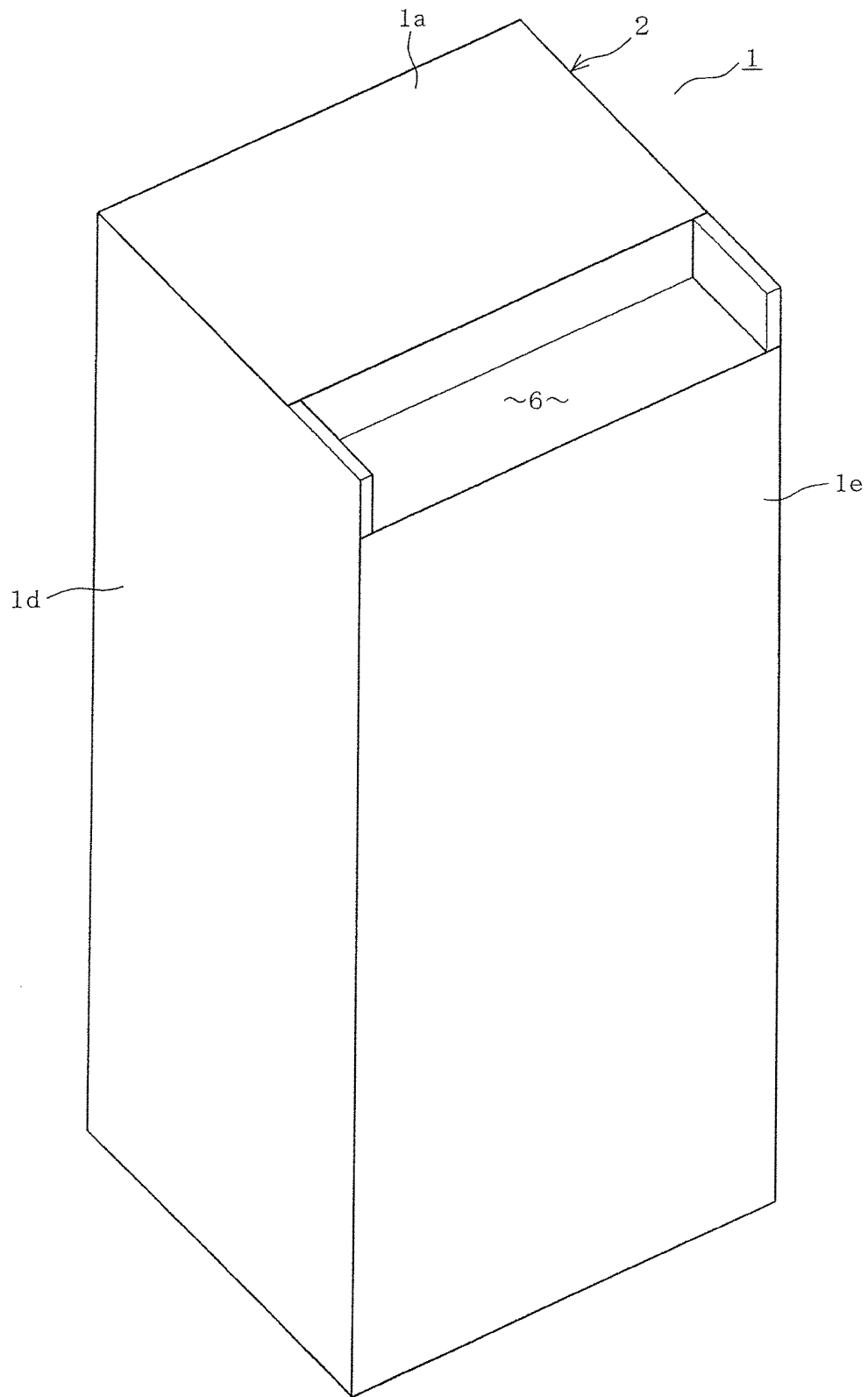


FIG. 4

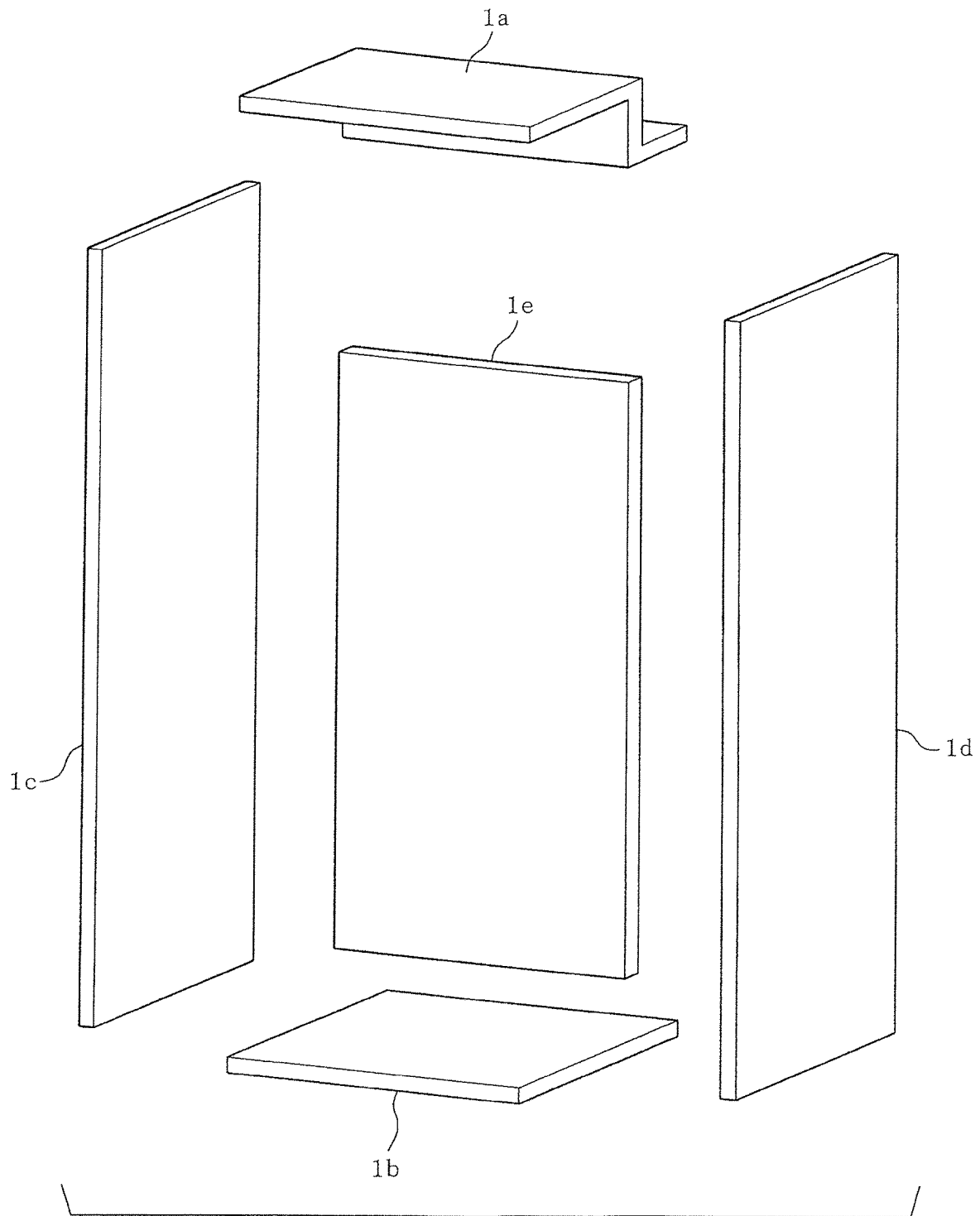


FIG. 5

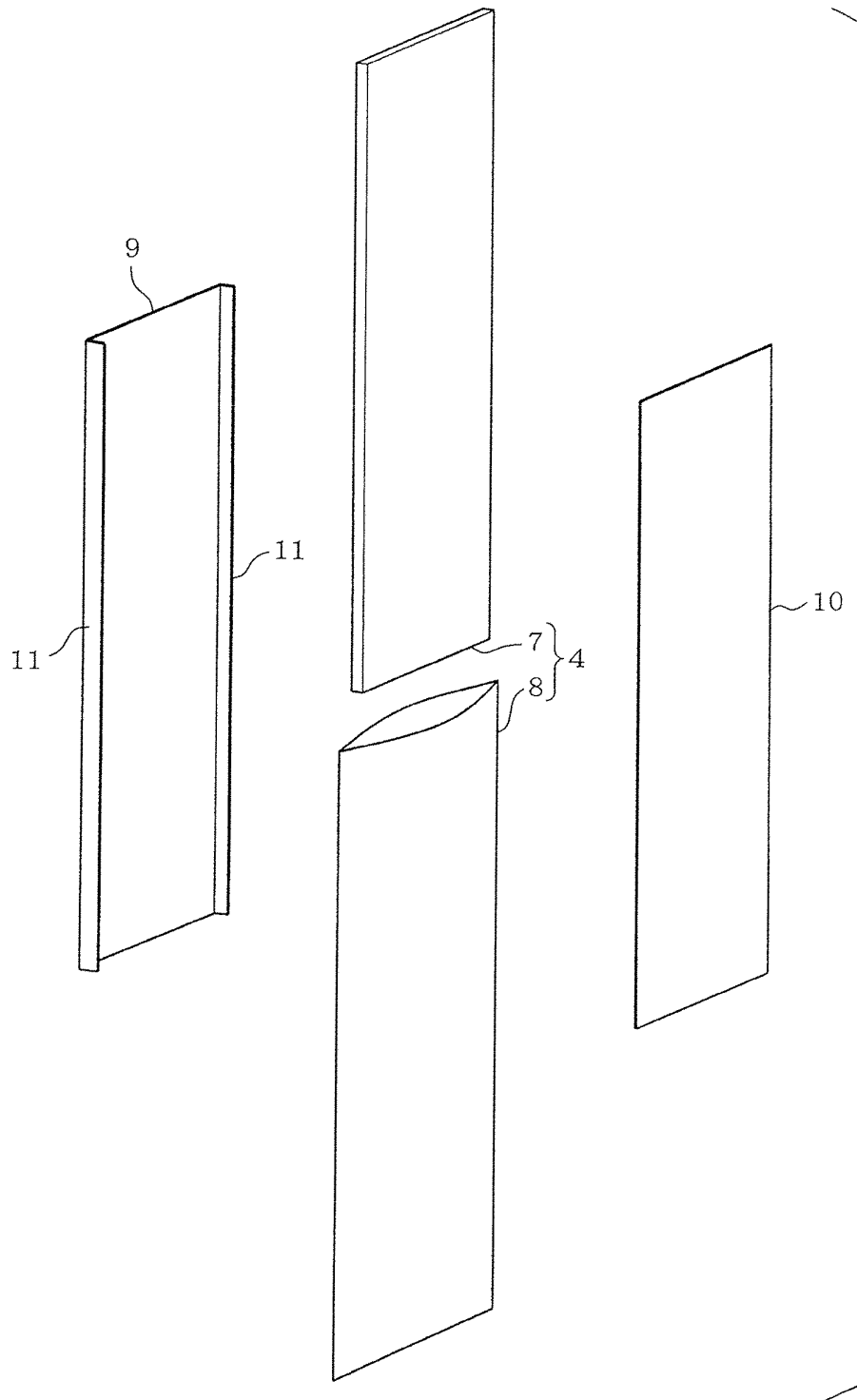


FIG. 6A

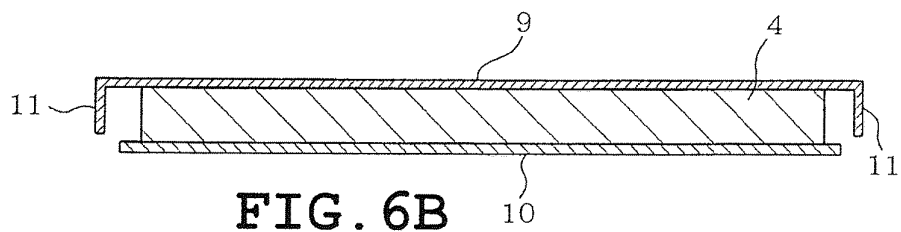


FIG. 6B

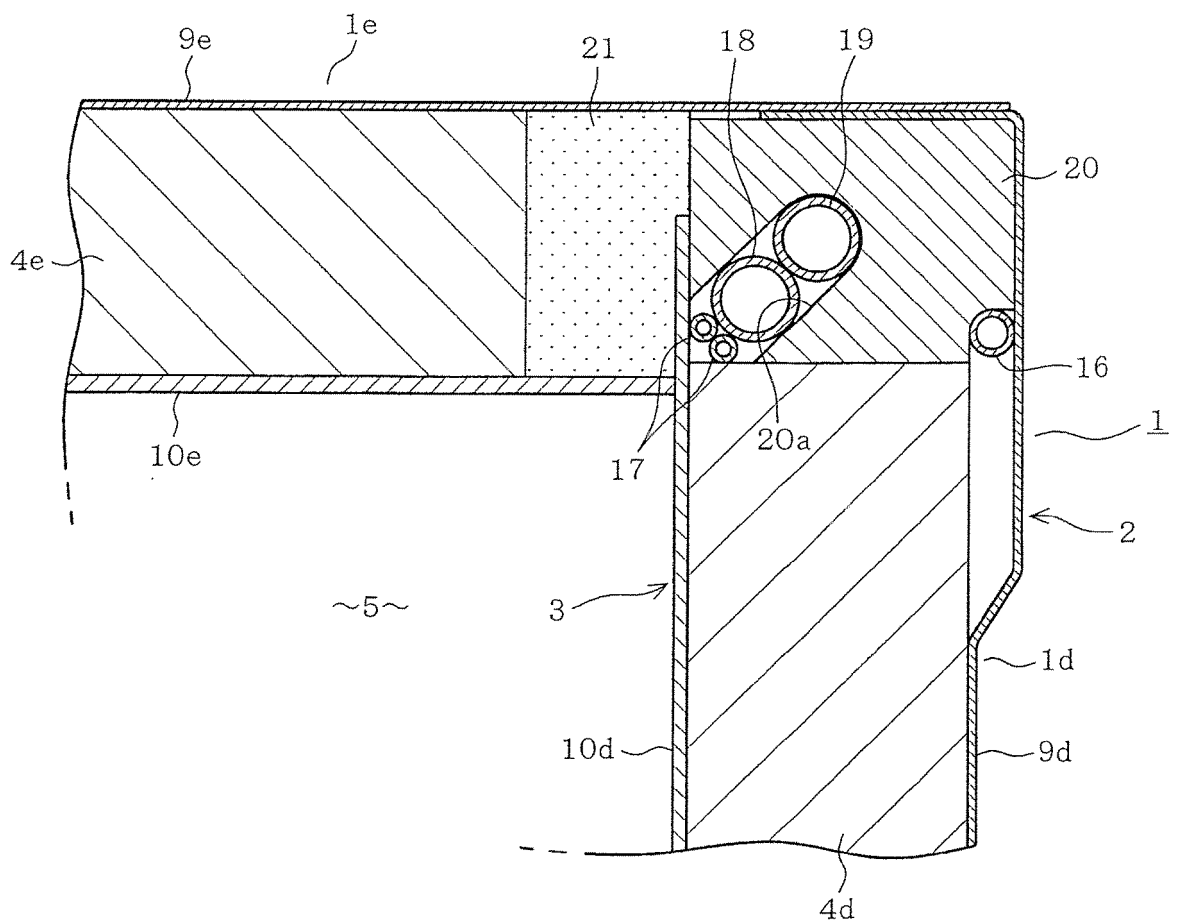


FIG. 7

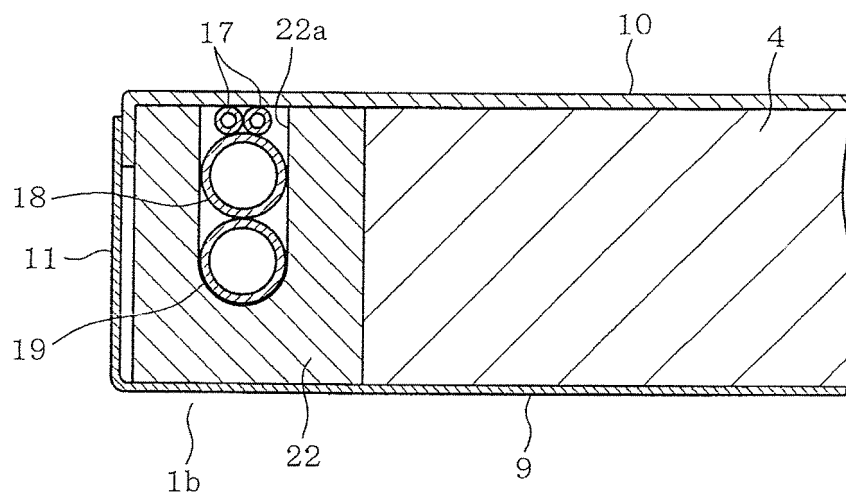


FIG. 8

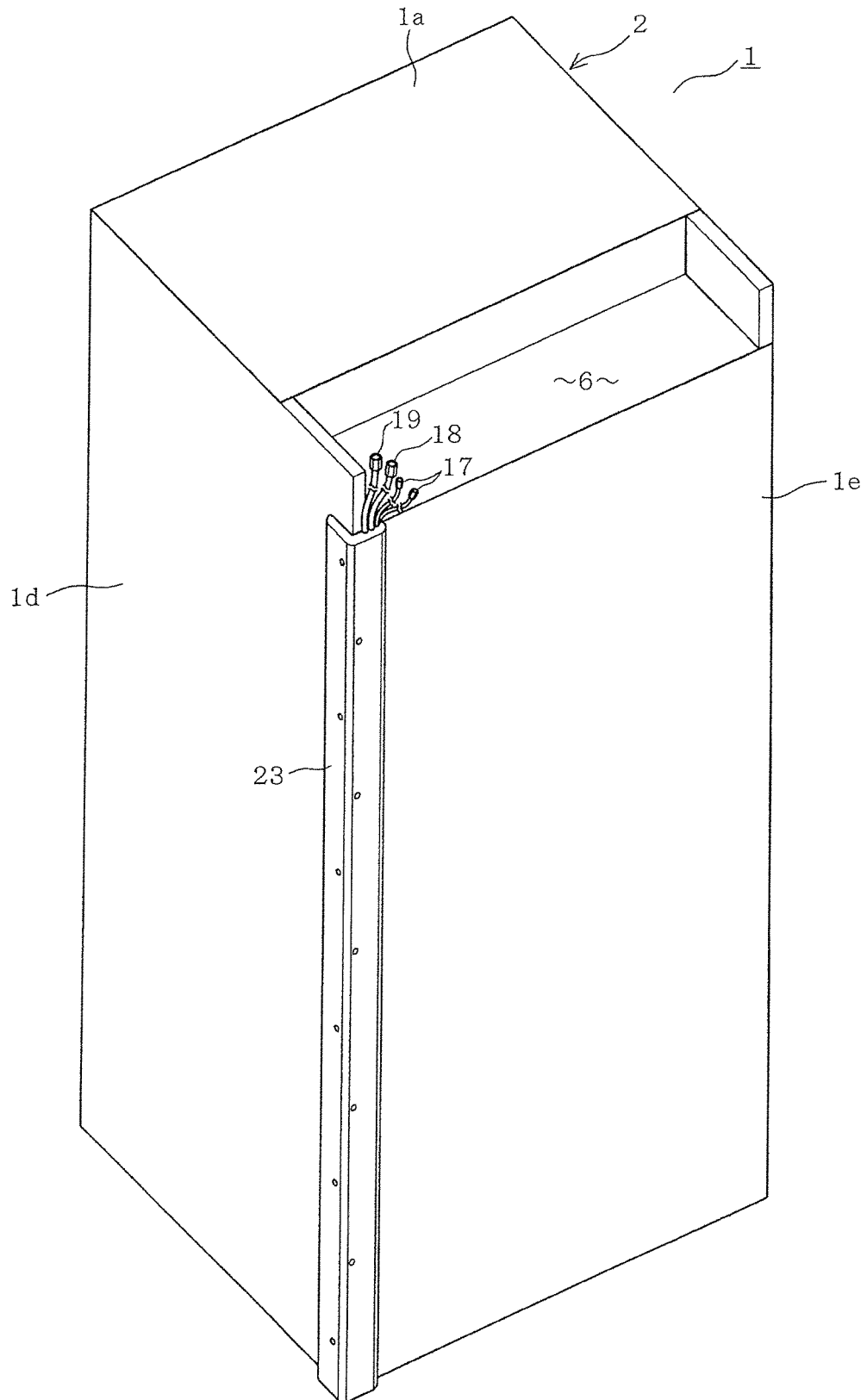


FIG. 9

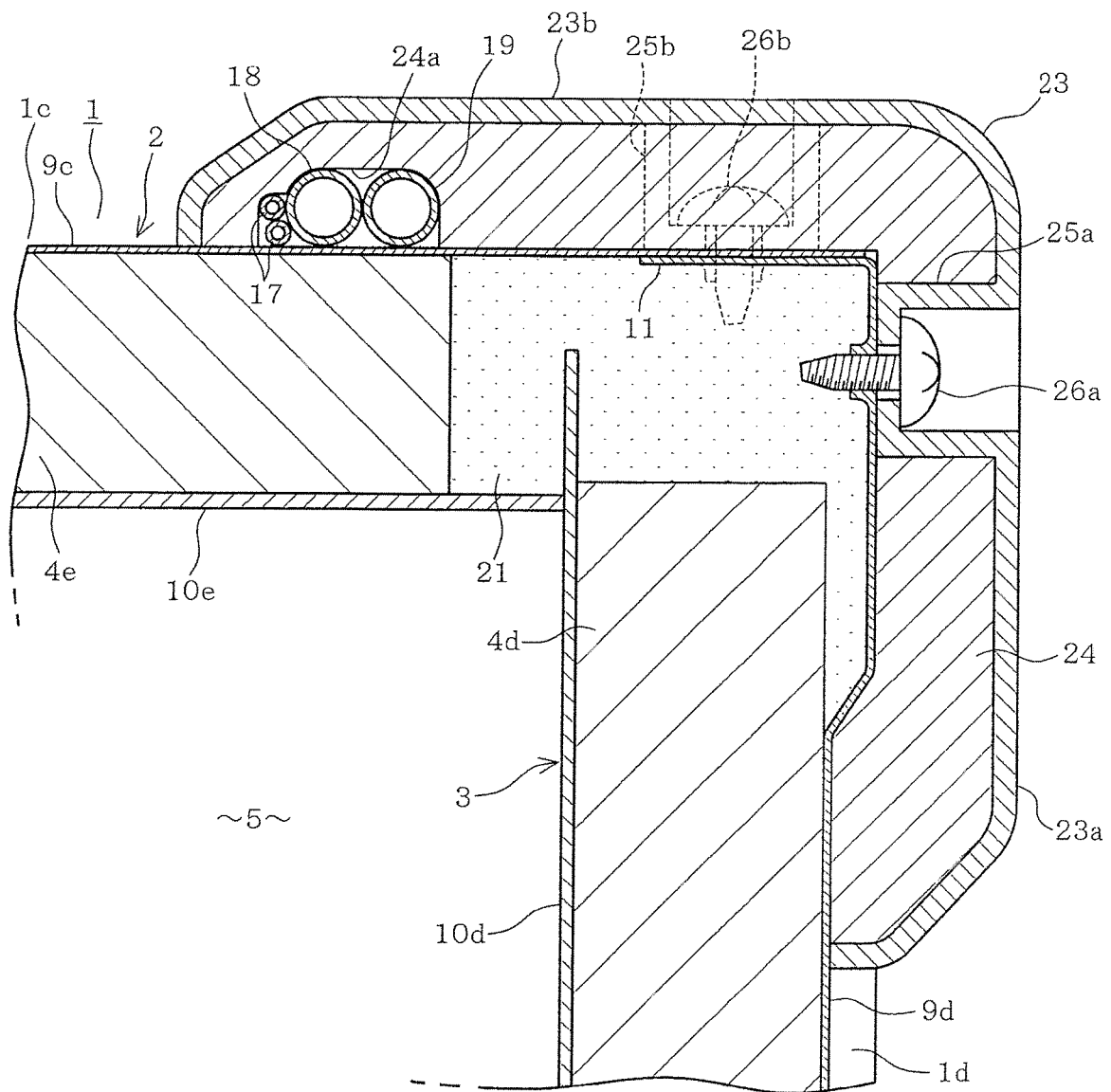


FIG. 10

REFERENCES CITED IN THE DESCRIPTION

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