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(54) **FRAME OF A WALL-EMBEDDED REFRIGERATOR**

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(57) **ABSTRACT**

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A frame of a wall-embedded refrigerator capable of providing a good appearance while simplifying its assembly process. The disclosed frame includes an outer case having a pair of side plates respectively forming opposite outer side surfaces, and a rear plate forming an outer rear surface, a pair of inner cases received in the outer case while being spaced apart from an inner surface of the outer case by a desired distance, the inner cases defining freezing and refrigerating chambers, respectively, and a cabinet flange to cover front surfaces of the outer and inner cases, and a front surface of a partition wall formed between the freezing and refrigerating chambers. The inner cases and the cabinet flange are integrally formed as an integrated inner case. The frame simplifies the assembly process, thereby achieving an improvement in productivity, a reduction in manufacturing costs, and a good refrigerator appearance.

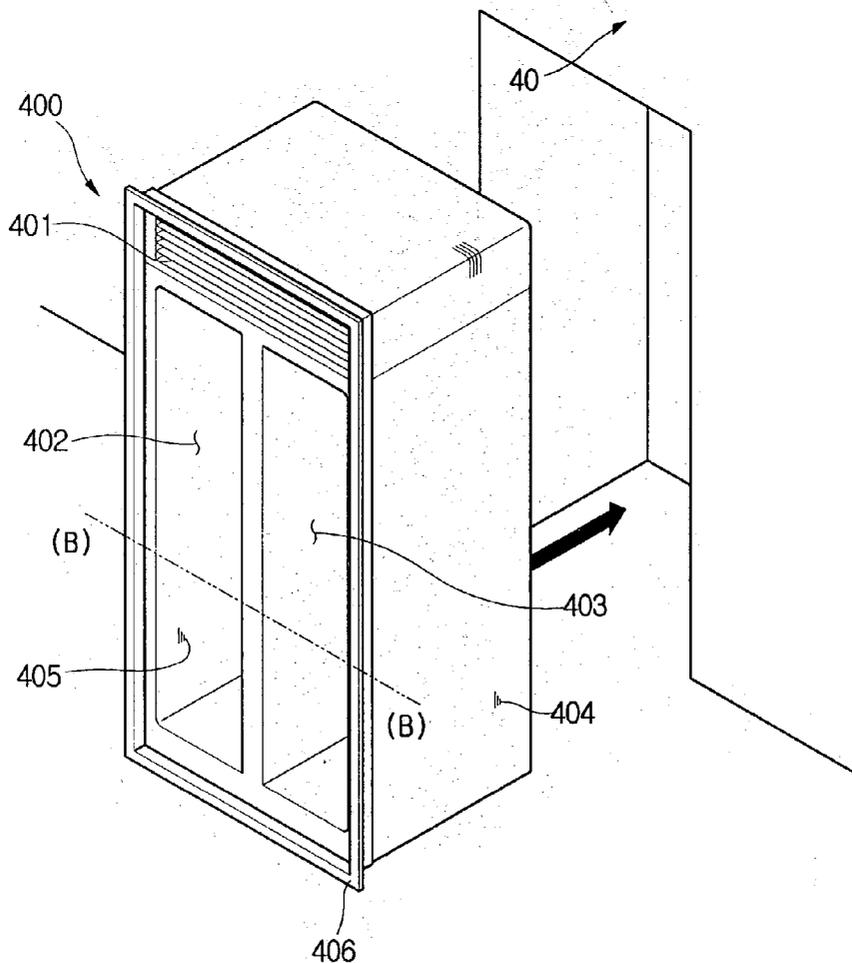


FIG. 1  
(PRIOR ART)

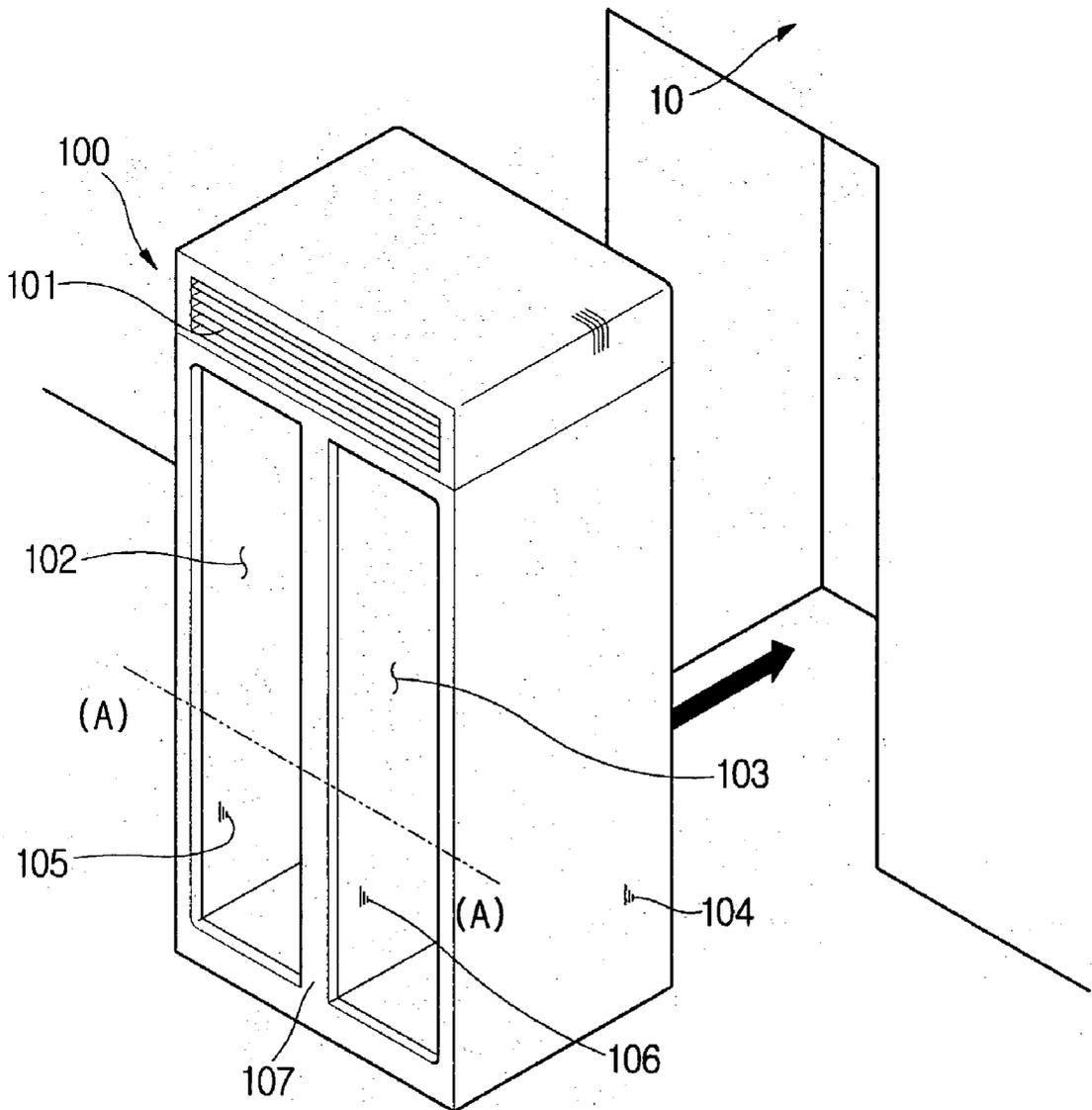


FIG. 2  
(PRIOR ART)

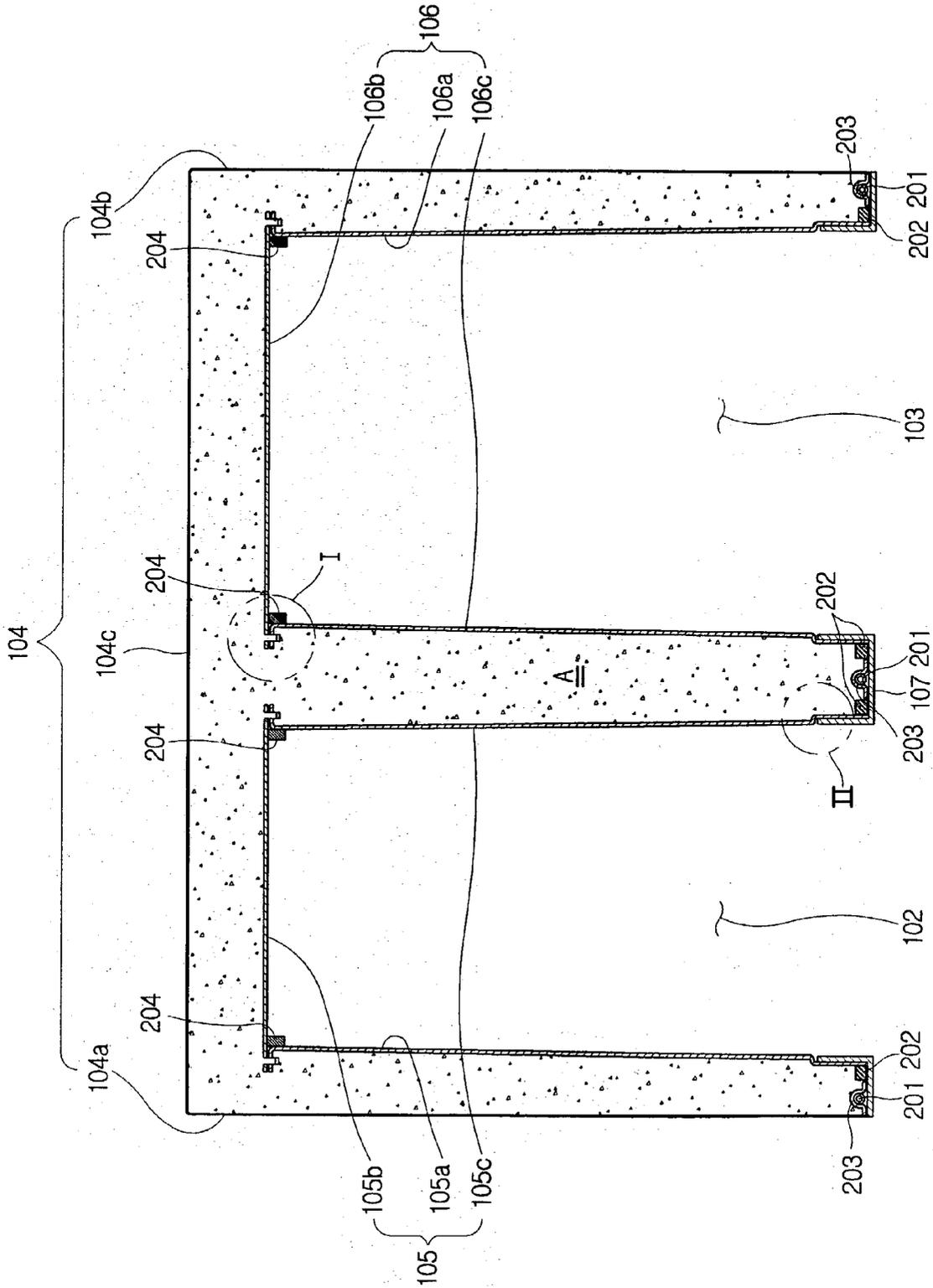


FIG. 3  
(PRIOR ART)

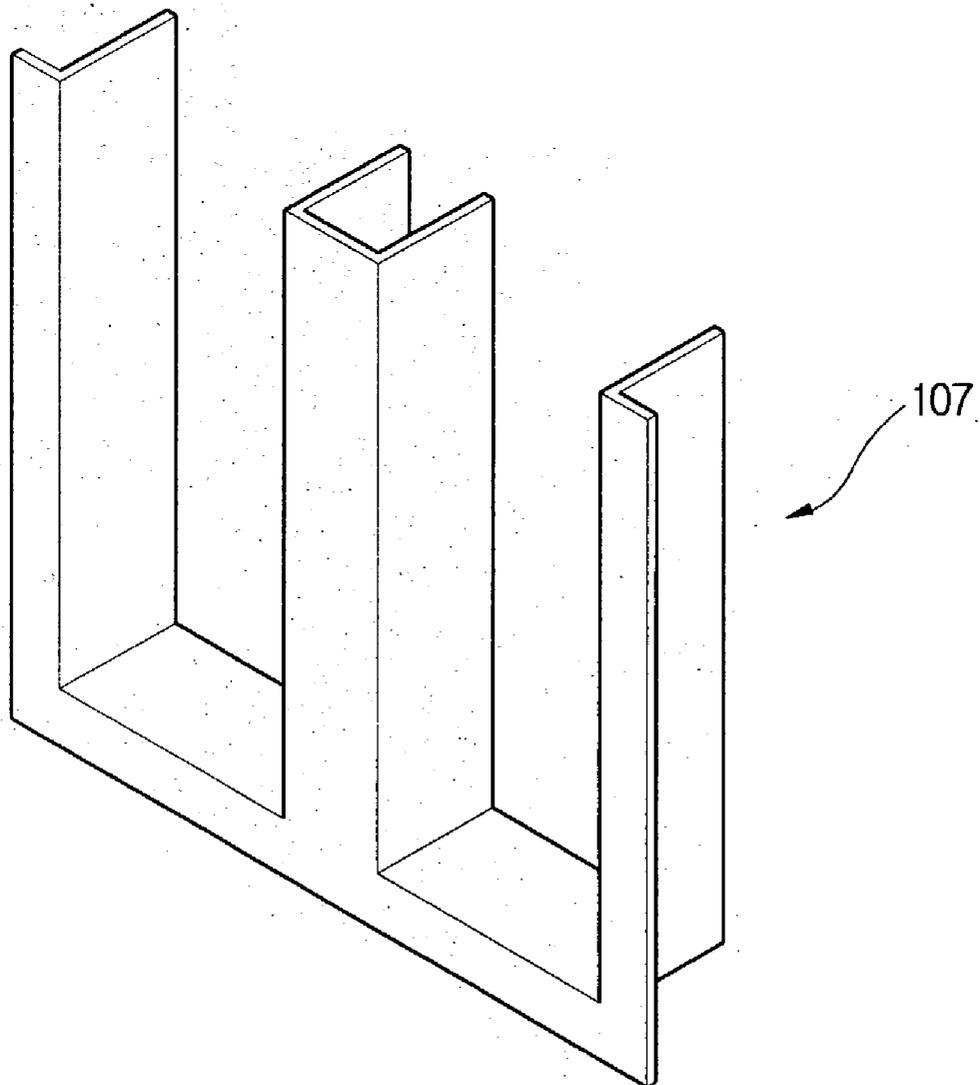


FIG. 4

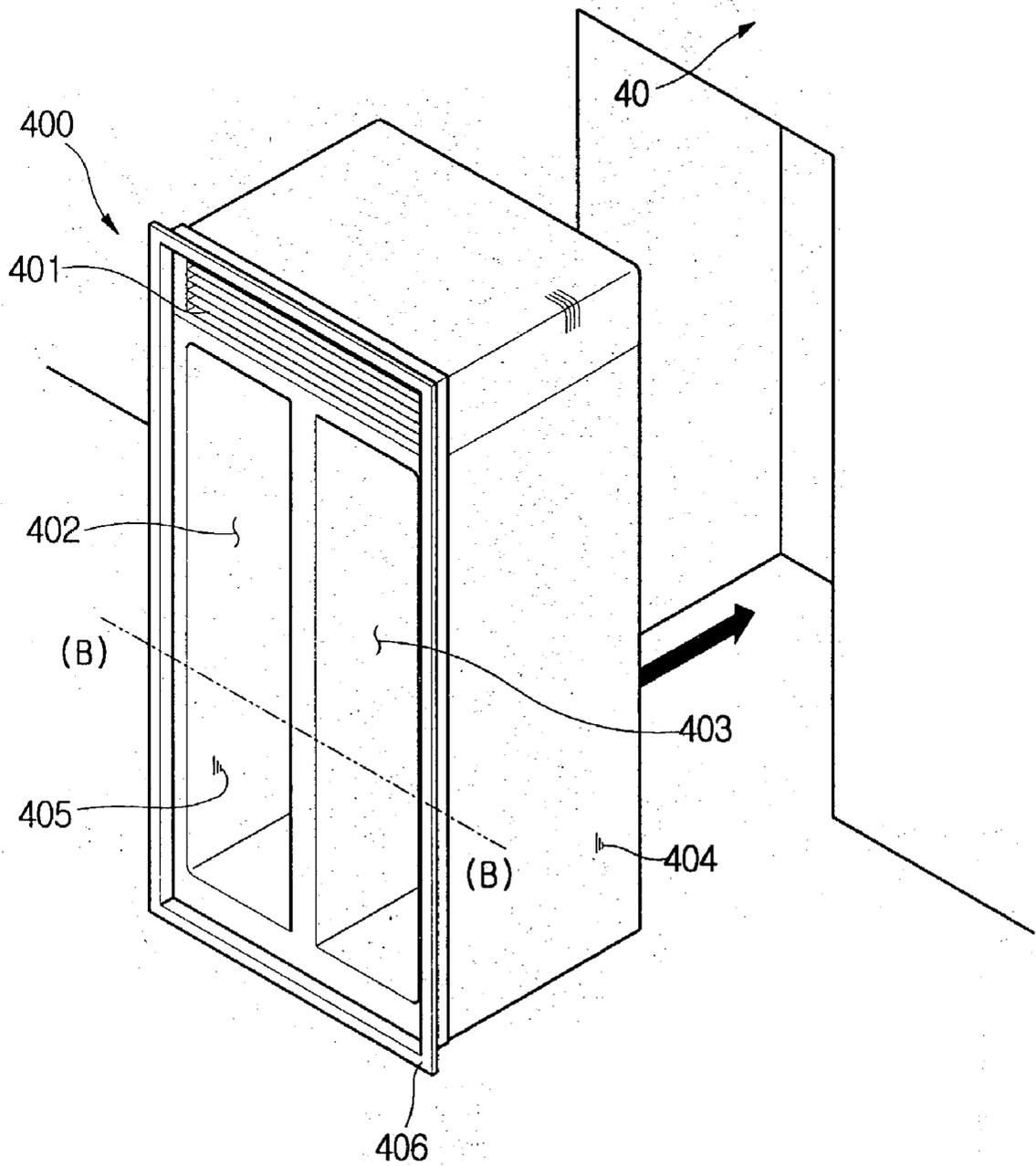


FIG. 5

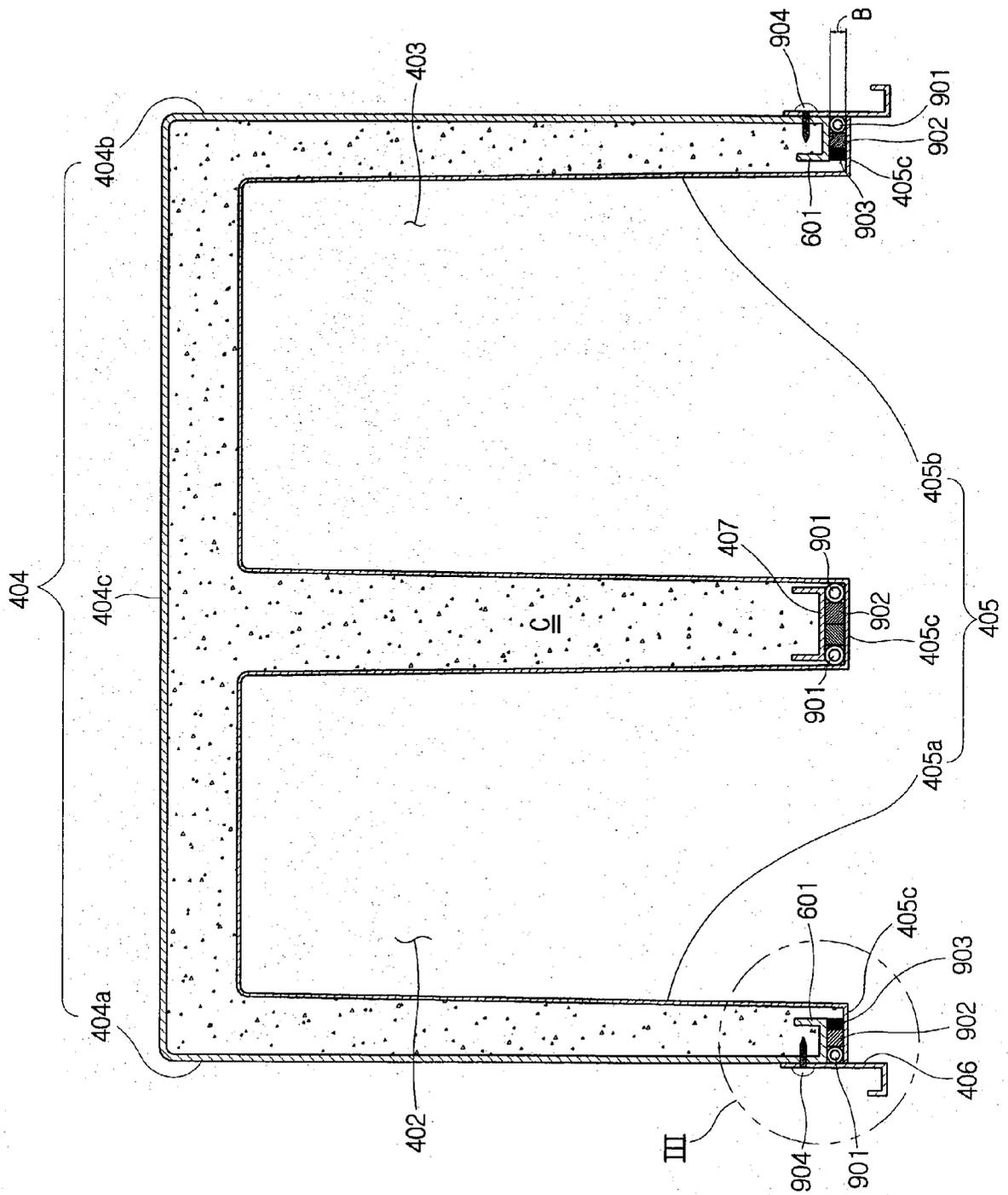


FIG. 6

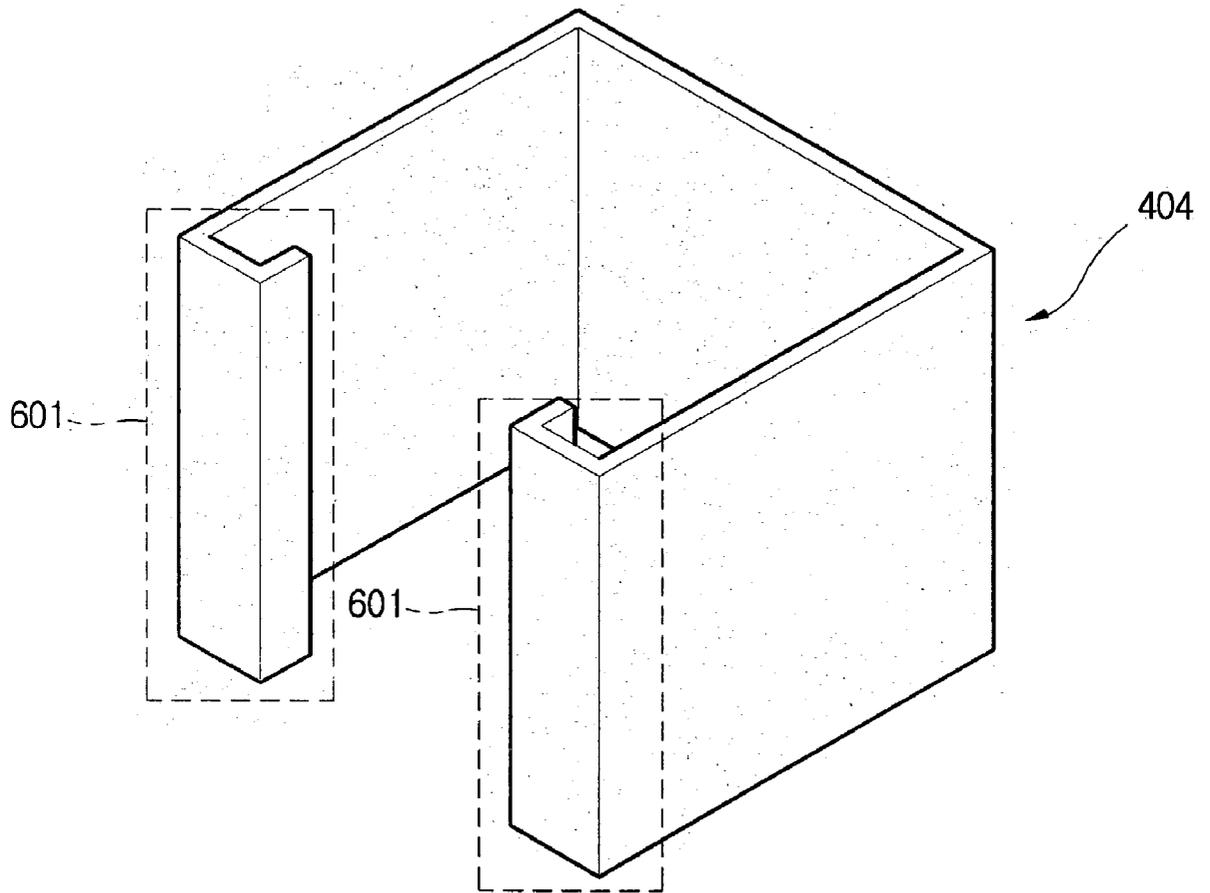


FIG. 7

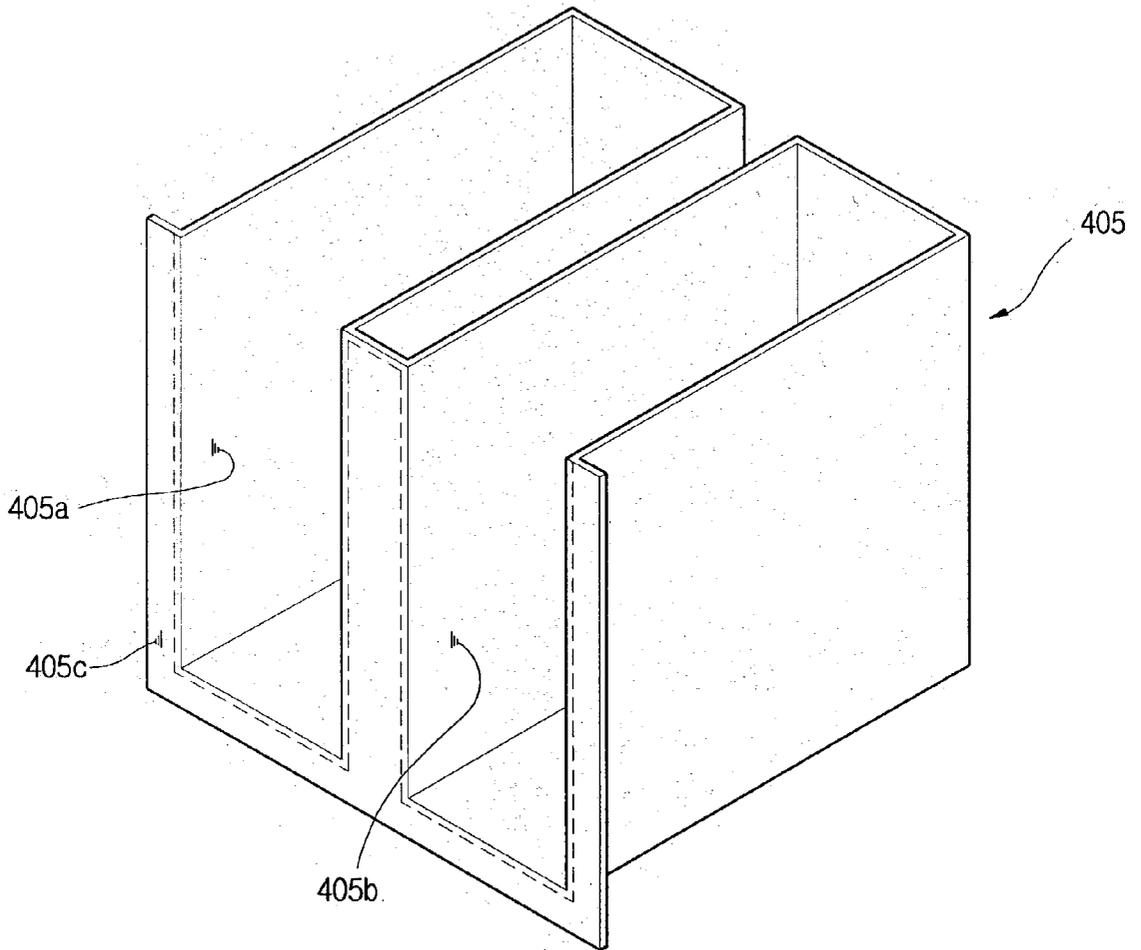


FIG. 8A

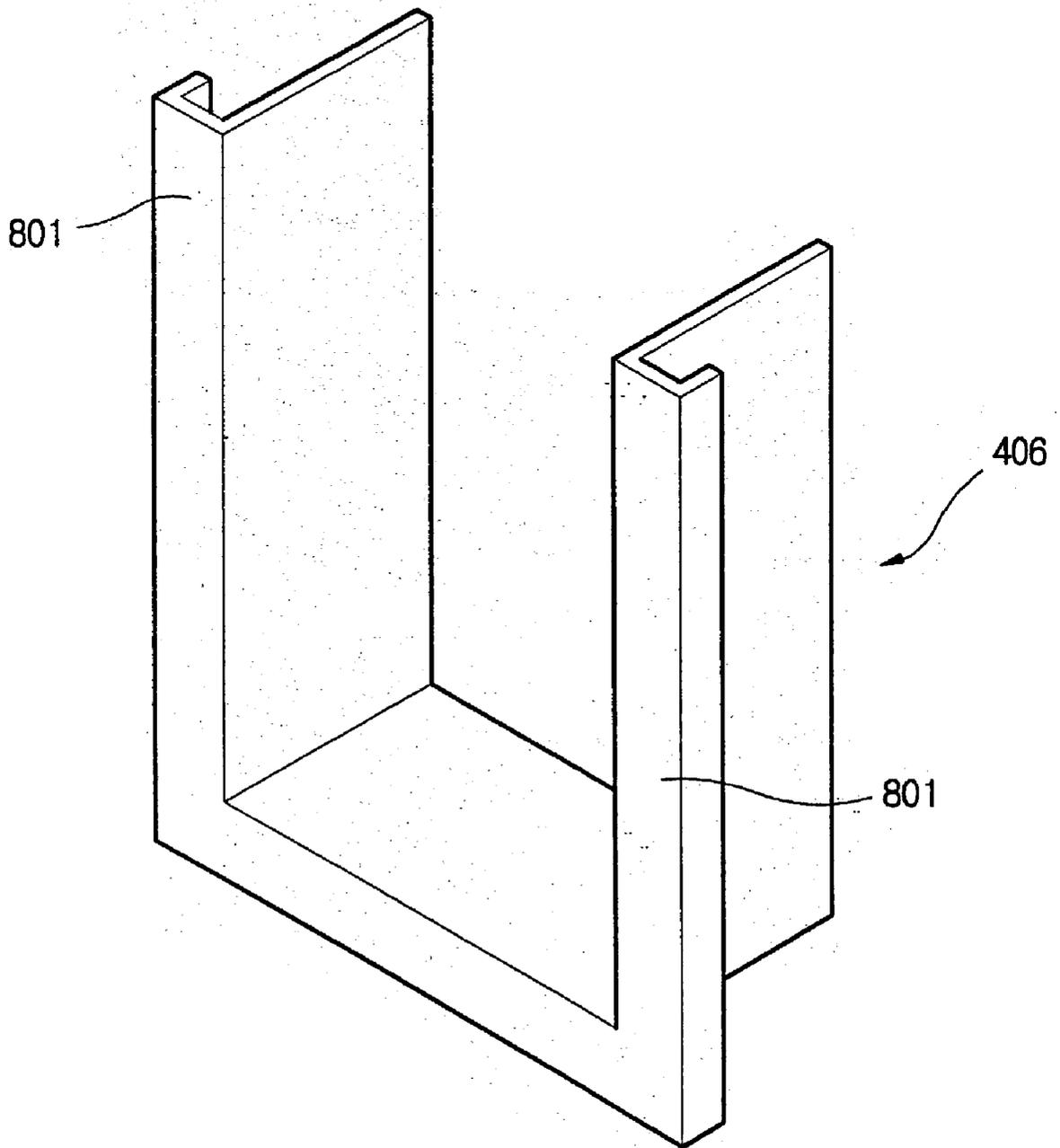


FIG. 8B

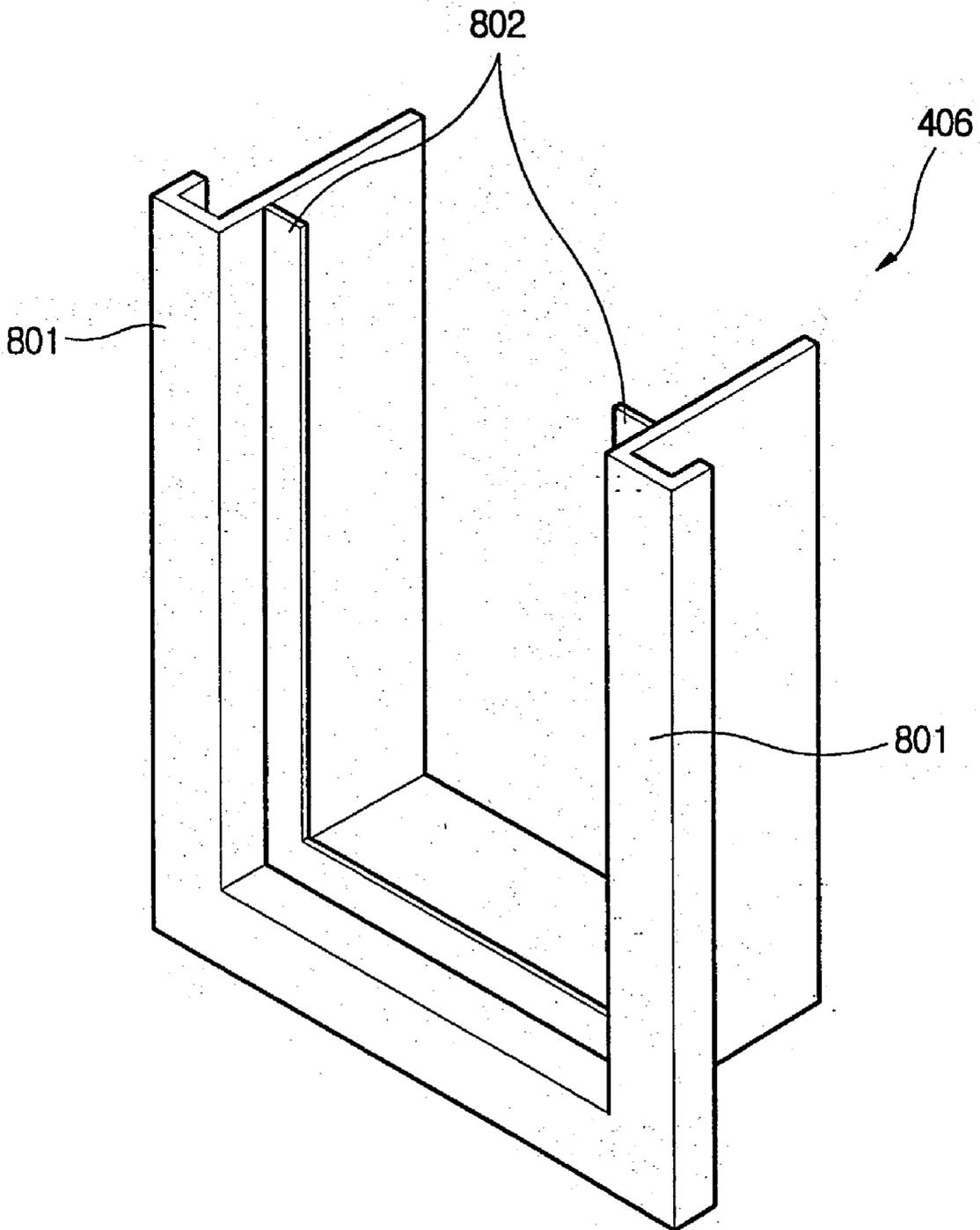
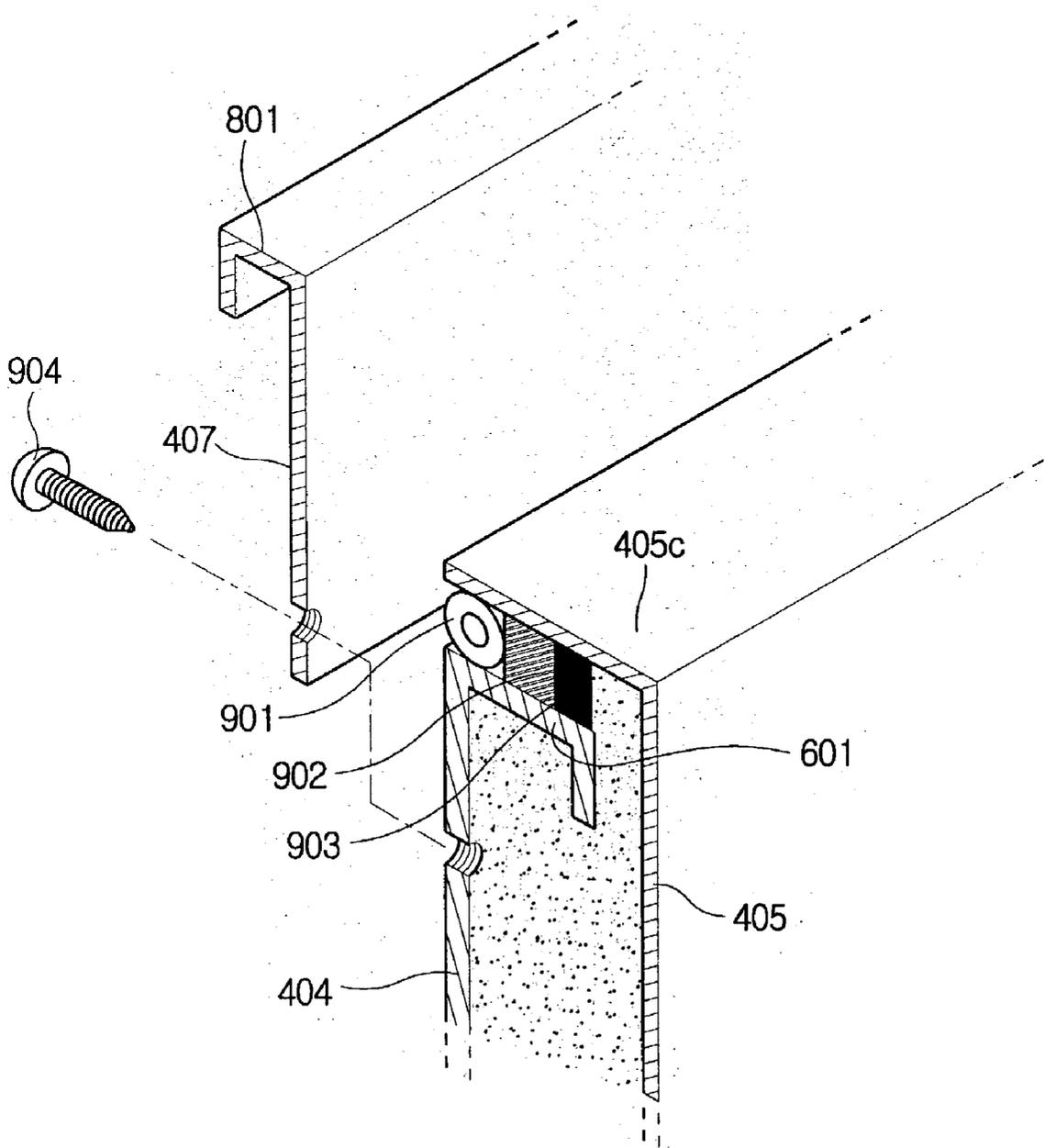


FIG. 9



## FRAME OF A WALL-EMBEDDED REFRIGERATOR

### CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of Korean Application No. 2002-52255, filed Aug. 31, 2002, in the Korean Intellectual Property Office, the disclosure of which is incorporated herein by reference.

### BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention relates to a wall-embedded refrigerator, and more particularly to a frame of such a wall-embedded refrigerator which has a simplified structure.

[0004] 2. Description of the Related Art

[0005] In order to efficiently install refrigerators of a large capacity as compared to that of general refrigerators for domestic use, a proposal has been made in which a building wall is recessed to define a space to receive or embed a refrigerator. Such a refrigerator, which is designed to meet this proposal, is called a "wall-embedded refrigerator". The frame of such a wall-embedded refrigerator will be described with reference to FIGS. 1 and 2. In FIGS. 1 and 2, elements having the same function are denoted by the same reference numeral.

[0006] FIG. 1 is a perspective view illustrating a conventional wall-embedded refrigerator 100. Arranged at the rear of the wall-embedded refrigerator 100 in FIG. 1 is a building wall 10 defined with a space in which the wall-embedded refrigerator 100 can be embedded. The wall-embedded refrigerator 100 shown in FIG. 1 includes a machine chamber 101 formed at an upper portion of the refrigerator 100, and freezing and refrigerating chambers 102 and 103 formed beneath the machine chamber 101. In order to conveniently show the freezing and refrigerating chambers 102 and 103, the illustration of their doors are eliminated. Now, the frame of the wall-embedded refrigerator 100 will be briefly described under the condition in which the doors of the freezing and refrigerating chambers 102 and 103 are removed. As shown in FIG. 1, the refrigerator frame includes an outer case 104 forming the outer surface of the refrigerator 100, a first inner case 105 defining the freezing chamber 102, a second inner case 106 defining the refrigerating chamber 103, and a cabinet flange 107 to finish the front surfaces of the cases 104, 105, and 106, and the front surface between the inner cases 105 and 106.

[0007] FIG. 2 is a cross-sectional view of a refrigerator taken along the line A-A of FIG. 1. The frame of the conventional wall-embedded refrigerator will be described in more detail with reference to FIG. 2.

[0008] The outer case 104, which forms the outer surface of the wall-embedded refrigerator 100, includes a pair of side plates, that is, left and right plates 104A and 104B, respectively forming opposite outer side surfaces, that is, outer left and right surfaces, and a rear plate 104C forming an outer rear surface. Although the outer case 104 includes a top plate forming an outer top surface, and a bottom plate forming an outer bottom surface, these plates are removed for convenience of illustration. The inner cases, that is, the

first and second inner cases 105 and 106, form inner surfaces of the wall embedded refrigerator 100 respectively defining the freezing chamber 102 and the refrigerating chamber 103. The first inner case 105 forming the freezing chamber 102 includes a first inner left surface 105A facing the left plate 104A, a first inner rear surface 105B facing the rear plate 104C, and a first inner right surface 105C forming one side surface of a partition wall A formed between the first and second inner cases 105 and 106. Although the first inner case 105 includes top and bottom plates associated with the freezing chamber 102, these plates are removed for convenience of illustration. The second inner case 106 forming the refrigerating chamber 103 includes a second inner right surface 106A facing the right plate 104B, a second inner rear surface 106B facing the rear plate 104C, and a second inner left surface 106C forming the other side surface of the partition wall A. Although the second inner case 105 includes top and bottom plates associated with the refrigerating chamber 103, these plates are removed for convenience of illustration. The cabinet flange 107 is coupled to the front surface of the refrigerator frame, that is, the front surface formed between the outer case 104 and the inner case 105, the front surface formed between the outer case 104 and the inner case 106, and the front surface of the partition wall A, in order to cover or finish those surfaces. Referring to FIG. 3, the cabinet flange 107 is clearly shown. The coupling among the first inner left surface 105A, first inner rear surface 105B, and first inner right surface 105C of the first inner case 105 forming the freezing chamber 102, and the coupling among the second inner right surface 106A, second inner rear surface 106B, and second inner left surface 106C of the second inner case 106 forming the refrigerating chamber 103 are achieved using a caulking process, as shown by a portion "I" in FIG. 2. A seal member 204 is provided at each corner of each inner case where adjacent inner surfaces are in contact with each other, in order to prevent urethane from being leaked from the space defined between the outer and inner cases when the urethane is subsequently foamed in that space.

[0009] Meanwhile, hot pipes 201 and magnets 202 are installed at the front surface of the refrigerator frame including the outer case 104, first and second inner cases 105 and 106, and the cabinet flange 107 such that they are covered by the cabinet flange 107. Each hot pipe 201 serves to prevent a dewing phenomenon from occurring at the front end of the wall-embedded refrigerator 100. The hot pipe 201 is attached to the cabinet flange 107 by means of a dip pipe 203, and a double-sided tape. The magnets 202 serve to magnetically couple the magnet-attached doors of the wall-embedded refrigerator 100 to the cabinet flange 107. Each magnet 202 is attached to the cabinet flange 107 by means of a double-sided tape.

[0010] The process of assembling the above described frame of the wall-embedded refrigerator 100 is carried out as follows:

[0011] (1) The first inner case 105 forming the freezing chamber and the second inner case 106 forming the refrigerating chamber are assembled in accordance with a caulking process;

[0012] (2) Magnets 202 are attached to the rear surface of the cabinet flange 107 by means of double-sided tapes;

[0013] (3) Hot pipes **201** are fixed to the rear surface of the cabinet flange **107** by means of clip pipes **203** attached with double-sided tapes, respectively;

[0014] (4) The first and second inner cases **105** and **106** are coupled in a fitting fashion to the cabinet flange **107** carrying the hot pipes **201** and magnets **202**; and

[0015] (5) The resultant assembly obtained in accordance with the assembly process of step (4) is assembled with the outer case **104**.

[0016] However, there are problems involved with the frame of the conventional wall-mounted refrigerator **100**, and the assembly process of that frame. The first problem is a poor appearance in that steps and gaps are formed at regions where the first and second inner cases **105** and **106** are assembled with the cabinet flange **107**. Second, the assembly process is complex because it is achieved by caulking adjacent ones of the inner surfaces of the first and second inner cases **105** and **106**. For this reason, there are a degradation in productivity and an increase in manufacturing costs. Third, the seal members **204** provided at respective corners of the first and second inner cases **105** and **106** cause a poor appearance.

#### SUMMARY OF THE INVENTION

[0017] Accordingly, it is an aspect of the present invention is to provide a frame of a wall-embedded refrigerator which can provide a good appearance while simplifying its assembly process.

[0018] Additional objects and advantages of the invention will be set forth in part in the description which follows and, in part, will be obvious from the description, or may be learned by practice of the invention.

[0019] The foregoing and/or other aspects of the present invention are accomplished by providing a frame of a refrigerator embedded in a recessed wall, the frame including an outer case having a pair of side plates respectively forming opposite outer side surfaces, and a rear plate forming an outer rear surface, a pair of inner cases received in the outer case while being spaced apart from an inner surface of the outer case by a desired distance, the inner cases defining freezing and refrigerating chambers, respectively, and a front surface section to cover front surfaces of the outer and inner cases, and a front surface of a partition wall formed between the freezing and refrigerating chambers, wherein the inner cases and the cabinet flange are integrally formed as an integrated inner case.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0020] These and/or other aspects and advantages of the invention will become apparent and more readily appreciated from the following description of the embodiments, taken in conjunction with the accompanying drawings of which:

[0021] FIG. 1 is a perspective view illustrating the appearance of a conventional wall-embedded refrigerator;

[0022] FIG. 2 is a cross-sectional view taken along the line A-A of FIG. 1;

[0023] FIG. 3 is a perspective view illustrating a cabinet flange partially taken along the line A-A of FIG. 1;

[0024] FIG. 4 is a perspective view illustrating the appearance of a wall-embedded refrigerator according to an embodiment of the present invention;

[0025] FIG. 5 is a cross-sectional view taken along the line B-B of FIG. 4;

[0026] FIG. 6 is a perspective view illustrating an outer case included in the wall-embedded refrigerator of FIG. 4, the outer case being partially taken along the line B-B of FIG. 4;

[0027] FIG. 7 is a perspective view illustrating an integrated inner case included in the wall-embedded refrigerator of FIG. 4, the integrated inner case being partially taken along the line B-B of FIG. 4;

[0028] FIG. 8A is a perspective view illustrating a cabinet chassis included in the wall-embedded refrigerator of FIG. 4, the cabinet chassis being partially taken along the line B-B of FIG. 4;

[0029] FIG. 8B is a perspective view illustrating a cabinet chassis according to another embodiment of the present invention; and

[0030] FIG. 9 is an enlarged exploded perspective view corresponding to a portion "III" of FIG. 4.

#### DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0031] Reference will now be made in detail to the embodiments of the present invention, examples of which are illustrated in the accompanying drawings, wherein like reference numerals refer to like elements throughout. The embodiments are described below in order to explain the present invention by referring to the figures.

[0032] FIG. 4 is a perspective view illustrating the appearance of a wall-embedded refrigerator **400** according to an embodiment of the present invention.

[0033] Arranged at the rear of the wall-embedded refrigerator **400** in FIG. 4 is a building wall **40** defined with a space in which the wall-embedded refrigerator **400** can be embedded. As shown in FIG. 4, the wall-embedded refrigerator **400** includes a machine chamber **401** formed at an upper portion of the refrigerator **400**, and freezing and refrigerating chambers **402** and **403** formed beneath the machine chamber **401**. In order to conveniently show the freezing and refrigerating chambers **402** and **403**, the illustration of their doors are eliminated. Now, the frame of the wall-embedded refrigerator **400** will be brief described under the condition in which the doors of the freezing and refrigerating chambers **402** and **403** are removed. As shown in FIG. 4, the refrigerator frame includes an outer case **404** forming the outer surface of the refrigerator **400**, an integrated inner case **405** defining both the freezing and refrigerating chambers **402** and **403**, and a cabinet chassis **406** to finish the front surface edges of the outer and inner cases **404** and **405**.

[0034] FIG. 5 is a cross-sectional view taken along the line B-B of FIG. 4. Referring to FIG. 5, the frame of the wall-embedded refrigerator according to this embodiment is more clearly illustrated.

[0035] The outer case **404**, which forms the outer surface of the wall-embedded refrigerator **400**, includes a pair of

side plates, that is, left and right plates **404A** and **404B**, respectively forming opposite outer side surfaces, that is, outer left and right surfaces, and a rear plate **404C** forming an outer rear surface. Although the outer case **404** includes a top plate forming an outer top surface, and a bottom plate forming an outer bottom surface, these plates are removed for convenience of illustration. This structure of the outer case **404** is more clearly illustrated in **FIG. 6**. The structure of the outer case **404** will be described in more detail with reference to **FIGS. 5 and 6**. The side plates **404a** and **404b** of the outer case **404** is provided at respective front ends thereof with extensions **601** each extending from an associated one of the front ends toward the integral inner case **405** while being bent. These extensions **601** serve to support hot pipes and magnets, as described hereinafter. In accordance with the illustrated embodiment of **FIG. 6**, each extension **601** has a double-bent structure primarily bent toward the inner case **405**, and then secondarily bent toward the rear plate **404C** of the outer case **404**.

[0036] Referring to **FIG. 7**, the structure of the integral inner case **405**, which forms the inner and front surfaces of the wall-embedded refrigerator **400**, is clearly illustrated. As shown in **FIG. 7**, the integral inner case **405** includes a freezing chamber surface section **405A** defining the freezing chamber **402**, a refrigerating chamber surface section **405B** defining the refrigerating chamber **403**, and a front surface section **405C** forming the front surface of the wall-embedded refrigerator **400**.

[0037] The cabinet chassis **406** to finish the front surface edges of the wall-embedded refrigerator **400** is clearly illustrated in **FIGS. 8A and 8B**. **FIG. 8A** is a perspective view illustrating the cabinet chassis **406** of **FIG. 5**. The structure of the cabinet chassis **406** will be described in detail with reference to **FIGS. 5 and 8A**. The cabinet chassis **406** is provided at its front end with a bent portion **801** primarily bent outwardly to extend along the front surface of the refrigerator **400**, and then secondarily bent toward the rear portion of the refrigerator **400**. The bent portion **801** of the cabinet chassis **406** serves to hide gaps possibly formed between the building wall **40** and the cabinet chassis **406** when the refrigerator **400** is embedded in the space formed in the building wall **40**, thereby providing a good appearance.

[0038] Referring to **FIG. 8B**, a cabinet chassis according to another embodiment of the present invention is illustrated. The cabinet chassis of **FIG. 8B** further has a support rim **802** to support the front surface edge of the integrated inner case **405** in a state in which the frame of the wall-embedded refrigerator is completely assembled, thereby preventing the front surface edge of the integrated inner case **405** from being protruded.

[0039] The detailed configuration of the refrigerator frame according to **FIG. 5** will now be described with reference to **FIG. 9**, which is an enlarged view corresponding to a portion "III" of **FIG. 5**.

[0040] The front surface section **405C** of the inner case **405** and the extension **601** of the outer case **404** are uniformly spaced apart from each other by a distance **B** (**FIG. 5**). This space receives hot pipes **901** to prevent a dewing phenomenon from occurring at the front end of the wall-embedded refrigerator **400**, and magnets **902** to magnetically couple the magnet-attached doors of the wall-

embedded refrigerator **400** to the front surface section **405C** of the inner case **405**. The extension **601** of the outer case **404** serves to support the hot pipes **901** and magnets **902** such that the hot pipes **901** and magnets **902** are in dose contact with the front surface section **405C** of the inner case **405**. Seal members **903** are disposed in the space defined by the distance **B** in order to sealably isolate the hot pipes **901** and magnets **902** from the freezing chamber surface section **405A** or refrigerating chamber surface section **406B** of the inner case **405**, thereby preventing urethane from being leaked from the space when the urethane is foamed in the space. The cabinet chassis **406** is fixed to the outer case **404** by means of set screws **904**.

[0041] Referring to **FIG. 5**, it can be seen that a partition wall **C** is formed by the freezing chamber surface section **405A** refrigerating chamber surface section **405B**, and front surface section **405C**. As shown in **FIG. 5**, two hot pipes **901** and one magnet **902** are provided at the partition wall **C** so that they are in close contact with the front surface section **405C**. In order to make the hot pipes **901** and magnet **902** be in dose contact with the front surface section **405C**, a support member **407** is arranged in the space defined by the partition wall **C** while being fixedly mounted to the outer case **404**.

[0042] The process of assembling the frame of the wall-embedded refrigerator **400** having the above described configuration is carried out as follows:

[0043] (1) Hot pipes **901**, magnets **902**, and seal members **903** are installed at the extension **601** of the outer case **404** and the support member **407** is fixedly mounted to the outer case **404**;

[0044] (2) The integral inner case **405** is fitted in the outer case **404**, and urethane is foamed in a space defined between the outer case **404** and the inner case **405**; and

[0045] (3) The cabinet chassis **406** is fixedly mounted to the outer case **404** by means of set screws after completion of the foaming.

[0046] As is apparent from the above description, the frame of the wall-embedded refrigerator according to the present invention provides a superior appearance in that there is no step or gap formed by the inner case, and that the cabinet chassis is used to finish the frame. In addition, loss of cold air is reduced, thereby reducing the consumption of electric power. Since the inner case according to the present invention has an integrated structure, it is possible to achieve an improvement in assembling workability and productivity and a reduction in manufacturing costs.

[0047] Although a few embodiments of the present invention have been shown and described, it would be appreciated by those skilled in the art that changes may be made in this embodiment without departing from the principles and spirit of the invention, the scope of which is defined in the claims and their equivalents.

What is claimed is:

1. A frame of a refrigerator embedded in a recessed wall, the frame comprising:

an outer case having a pair of side plates respectively forming opposite outer side surfaces, and a rear plate forming an outer rear surface;

a pair of inner cases received in the outer case while being spaced apart from an inner surface of the outer case by a desired distance, the inner cases being separated by a partition wall and defining freezing and refrigerating chambers, respectively; and

a front surface section to cover front surfaces of the outer and inner cases, and a front surface of the partition wall formed between the freezing and refrigerating chambers,

wherein the inner cases and the front surface section are integrally formed as an integrated inner case.

2. The frame according to claim 1, further comprising:

extensions provided at respective front ends of the side plates of the outer case each extending from an associated one of the front ends toward the integral inner case while being bent, thereby maintaining a desired space between the extension and a front surface of the integral inner case such that the space receives at least one hot pipe to prevent a dewing phenomenon from occurring at a front end of the wall-embedded refrigerator.

3. The frame according to claim 2, further comprising at least one magnet provided in the space to magnetically couple a magnet-attached door of the wall-embedded refrigerator to the front surface of the integrated inner case.

4. The frame according to claim 3, further comprising a seal member provided in the space to sealably isolate the hot pipe and the magnet from the integrated inner case, thereby preventing urethane from being leaked from the space when the urethane is foamed in the space.

5. The frame according to claim 3, further comprising:

a cabinet chassis to finish a front surface edge of the outer case and a front surface edge of the integrated inner case; and

a fixing unit to fix the cabinet chassis to the outer case.

6. The frame according to claim 5, further comprising a bent portion provided at a front end of the cabinet chassis extending toward the front end of the wall-embedded refrigerator while being bent toward the wall, and adapted to hide a gap defined between the outer case and the wall.

7. The frame according to claim 5, wherein the fixing unit comprises set screws.

8. The frame according to claim 5, further comprising a support rim provided at the cabinet chassis to support the front surface edge of the integrated inner case.

9. The frame according to claim 1, wherein the partition wall formed between the freezing and refrigerating cham-

bers in the integrated inner case defines a space to receive at least one hot pipe to prevent a dewing phenomenon from occurring at a front end of the wall-embedded refrigerator, and at least one magnet to magnetically couple a magnet-attached door of the wall-embedded refrigerator to a front surface of the integrated inner case.

10. The frame according to claim 9, further comprising a support member arranged in the space defined by the partition wall while being fixedly mounted to the outer case to make the hot pipe and the magnet be in dose contact with the front surface of the integrated inner case.

11. A frame of a refrigerator to be embedded within a recessed wall, comprising:

an outer case;

an inner case received in the outer case and separated by a partition wall into a freezing chamber and a refrigerating chamber; and

a cabinet chassis to finish the front surface edges of the outer and inner cases.

12. The frame according to claim 11, wherein the outer case further comprises:

a pair of side plates forming opposite outer side surfaces;

a rear plate forming an outer rear surface; and

a top plate forming an outer top surface;

a bottom plate forming an outer bottom surface.

13. The frame according to claim 12, further comprising extensions provided at a front end of each side plate toward the inner case and having a double-bent structure to extend back toward the rear plate.

14. The frame according to claim 13, wherein the inner case further comprises front surfaces to cover the respective extensions.

15. The frame according to claim 14, further comprising urethane foamed between the outer case and the inner case.

16. The frame according to claim 14, further comprising a pair of magnets and a hot pipe fitted between each extension and a respective covering inner case front surface such that the pair of magnets and hot pipe are surrounded by an extension, an inner front surface and a side of the cabinet chassis.

17. The frame according to claim 11, wherein the inner case has an integrated structure.

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