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(54) **COOL AIR SUPPLY STRUCTURE FOR REFRIGERATOR**

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(57) **ABSTRACT**

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The present invention discloses a cool air supply structure for a refrigerator, including an inner casing defining a storage space in the refrigerator, a cool air discharge hole formed at the inner casing, and a passage member provided at the rear face of the inner casing, for forming a cool air passage and communicating with the cool air discharge hole, or including a passage provided at a rear face of an inner casing defining a storage space in the refrigerator, the cool air to be supplied to the storage space flowing in the passage, and at least one cool air discharge hole formed at the front face of the inner casing, and operated as an outlet for discharging the cool air flowing in the passage. As a result, the flow of the cool air can be facilitated by the simple configuration.

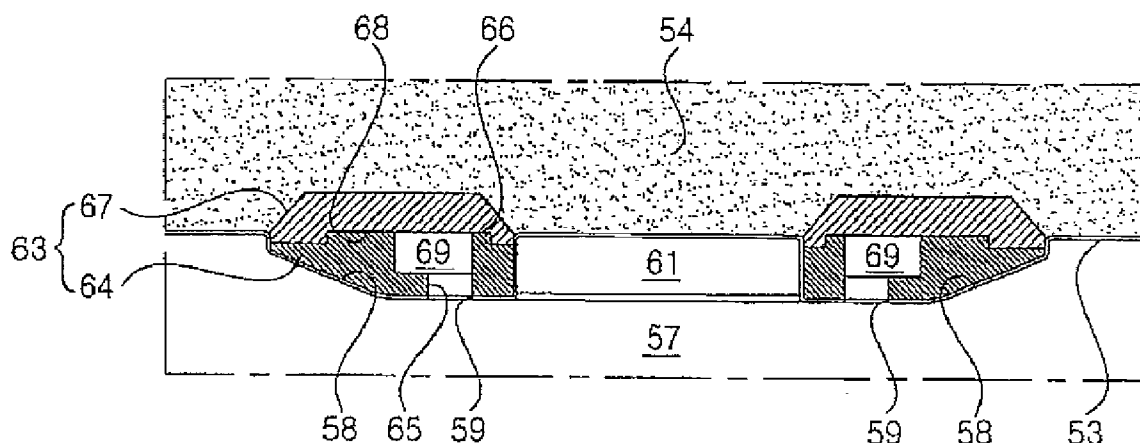


FIG. 1

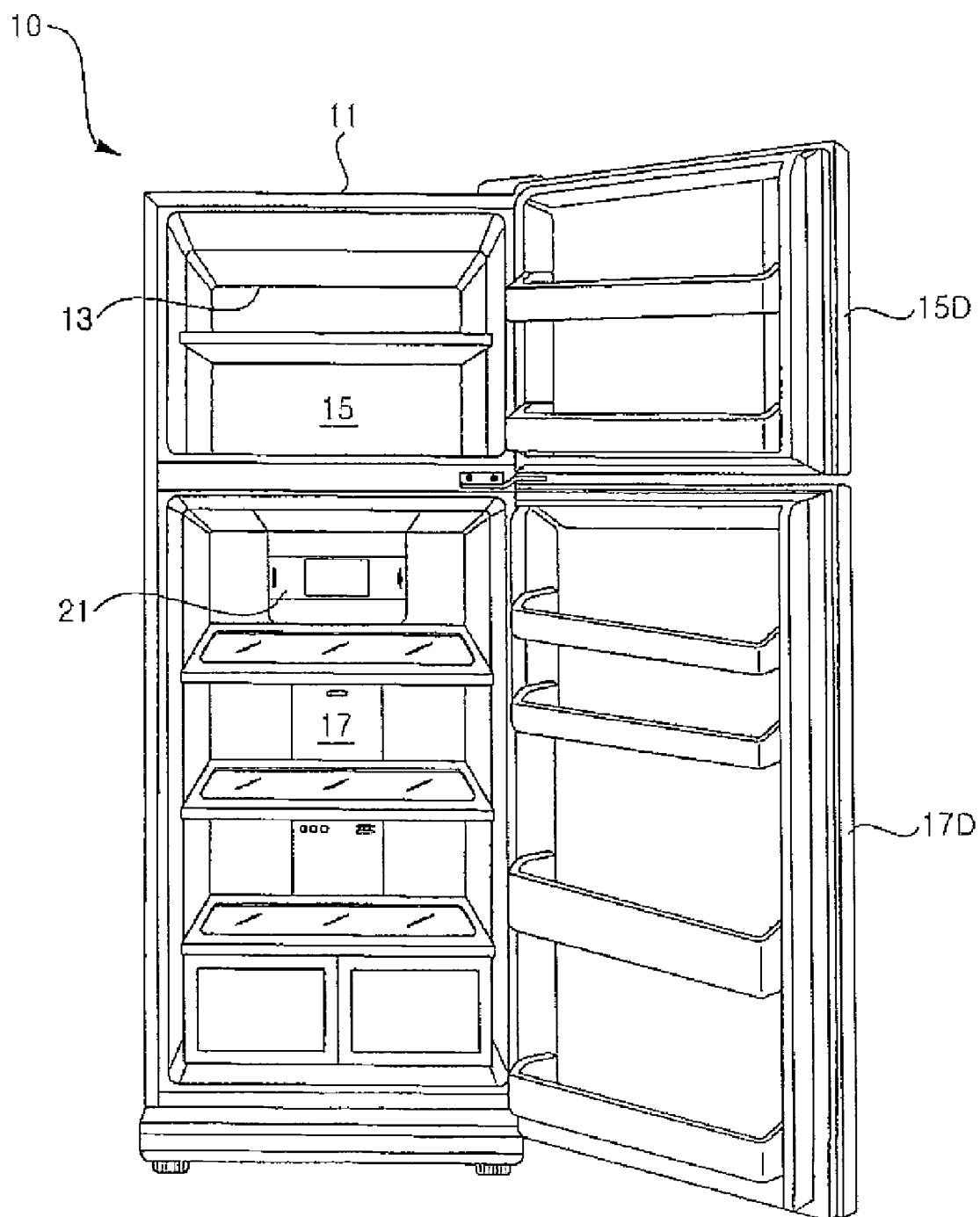


FIG. 2

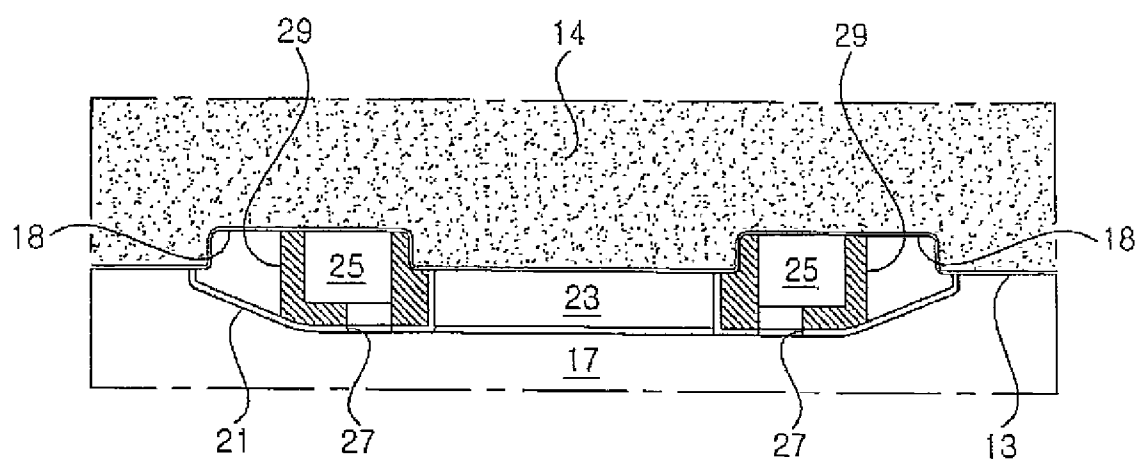


FIG. 3

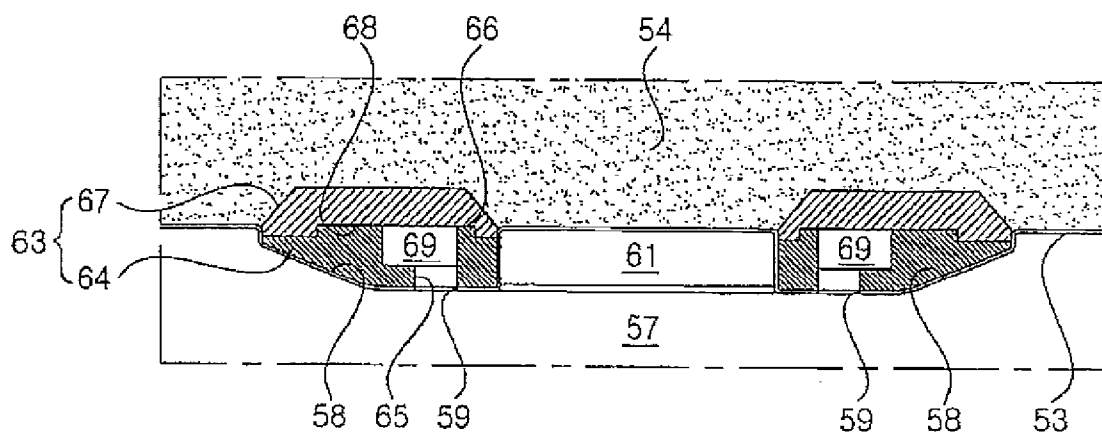


FIG. 4A

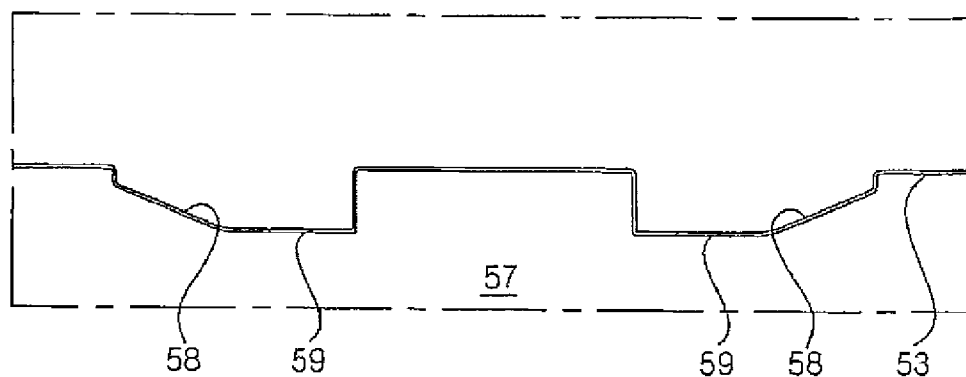


FIG. 4B

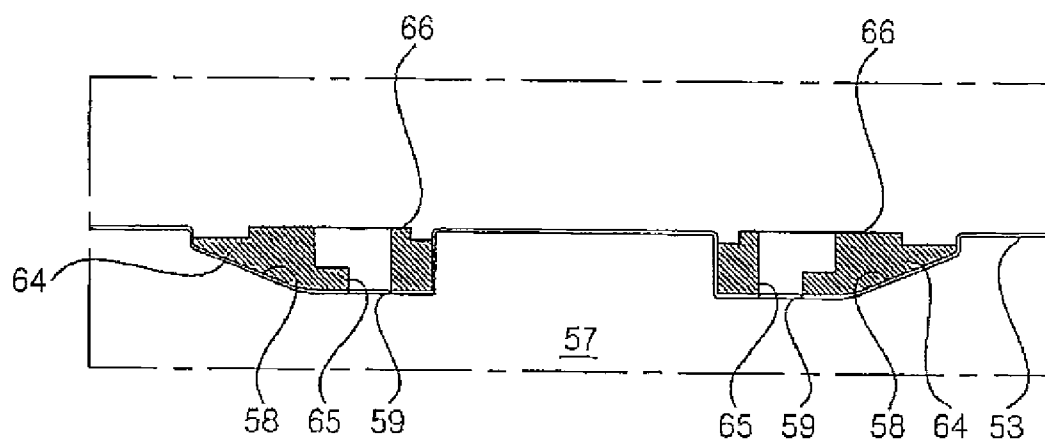
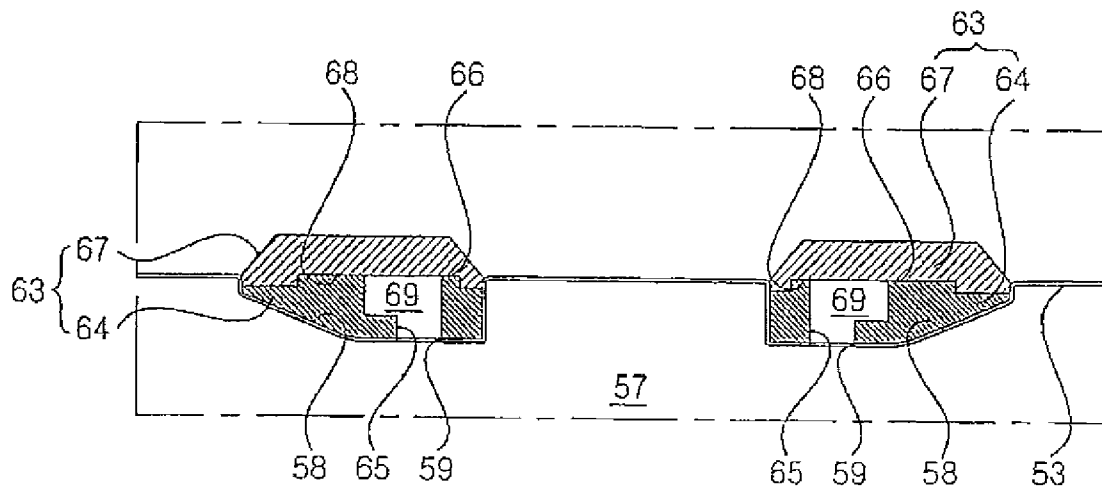


FIG. 4C



COOL AIR SUPPLY STRUCTURE FOR REFRIGERATOR

TECHNICAL FIELD

[0001] The present invention relates to a refrigerator, and more particularly, to a cool air supply structure for a refrigerator which can circulate the cool air in a storage space of the refrigerator.

BACKGROUND ART

[0002] FIG. 1 is a front view illustrating a conventional refrigerator with a cool air supply structure, and FIG. 2 is a cross-sectional view illustrating the cool air supply structure of FIG. 1.

[0003] Referring to FIG. 1, an outer casing 11 defines the exterior of a refrigerator main body 10, and inner casings 13 defining the interior of the main body 10 form a freezing chamber 15 and a refrigerating chamber 17 in the up-down direction. The freezing chamber 15 and the refrigerating chamber 17 are selectively opened and closed by a freezing chamber door 15D and a refrigerating chamber door 17D installed at the main body 10, respectively. Here, the leading ends of the freezing chamber door 15D and the refrigerating chamber door 17D are pivotable around one ends thereof in the forward-backward direction.

[0004] As illustrated in FIG. 2, a pair of passage grooves 18 are formed at the inner casing 13 corresponding to the rear face of the refrigerating chamber 17. The passage grooves 18 are formed by depressing parts of the inner casing 13 to the rear of the refrigerating chamber 17 to be long in the up-down direction with a predetermined width. The passage grooves 18 are intended to define passages 25 explained later.

[0005] Meanwhile, a cool air duct 21 is provided at the rear face of the refrigerating chamber 17. The cool air duct 21 serves to transfer the cool air heat-exchanged in an evaporator (not shown) provided at the rear end of the freezing chamber 15 to the refrigerating chamber 17. The cool air duct 21 is formed in a flat polyhedral shape with one open face, and closely adhered to the inner casing 13. In this embodiment, the cool air duct 21 is formed in a polyhedral shape with a hexahedral cross section, which is not intended to be limiting.

[0006] The cool air duct 21 is fixed to one side of the inner casing 13 corresponding to the rear face of the refrigerating chamber 17. The cool air duct 21 can be fixed to the inner casing 13 by a separate fastener (not shown) or a hook (not shown) of the cool air duct 21. In a state where the cool air duct 21 is fixed to the inner casing 13, the passage grooves 18 are positioned in the longitudinal section region adjacent to both side ends of the cool air duct 21.

[0007] A lamp installation portion 23 is provided at the top center portion of the cool air duct 21. A lamp (not shown) for lighting the refrigerating chamber 17 is installed at the lamp installation portion 23. A pair of passages 25 are formed at both sides of the space between the inner casing 13 and the cool air duct 21 which correspond to both sides of the lamp installation portion 23 to be long in the up-down direction. Here, the passages 25 are substantially defined by the passage grooves 18 and both inner ends of the cool air duct 21. The passages 25 function as paths for the cool air heat-exchanged in the evaporator.

[0008] A plurality of cool air discharge holes 27 are formed at both side ends of the front face of the cool air duct 21. The cool air discharge holes 27 communicate with the passages

25, respectively, and thus function as outlets for discharging the cool air flowing in the passages 25 to the refrigerating chamber 17.

[0009] Insulation members 29 are provided in the passages 25, namely, between the inner casing 13 and the cool air duct 21. The insulation members 19 prevent the heat exchange between the refrigerating chamber 17 and the cool air flowing in the passages 25, and also prevent the cool air flowing in the passages 25 from being externally leaked through the space between the inner casing 13 and the cool air duct 21. The insulation members 29 surround the whole passages 25 except one sides of the passages 25 communicating with the cool air discharge holes 27. That is, the cool air heat-exchanged in the evaporator substantially flows in the insulation members 29.

[0010] Reference numeral 14 denotes an insulating layer. The insulating layer 14 is provided between the outer casing 11 and the inner casing 13, for preventing the heat exchange between the freezing chamber 15 or the refrigerating chamber 17 and the installation space of the refrigerator.

[0011] However, the conventional cool air supply structure for the refrigerator has the following disadvantages.

[0012] As described above, the passages 25 are defined by the inner casing 13 and the cool air duct 21. That is, the refrigerator needs the separate cool air duct 21 for supplying the cool air heat-exchanged in the evaporator to the refrigerating chamber 17, which complicates the product configuration.

[0013] Moreover, a gap may be formed between the inner casing 13 and the cool air duct 21 due to a size error or a working tolerance of the inner casing 13 or the cool air duct 21. As a result, the cool air flowing in the passages 25 is not discharged in a predetermined direction through the cool air discharge holes 27, but leaked to the outside, namely, to the refrigerating chamber 17 through the gap. That is, the cool air is not evenly supplied to the refrigerating chamber 17.

DISCLOSURE OF THE INVENTION

[0014] Accordingly, the present invention is conceived to solve the aforementioned problems in the prior art. An object of the present invention is to provide a cool air supply structure for a refrigerator with a simple configuration.

[0015] Another object of the present invention is to provide a cool air supply structure for a refrigerator which can efficiently flow the cool air to a storage space.

[0016] In order to achieve the above-described objects of the invention, there is provided a cool air supply structure for a refrigerator, including: an inner casing defining a storage space in the refrigerator; a cool air discharge hole formed at the inner casing; and a passage member provided at the rear face of the inner casing, for forming a cool air passage and communicating with the cool air discharge hole.

[0017] A part of the inner casing can form a long passage groove protruding to the storage space, and the passage member can be provided inside the passage groove at the rear face of the inner casing. Preferably, the long passage groove can be formed in a pair to be spaced apart from each other at a predetermined interval.

[0018] The passage member can make the passage communicate with the cool air discharge hole, and shield the passage from a foaming space wherein the rear face of the inner casing forms a part of the boundary. In this case, the passage member includes a first member and a second member. The first member makes the passage communicate with the cool air dis-

charge hole, and opens a part of the passage toward the foaming space, and the second member shields the part of the passage open to the foaming space from the foaming space. The first member can include a discharge opening communicating with the cool air discharge hole. In addition, one face of the first member can be closely adhered to the rear face of the inner casing, and the other face of the first member can be closely adhered to the second member, for forming the passage between the first member and the second member. Preferably, at least one seating protrusion and seating recess matching in shape with each other are provided at the closely-adhered faces of the first and second members, respectively.

[0019] In addition, there is provided a cool air supply structure for a refrigerator, including: a passage provided at a rear face of an inner casing defining a storage space in the refrigerator, the cool air to be supplied to the storage space flowing in the passage; and at least one cool air discharge hole formed at the front face of the inner casing, and operated as an outlet for discharging the cool air flowing in the passage.

[0020] A part of the inner casing can form a long passage groove protruding to the storage space, and the passage can be provided inside the passage groove at the rear face of the inner casing. Preferably, the long passage groove can be formed in a pair to be spaced apart from each other at a predetermined interval.

[0021] The passage can be formed by a separate insulation member. In this case, the insulation member can make the passage communicate with the cool air discharge hole, and shield the passage from a foaming space wherein the rear face of the inner casing forms a part of the boundary. In addition, the insulation member includes a first member and a second member. The first member makes the passage communicate with the cool air discharge hole, and opens a part of the passage toward the foaming space, and the second member shields the part of the passage open to the foaming space from the foaming space. The first member can include a discharge opening communicating with the cool air discharge hole. Moreover, one face of the first member can be closely adhered to the rear face of the inner casing, and the other face of the first member can be closely adhered to the second member, for forming the passage between the first member and the second member. Preferably, at least one seating protrusion and seating recess matching in shape with each other are provided at the closely-adhered faces of the first and second members, respectively.

[0022] According to the present invention, the flow of the cool air can be facilitated by the simple configuration.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023] The present invention will become better understood with reference to the accompanying drawings which are given only by way of illustration and thus are not limitative of the present invention, wherein:

[0024] FIG. 1 is a front view illustrating a conventional refrigerator with a cool air supply structure;

[0025] FIG. 2 is a cross-sectional view illustrating the cool air supply structure of FIG. 1;

[0026] FIG. 3 is a cross-sectional view illustrating a cool air supply structure according to a preferred embodiment of the present invention; and

[0027] FIGS. 4a to 4c are cross-sectional views illustrating a manufacturing process of the embodiment of FIG. 3.

BEST MODE FOR CARRYING OUT THE INVENTION

[0028] A cool air supply structure for a refrigerator in accordance with preferred embodiments of the present invention will be described in detail with reference to the accompanying drawings.

[0029] FIG. 3 is a cross-sectional view illustrating a cool air supply structure according to a preferred embodiment of the present invention. Reference numerals of FIG. 1 are used for the same elements.

[0030] Referring to FIG. 3, a pair of passage grooves 58 are provided at a rear face of a refrigerating chamber 57 provided in a refrigerator main body 10. The passage grooves 58 are substantially formed by an inner casing 53 defining the refrigerating chamber 57. That is, the passage grooves 58 are formed by protruding parts of the inner casing 53 to the front of the refrigerating chamber 57 to be long in the up-down direction with a predetermined width. In this embodiment, the pair of passage grooves 58 are spaced apart from each other at a predetermined interval.

[0031] A plurality of cool air discharge holes 59 are formed at the inner casing 53 corresponding to the insides of the passage grooves 58. The cool air discharge holes 59 serve to discharge the cool air heat-exchanged in an evaporator to the refrigerating chamber 57. The plurality of cool air discharge holes 59 are formed at the passage grooves 58 with corresponding heights, respectively.

[0032] A lamp installation portion 61 is provided at one side of the inner casing 53 corresponding to the space between the passage grooves 58. A lamp (not shown) selectively flickered by opening and closing of the refrigerating chamber 57, for lighting the refrigerating chamber 57 is installed at the lamp installation portion 61. Preferably, the lamp installation portion 61 is formed at the top center portion of the rear face of the refrigerating chamber 57.

[0033] Meanwhile, insulation members 63 are provided at the rear face of the inner casing 53 corresponding to the insides of the passage grooves 58, respectively. The insulation members 63 substantially form passages 69 for supplying the cool air heat-exchanged in the evaporator provided at a rear end of a freezing chamber 15 to the refrigerating chamber 57. In this embodiment, each of the insulation members 63 includes a first member 64 and a second member 67. The first member 64 is fixed to the inside of the passage groove 58. Here, one face of the first member 64 is closely adhered to the rear face of the inner casing 53 corresponding to the inside of the passage groove 58. A part of the first member 64 is depressed to be long in the up-down direction to form the passage 69. A plurality of discharge openings 65 communicating with the cool air discharge holes 59 are formed at one face of the first member 64 closely adhered to the inside of the passage groove 58. In addition, a seating protrusion 66 is provided at the other face of the first member 64 opposite to one face of the first member 64 closely adhered to the inside of the passage groove 58. The seating protrusion 66 is formed by protruding the other face of the first member 64 to the rear by a predetermined thickness.

[0034] In a state where one face of the second member 67 is closely adhered to the other face of the first member 64, the second member 67 is fixed to the inside of the passage groove 58, substantially, to the first member 64. The second member

67 shields the depressed portion of the first member 64 from a foaming space wherein the rear face of the inner casing 53 forms a part of the boundary, thereby forming the passage 69. A seating recess 68 corresponding to the seating protrusion 66 is formed at one face of the second member 67. The seating recess 68 is formed by depressing one face of the second member 67 to the rear by a predetermined depth. In a state where one face of the second member 67 is closely adhered to the other face of the first member 64, the seating protrusion 66 is seated in the seating recess 68.

[0035] In the meantime, the insulation members 63 are completely fixed by an insulating layer 54 formed in the foaming space. That is, in a state where one face of the first member 64 and one face of the second member 67 are closely adhered to the inside of the passage groove 58 and the other face of the first member 64, respectively, a foaming liquid filled and foamed in the foaming space whose boundaries are defined by an outer casing 11 and the inner casing 53 is solidified to form the insulating layer 54, thereby completely fixing the insulation members 63. The second members 67 shield the passages 69 from the foaming space, so that the foaming liquid is not leaked into the passages 69 or to the outside of the inner casing 53 through the passages 69 in the foaming process. Here, the shielding degree means a degree of preventing the foaming liquid from being leaked into the passages 69 in the foaming process.

[0036] Alternatively, the insulation members 63 can be provided as one member.

[0037] The manufacturing process of the cool air supply structure for the refrigerator according to the preferred embodiment of the present invention will be explained in detail with reference to the accompanying drawings.

[0038] FIGS. 4a to 4c are cross-sectional views illustrating the manufacturing process of the cool air supply structure for the refrigerator according to the preferred embodiment of the present invention.

[0039] Referring to FIG. 4a, the inner casing 53 is vacuum-molded in a predetermined shape to define the refrigerating chamber 57. Here, the passage groove 58 is formed by protruding a part of the inner casing 53 corresponding to the rear face of the refrigerating chamber 57. In addition, the cool air discharge holes 59 are formed by cutting parts of the inner casing 53 corresponding to the inside of the passage groove 58. As occasion demands, the cool air discharge holes 59 can be formed in the initial molding.

[0040] As shown in FIG. 4b, one face of the first member 64 is closely adhered to the rear face of the inner casing 53 corresponding to the inside of the passage groove 58. Here, the discharge openings 65 of the first member 64 communicate with the cool air discharge holes 59. The first member 64 is fixed to the inside of the passage groove 58 by an adhesive or a double-faced tape.

[0041] In a state where the first member 64 is fixed to the inside of the passage groove 58, as depicted in FIG. 4c, the second member 67 is fixed to the first member 64. In a state where one face of the second member 67 is closely adhered to the other face of the first member 64, the second member 67 is fixed by an adhesive or a double-faced tape. When the second member 67 is fixed to the first member 64, the passage 69 is formed by the depressed portion of the first member 64 and one face of the second member 67.

[0042] As described above, after the first and second members 64 and 67 are fixed to the inside of the passage groove 58, the inner casing 53 is coupled to the inside of the outer casing

11. The foaming liquid is filled and foamed in the foaming space whose boundaries are defined by the outer casing 11 and the inner casing 53. When the foaming liquid is solidified in the foaming space to form the insulating layer 54, as shown in FIG. 3, the first and second members 64 and 67 are completely fixed.

[0043] Although the preferred embodiments of the present invention have been described, it is understood that the present invention should not be limited to these preferred embodiments but various changes and modifications can be made by one skilled in the art within the spirit and scope of the present invention as hereinafter claimed.

INDUSTRIAL APPLICABILITY

[0044] According to the present invention, the cool air supply structure for the refrigerator with the above configuration has the following advantages.

[0045] First, according to the present invention, the passages for supplying the cool air heat-exchanged in the evaporator to the storage space can be formed without a separate cool air duct. As the number of the components constituting the product is reduced, the manufacturing cost of the product can be cut down.

[0046] Moreover, according to the present invention, the passages can be substantially formed between the inner casing and the insulating layer. Therefore, the cool air flowing in the passages is not leaked to the outside of the passage, namely, to the storage space. As a result, the cool air can be evenly supplied to the storage space, for conducting efficient cooling.

What is claimed is:

1. A cool air supply structure for a refrigerator, comprising: an inner casing defining a storage space in the refrigerator; a cool air discharge hole formed at the inner casing; and a passage member provided at the rear face of the inner casing, for forming a cool air passage and communicating with the cool air discharge hole.
2. The cool air supply structure of claim 1, wherein a part of the inner casing forms a long passage groove protruding to the storage space, and the passage member is provided inside the passage groove at the rear face of the inner casing.
3. The cool air supply structure of claim 2, wherein the long passage groove is formed in a pair to be spaced apart from each other at a predetermined interval.
4. The cool air supply structure of claim 1, wherein the passage member makes the passage communicate with the cool air discharge hole, and shields the passage from a foaming space wherein the rear face of the inner casing forms a part of the boundary.
5. The cool air supply structure of claim 4, wherein the passage member comprises a first member and a second member, the first member makes the passage communicate with the cool air discharge hole, and opens a part of the passage toward the foaming space, and the second member shields the part of the passage open to the foaming space from the foaming space.

6. The cool air supply structure of claim 5, wherein the first member comprises a discharge opening communicating with the cool air discharge hole.

7. The cool air supply structure of claim 5, wherein one face of the first member is closely adhered to the rear face of the inner casing, and the other face of the first member is closely adhered to the second member, for forming the passage between the first member and the second member.

8. The cool air supply structure of claim 7, wherein at least one seating protrusion and seating recess matching in shape with each other are provided at the closely-adhered faces of the first and second members, respectively.

9. A cool air supply structure for a refrigerator, comprising: a passage provided at a rear face of an inner casing defining a storage space in the refrigerator, the cool air to be supplied to the storage space flowing in the passage; and at least one cool air discharge hole formed at the front face of the inner casing, and operated as an outlet for discharging the cool air flowing in the passage.

10. The cool air supply structure of claim 9, wherein a part of the inner casing forms a long passage groove protruding to the storage space, and the passage is provided inside the passage groove at the rear face of the inner casing.

11. The cool air supply structure of claim 10, wherein the long passage groove is formed in a pair to be spaced apart from each other at a predetermined interval.

12. The cool air supply structure of claim 9, wherein the passage is formed by a separate insulation member.

13. The cool air supply structure of claim 12, wherein the insulation member makes the passage communicate with the

cool air discharge hole, and shields the passage from a foaming space wherein the rear face of the inner casing forms a part of the boundary.

14. The cool air supply structure of claim 13, wherein the insulation member comprises a first member and a second member, the first member makes the passage communicate with the cool air discharge hole, and opens a part of the passage toward the foaming space, and the second member shields the part of the passage open to the foaming space from the foaming space.

15. The cool air supply structure of claim 14, wherein the first member comprises a discharge opening communicating with the cool air discharge hole.

16. The cool air supply structure of claim 14, wherein one face of the first member is closely adhered to the rear face of the inner casing, and the other face of the first member is closely adhered to the second member, for forming the passage between the first member and the second member.

17. The cool air supply structure of claim 16, wherein at least one seating protrusion and seating recess matching in shape with each other are provided at the closely-adhered faces of the first and second members, respectively.

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