EUROPEAN PATENT SPECIFICATION

AIR BLOWING ARRANGEMENT FOR A COMBINED REFRIGERATOR

AGENCEMENT DE SOUFFLERIE DE REFRIGERATEUR COMBINE

Designated Contracting States:
DE ES FR GB IT PL

Priority: 12.07.2005 BR PI0502706

Date of publication of application:
02.04.2008 Bulletin 2008/14

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References cited:

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Description

Field of the Invention

[0001] The present invention refers to a combined refrigerator of the forced ventilation type with an air blowing arrangement, the refrigerator presenting a single cabinet that internally defines a freezing compartment and a refrigerating compartment, usually separated by a horizontal dividing wall.

Prior Art

[0002] The combined refrigerators are generally constituted by a cabinet formed of an outer case, usually in metallic sheet, and by two inner cases molded in plastic material, EPS for example, which are spaced from each other and also from the outer case by a thermal insulating filler generally in polyurethane foam injected between said outer case and inner cases. The inner cases respectively define the freezing compartment and the refrigerating compartment, and the freezing compartment can be disposed above or below the refrigerating compartment and separated therefrom by the dividing wall.

[0003] These combined refrigerators with forced ventilation are provided with ducts for conducting cool air coming from the evaporator, to the freezing and refrigerating compartments.

[0004] Considering that the cool air is produced in an air refrigerating compartment lodging an evaporator and a fan which is disposed inside the freezing compartment, it is necessary to provide ducts that allow the cool air, which is produced upon passing through the evaporator, to be conducted not only to the freezing compartment inside which the air refrigerating compartment is situated, but also to the refrigerating compartment disposed below or above the freezing compartment, depending on the construction applied to the combined refrigerator.

[0005] Usually, the conduction of cool air from the air cooling compartment to the refrigerating compartment is made through air passages provided in the horizontal dividing wall which separates the freezing compartment from the refrigerating compartment. After passing through said dividing wall, the cool airflow, to be released to the interior of the refrigerating compartment, is conducted through a diffusing duct mounted in the interior of the refrigerating compartment and seated and affixed against a rear wall of the latter, this diffusing duct being generally defined by an EPS body provided with at least one longitudinal slot opened to its rear face, against which is seated and affixed an adhesive blanket that operates as a sealing joint between the diffusing duct and the rear wall of the respective inner case. The diffusing duct body is provided with a plurality of air outlet openings turned to its front face and which are maintained in communication with the rear slot, in order to permit that the forced airflow admitted into the slot, by an adequately positioned inlet, be released through said openings in different levels of the refrigerating compartment.

[0006] In this type of prior art construction, the diffusing duct is disposed inside the refrigerating compartment, therefore being exposed to the user upon the opening of the respective front door of the cabinet. With this assembly, it is necessary to provide a finishing cover to be affixed onto the diffusing duct, giving to the latter a aesthetic aspect determined in the project of the refrigeration appliance. Besides being developed to esthetically minimize the presence of the diffusing duct inside the refrigerating compartment, the finishing cover is designed to present openings or windows coinciding with the air outlet openings of the diffusing duct and also, optionally, an end portion with an increased depth, in order to define a chamber in which will be mounted an airflow control means for the diffusing duct and also, optionally, an obturator or a fan, depending on the design of the refrigeration appliance.

[0007] This known construction requires the provision of a finishing cover to cover the whole extension of the diffusing duct, with the consequent costs in material and investments in moulds with considerably dimensions.

[0008] In addition to the inconvenience above, this prior art construction requires special cares for assembling the diffusing duct and its finishing cover, turning the assembling operations difficult and expensive and requiring a design for both the diffusing duct and the finishing cover for each model of combined refrigerator.

[0009] Finally, the fact of the diffusing duct-finishing cover assembly being exposed inside the refrigerating compartment restrict or impairs the introduction of new esthetic characteristics in the combined refrigerator.


Summary of the Invention

[0011] By reason of the inconveniences presented by the solutions known so far, it is an objective of the present invention to provide a combined refrigerator of the type considered above with an air blowing arrangement presenting a construction which is simple to assemble and of relatively reduced cost, and which can be applied to different models of refrigerator.

[0012] It is a further objective of the present invention to provide a refrigerator with an air blowing arrangement, which requires a finishing element of reduced dimensions and which interferes very little with the esthetic design of the interior of the refrigerating compartment of the combined appliance.

[0013] It is a further objective of the present invention to provide a refrigerator in which temperature losses across the rear wall of the refrigerator are reduced.

[0014] According to the invention the above objectives are achieved by a combined refrigerator as defined in claim 1. The basic construction defined in claim 1 permits the air diffusing body to be disposed behind the rear wall
of the inner case of the refrigerating compartment and, therefore, not visible to the user. In this condition, the assembly of the diffusing body is effected concomitantly with the assembly of the outer case and inner cases, during the injection phase of the thermal insulating filler, dispensing esthetic finishings and leaving the interior of the refrigerating compartment free of covering pieces and liable to variations of its ornamental aspect.

[0015] While only one air distributing duct in the air diffusing body has been provided, it should be understood, as described ahead, that the air diffusing body can present two or more air distributing ducts and further at least one air inlet duct having an air inlet in communication with the interior of the inner case of the freezing compartment, and an air outlet in selective communication with the air inlet of the air distributing duct(s), said selective communication being controlled by the manual or automatic drive of an obturator or by the automatic drive of a fan, the automatic drive being achieved, both to the obturator and to the fan, through a driving means whose operation is controlled by a temperature sensor means mounted in the interior of the inner case of the refrigerating compartment. The provision of an air inlet duct along the air diffusing body is recommended to keep the obturator away from the air cooling compartment defined in the interior of the freezing compartment, when the latter is disposed under the refrigerating compartment.

Detailed Description of the Invention

[0017] As already mentioned, the present air blowing arrangement can be applied to the combined refrigerators of the no frost type and with forced ventilation, presenting the freezing compartment FC disposed above or under the refrigerating compartment RC.

[0018] Figures 1-5 illustrates a combined refrigerator of the type considered herein and in which the freezing compartment FC is disposed under the refrigerating compartment RC. In these exemplary applications, the refrigerator comprises a cabinet defined by an outer case 1 generally made of metallic sheet, an inferiorly disposed inner case 2, defining the freezing compartment FC, and a superiorly disposed inner case 3, defining the refrigerating compartment RC. The two inner cases 2, 3 are separated from each other and also from the outer case 1 by a thermal insulating filler 4, generally made of injected and expanded polyurethane (foam), said thermal insulating filler 4 further defining a dividing wall 5 horizontally lying between the inner cases 2, 3.

[0019] The combined refrigerator further comprises an air cooling compartment 6, provided in a rear region of the freezing compartment FC and lodging an evaporator 7 and a ventilator 8. The air cooling compartment 6 presents a circulated air inlet (not illustrated) and a cool air outlet 6b, disposed downstream of the fan 8.

[0020] It should be understood that the circulated air inlet and the cool air outlet 6b can be multiple and arranged in different manners, according to each refrigerator design, not forming part of the present invention.

[0021] As it can be noted, in the different ways of carrying out the invention, the inner cases 2 and 3 present...
a respective rear wall 2a, 3a which is kept spaced from the outer case 1 by a respective extension of the thermal insulating filler 4.

[0022] In the arrangement illustrated in figures 1-5, the cool air outlet 6b is opened to the interior of a plenum P, usually occupying the whole width and height of the freezing compartment FC and spaced therefrom by a thin wall 9, which is generally vertical and provided with openings 9a adequately dimensioned and positioned for allowing the cool air to be supplied to the freezing compartment FC in the evaporator 7.

[0023] The forced cool airflow is supplied to the refrigerating compartment RC, through the plenum P in the cases in which the blowing arrangement has the construction illustrated in figures 1-5, or from the air cooling compartment 6 itself, in the cases in which said arrangement has the construction illustrated in figures 6-9, there being further provided conductors (not illustrated) to promote the return of air from the freezing FC and refrigerating RC compartments to the air cooling compartment 6.

[0024] The air blowing arrangement of the invention comprises an air diffusing element 10, generally in the form of a parallelepipedic body of low height, constructed in EPS or other adequate material of low thermal conductivity and of easy moldability, to be lodged in the interior of the thermal insulating filler 4 between the rear wall 3a of the inner case 3 of the refrigerating compartment RC and the outer case 1, before the structure of the refrigerator cabinet is filled with the thermal insulating material in polyurethane foam.

[0025] In the construction illustrated in figures 1-5, the air diffusing element 10 has the function of conducting the forced cool airflow, coming from the plenum P provided inside the inner case 2 of the freezing compartment FC, to the interior of the refrigerating compartment RC, in an initially ascending and then descending path. In this construction, the air diffusing element 10 defines an air inlet duct 11, in the form of a longitudinal central channel, and a pair of air distributing ducts 12, in the form of longitudinal lateral channel, the air distributing ducts 12 presenting a longitudinal extension shorter than that of the air diffusing element 10 and all the ducts being opened to a rear face 10a of the air diffusing element 10. In order to form said air inlet and distributing ducts 11, 12, completed with the rear closing of the respective channel, a closing plate 20 is hermetically seated and retained against the rear face 10a of the air diffusing element 10. Generally, the closing plate 20 is made of PS and is affixed and sealed against the air diffusing element 10 by means of adhesive tape, not illustrated since it is a well known prior art solution.

[0026] In all the constructive forms illustrated herein, the air diffusing element 10 presents a front face 10b which is seated and affixed, generally by adhesive tape (not illustrated), against the rear wall 3a of the inner case 3 of the refrigerating compartment RC before injecting the thermal insulating filler 4.

[0027] In the construction of figures 1-5, the air inlet duct 11 presents an air inlet 11a defined next to an end edge of the air diffusing element 10 and which is maintained in communication with the interior of the inner case 2 of the freezing compartment FC, more specifically with the plenum P defined downstream of the fan 8, in order to receive a respective cool airflow coming from the air cooling compartment 6. It should be understood that the fluid communication between the plenum P and the air inlet 11a is made through a duct arrangement D adequately provided through the dividing wall 5. In this constructive form, the cool air is upwardly forced along the air inlet duct 11 by the fan 8 until reaching the opposite end of the air inlet duct 11, where it is provided with an air outlet 11b turned and opened to the front face 10b of the air diffusing element 10 and aligned with a respective opening 3b provided in the rear wall 3a of the inner case 3 of the refrigerating compartment RC, in the upper region of the latter.

[0028] The refrigerating compartment RC is internally provided with a case 30 which is affixed against the rear wall 3a of the respective inner case 3, so as to maintain its interior in fluid communication with the air outlet 11b of the air inlet duct 11, through the opening 3b provided in said rear wall 3a.

[0029] Each of the two air distributing ducts 12 presents an air inlet 12a turned and opened to the front face 10b of the air diffusing element 10 and aligned with a respective opening 3c (see figure 7) provided in the rear wall 3a of the inner case 3 of the refrigerating compartment RC. Thus, the cool airflow, which penetrates in the case 30, through the ascending inlet duct 11, is directed downwardly through the interior of the two distributing ducts 12, which are provided with a plurality of air outlets 12b, turned and opened to the front face 10b of the air diffusing element 10 and aligned with respective windows 3d provided in the rear wall 3a of the respective inner case 3.

[0030] In the construction of figures 1-5, the forced airflow system is provided with only one ventilator 8, disposed between the plenum P and the air cooling compartment 6, and being the responsible for supplying of cool air to both the freezing compartment FC and the refrigerating compartment RC. In this construction, the supply of cool air to the refrigerating compartment RC is controlled by a flow control means CM, which can be in the form of an obturator 40 mounted inside the case 30 and to be selectively driven from a flow releasing condition, in which it communicates the case 30 and consequently the air outlet 11b of the air inlet duct 11 with the air inlets 12a of the air distributing ducts 12, and a flow blocking condition, in which it impedes the communication. The movement of the obturator 40 can be manual or obtained by a driving means 50 operatively associated with a temperature sensor 60 mounted in the refrigerating compartment RC.

[0031] When the temperature in the interior of the refrigerating compartment lowers to a determined value, the temperature sensor 60 activates the driving means
50, which displaces the obturator 40 to the closing position. When the temperature of the refrigerating compartment RC rises again, reaching a certain value, the temperature sensor reactivates the driving means 50, which makes the latter return the obturator 40 to the open position. The driving means 50 is generally defined by a thermostat, whose adjustment is made by an adjusting means 55, manually operated by the user.

[0032] As it can be observed in figure 3, onto the case 30 is adapted a cover 35, which is provided with an opening 36 for mounting the adjusting means 55 and also air outlet openings 37.

[0033] In the embodiment of figures 6-9, the freezing compartment FC is also disposed below the refrigerating compartment RC. In this construction, the air diffusing element 10 has a construction similar to that of the embodiment illustrated in figures 1-5, except for the fact that it does not present the inlet duct 11 and for the fact that the air inlets 12a of the two air distributing ducts 12 are disposed in a lower region and maintained in communication with the interior of the case 30 positioned next to the dividing wall 5, in the lower region of the refrigerating compartment RC, and maintained in fluid communication with the air cooling compartment 6, by means of a duct provided through the dividing wall 5. In this mounting arrangement, the airflow arriving to the case 30 is forced upwardly through the interior of the distributing ducts 12, by the operation of a second fan 70, mounted in the interior of the case 30 and whose driving means, defined by a respective electric motor 75, is activated by the temperature sensor 60 mounted in the interior of the refrigeration compartment RC, through a known control module of the different functions of the appliance and which can be constructed in any adequate form known in the prior art.

[0034] The second fan 70 is deenergized, blocking the passage of cool air to the air distributing ducts 12, when the temperature of the refrigerating compartment RC lowers to a certain value.

[0035] In this construction, the case 30 does not present the air outlet openings 37.

[0036] In the construction exemplified in figures 10 and 11, the freezing compartment FC is provided above the refrigerating compartment RC and the air diffusing element 10 presents a construction practically equal to that of the embodiment illustrated in figures 6-9, occurring only the inversion in the assembly of the case 30, which in this case is located in the upper region of the refrigeration compartment RC, just below the dividing wall 5. In this embodiment, the air coming from the plenum P or from the air cooling compartment 6 is conducted to the interior of the case 30 and, from the latter, to the air inlets 12a of the air distributing ducts 12, flowing downwardly therethrough and being discharged to the interior of different levels of the refrigerating compartment RC, through the air outlets 12b and through the windows 3d of the rear wall 3a of the respective inner case 3. In this construction, the case 30 can lodge a flow control means CM that can be defined either by an obturator or a second fan 70.

[0037] It should be understood that in the illustrated embodiments in figures 6-9 and 10 and 11, the diffusing element 10 is only completed by the closing plate 20, its front face 10b being hermetically seated and affixed against the rear wall 3a of the respective inner case 3, which is equally provided with openings 3c aligned with the air inlets 12a of the distributing ducts 12, and also with the windows 3d aligned with the air outlets 12b of the distributing ducts 12.

[0038] While only some embodiments of the invention have been illustrated and described herein, it should be understood that alterations can be made in the form and physical arrangement of the elements, provided that they fall within the scope of the attached claims.

Claims

1. A combined refrigerator with an air blowing arrangement of the type with forced ventilation and which comprises: a cabinet formed by an outer case (1) and two inner cases (2, 3), each provided with a wall (2a, 3a) and spaced from each other and from the outer case (1) by a thermal insulating filler (4), said inner cases (2, 3) respectively defining a freezing compartment (FC) and a refrigerating compartment (RC); and an air diffusing element (10) mounted to the cabinet and defining at least one air distributing duct (12), which has an air inlet (12a) in communication with the interior of the inner case (2) of the freezing compartment (FC), in order to receive a cool airflow, the air diffusing element (10) being disposed in the interior of the thermal insulating filler (4), between the outer case (1) and the rear wall (3a) of the inner case (3) of the refrigerating compartment (RC), against which it is seated and retained, characterized in that the air distributing duct (12) has a plurality of air outlets (12b) opened to the interior of the refrigerating compartment (RC), said rear wall (3a) is provided with a plurality of windows (3d) with which are aligned respective air outlets (12b) of the air distributing duct (12) defined in the interior of the air diffusing element (10), and the air diffusing element (10) presents a front face (10b) which is seated and affixed against the rear wall (3a) of the inner case (3) of the refrigerating compartment (RC).

2. The refrigerator, as set forth in claim 1, characterized in that the air diffusing element (10) comprises a parallelepipedic body of low height and made of a material of low thermal conductivity and presenting a rear face (10a) and a front face (10b) to be hermetically seated and externally affixed against the rear wall (3a) of the respective inner case (3), said air distributing duct (12) being defined by a respective channel provided along part of the longitudinal
extension of the air diffusing element (10) and opened to the rear face (10a) of the latter, the formation of said air distributing duct (12) being completed by closing the channel with a closing plate (20) hermetically seated and retained against the rear face (10a) of the air diffusing element (10).

3. The refrigerator, as set forth in claim 2, characterized in that the air distributing duct (12) presents an air inlet (12a) turned and opened to the front face (10b) of the air diffusing element (10), the rear wall (3a) of the inner case (3) of the refrigerating compartment (RC) being provided with an opening (3c) aligned with said air inlet (12a), and the refrigerating compartment (RC) being internally provided with a case (30) affixed against the rear wall (3a) of the respective inner case (3), in order to have its interior maintained in fluid communication with the air inlet (12a) of the air distributing duct (12) through the respective opening (3c) provided in said rear wall (3a) and the case (30) being maintained in communication with the interior of the inner case (2) of the freezing compartment (FC) to receive the cool airflow.

4. The refrigerator, as set forth in claim 3, characterized in that it comprises: a flow control means (CM) mounted in the case (30) and to be selectively driven from a flow releasing condition to a flow blocking condition of the case (30) to the air distributing duct (12).

5. The refrigerator, as set forth in claim 4, characterized in that it further comprises a driving means (50) operatively associated with the flow control means (CM) to modify the operational condition of the latter; and a temperature sensor (60) mounted in the refrigerating compartment (RC), so as to activate the driving means (50) to conduct the flow control means (CM) to one of its operational conditions due to the temperature reigning in the refrigerating compartment (RC).

6. The refrigerator, as set forth in claim 5, characterized in that the driving means (50) is defined by a thermostat.

7. The refrigerator, as set forth in any one of the claims 4, 5 or 6, characterized in that the flow control means (CM) is defined by an obturator (40) mounted in the interior of the case (30).

8. The refrigerator, as set forth in claim 5, characterized in that the flow control means (CM) is defined by a fan (70) mounted in the interior of the case (30), the driving means (50) being defined by an electric motor (75).

9. The refrigerator, as set forth in any one of the claims 3 or 4, characterized in that the air diffusing element (10) comprises an air inlet duct (11) also in the form of a channel and having an air inlet (11a) opened to one of the ends of the air diffusing element (10) and in communication with the interior of the inner case (3) of the freezing compartment (FC), and an air outlet (11b) turned and opened to the front face (10b) of the air diffusing element (10), the rear wall (3a) of the inner case (3) of the refrigerating compartment (RC) being provided with an opening (3b) aligned with said air outlet (11b) and in communication with the interior of the case (30).

10. The refrigerator, as set forth in claim 9, characterized in that the air inlet (11a) of the air inlet duct (11) is disposed in a lower end of the air diffusing element (10), the air outlet (11b) being disposed in an upper region of both the air diffusing element (10) and the refrigerating compartment (RC).

11. The refrigerator, as set forth in claim 10, characterized in that the air diffusing element (10) comprises an air inlet duct (11) that is centrally disposed, and two air distributing ducts (12) each disposed on each side of the air inlet duct (11).

Patentansprüche

1. Kühlkombination mit einer Gebläseanordnung des Zwangsbelüftungstyps, die umfasst: einen Kasten (1), der durch ein äußeres Gehäuse (1) und zwei innere Gehäuse (2, 3), die jeweils mit einer Rückwand (2a, 3a) versehen sind und voneinander und von dem äußeren Gehäuse (1) durch einen wärmeisolierenden Füllstoff (4) getrennt sind, gebildet ist, wobei die inneren Gehäuse (2, 3) ein Gefrierfach (FC) bzw. ein Kühlfach (RC) definieren; und ein Luftdiffusionselement (10), das an dem Kasten angebracht ist und wenigstens eine Luftverteilungsrohrleitung (12) definiert, die einen Luftauslass (12a) in Kommunikation mit dem Innenraum des inneren Gehäuses (2) des Gefrierfachs (FC) besitzt, um einen Kühlungsluftstrom zu empfangen, wobei das Luftdiffusionselement (10) innerhalb des wärmeisolierenden Füllstoffs (4) zwischen dem äußeren Gehäuse (1) und der Rückwand (3a) des inneren Gehäuses (3) des Kühlfachs (RC), an dem anliegend es sitzt und gehalten wird, angeordnet ist, dadurch gekennzeichnet, dass die Luftverteilungsrohrleitung (12) mehrere Luftauslässe (12b) besitzt, die in den Innenraum des Kühlfachs (RC) münden, wobei die Rückwand (3a) mit mehreren Fenstern (3d) versehen ist, auf die jeweilige Luftauslässe (12b) der Luftverteilungsrohrleitung (12) ausgerichtet sind, die im Innenraum des Luftdiffusionselement (10) definiert sind, und das Luftdiffusionselement (10) eine vorde re Fläche (10b) aufweist, die anliegend an der Rück-
5. Kühlschrank nach Anspruch 4, durch gekennzeichnet, dass der Luftdiffusionselement (10) einen spaltförmigen Körper mit geringer Höhe aufweist, der aus einem Material mit geringer Wärmeleitfähigkeit hergestellt ist und eine hintere Fläche (10a) und eine vordere Fläche (10b) besitzt, um an der Rückwand (3a) des jeweiligen inneren Gehäuses (3) hermetisch zu sitzen und von außen daran befestigt zu sein, wobei die Luftverteilungsrohrleitung (12) durch einen entsprechenden Kanal definiert ist, der längs eines Teils der Längserstreckung des Luftdiffusionselements (10) vorgesehen ist und in die hintere Fläche (10a) des Letzteren mündet, wobei die Bildung der Luftverteilungsrohrleitung (12) durch Schließen des Kanals mit einer Verschlussplatte (20) abgeschlossen ist, die an der hinteren Fläche (10a) des Luftdiffusionselements (10) hermetisch sitzt und gehalten wird.

6. Kühlschrank nach Anspruch 5, durch gekennzeichnet, dass das Antriebsmittel (50) durch einen Thermostaten definiert ist.

7. Kühlschrank nach einem der Ansprüche 4, 5 oder 6, durch gekennzeichnet, dass das Strömungssteuermittel (CM) durch einen im Innenraum des Gehäuses (30) montierten Verschluss (40) definiert ist.

8. Kühlschrank nach Anspruch 5, durch gekennzeichnet, dass das Strömungssteuermittel (CM) durch ein Gebläse (70) definiert ist, das im Innenraum des Gehäuses (30) montiert ist, wobei das Antriebsmittel (50) durch einen Elektromotor (75) definiert ist.

9. Kühlschrank nach einem der Ansprüche 3 oder 4, durch gekennzeichnet, dass das Luftdiffusionselement (10) eine Lufteinlassrohrleitung (11) ebenfalls in Form eines Kanals umfasst, der einen Lufteinlass (11a), der in eines der Enden des Luftdiffusionselements (10) mündet und mit dem Innenraum des inneren Gehäuses (2) des Gefrierfachs (FC) in Kommunikation steht, und einen Luftauslass (11b), der der vorderen Fläche (10b) des Luftdiffusionselements (10) gewandt ist und mit dem Innerenraum des Gehäuses (3) des Kühlfachs (RC) eine Lufteinlassrohrleitung (11) als auch des Kühlfachs (RC) angeordnet ist.


11. Kühlschrank nach Anspruch 10, durch gekennzeichnet, dass das Luftdiffusionselement (10) eine Lufteinlassrohrleitung (11), die mittig angeordnet ist, und zwei Luftverteilungsrohrleitungen (12), die auf jeder Seite der Lufteinlassrohrleitung (11) angeordnet sind, umfasst.

Reivendications

1. Réfrigérateur combiné avec un agencement de soufflage d’air du type avec ventilation forcée, et qui comprend : une armoire formée par une enceinte extérieure (1) et deux enceintes intérieures (2, 3) munies chacune d’une paroi arrière (2a, 3a) et espacées l’une de l’autre et de l’enceinte extérieure (1)
par une charge thermiquement isolante (4), lesdites enceintes intérieures (2, 3) définissant respectivement un compartiment de congélation (FC) et un compartiment de réfrigération (RC) ; et un élément de diffusion d’air (10) monté sur l’armoire et définissant au moins un conduit de distribution d’air (12), qui comporte un orifice d’entrée d’air (12a) en communication avec l’intérieur de l’enceinte intérieure (1) et la paroi arrière (3a) de l’enceinte intérieure (3) du compartiment de réfrigération (RC), contre lequel il est logé et maintenu, caractérisé en ce que le conduit de distribution d’air (12) comporte une pluralité d’orifices de sortie d’air (12b) ouverts vers l’intérieur du compartiment de réfrigération (RC), ladite paroi arrière (3a) est munie d’une pluralité de fenêtres (3d) avec lesquelles sont alignés des orifices de sortie d’air respectifs (12b) du conduit de distribution d’air (12) défini à l’intérieur de l’élément de diffusion d’air (10), et l’élément de diffusion d’air (10) présente une face avant (10b) qui est logée et fixée contre la paroi arrière (3a) de l’enceinte intérieure (3) du compartiment de réfrigération (RC).

2. Réfrigérateur selon la revendication 1, caractérisé en ce que l’élément de diffusion d’air (10) comprend un corps parallélépipédique de hauteur réduite et réalisé en un matériau ayant une faible conductivité thermique et présentant une face avant (10a) et une face avant (10b) de façon à être hermétiquement logé et extérieurement fixé contre la paroi arrière (3a) de l’enceinte intérieure respective (3), ledit conduit de distribution d’air (12) étant défini par un canal respectif disposé le long d’une partie de l’étendue longitudinale de l’élément de diffusion d’air (10) et ouvert vers la face arrière (10a) de ce dernier, la formation dudit conduit de distribution d’air (12) étant achevée par la fermeture du canal avec une plaque de fermeture (20) hermétiquement logée et maintenue contre la face arrière (10a) de l’élément de diffusion d’air (10).

3. Réfrigérateur selon la revendication 2, caractérisé en ce que le conduit de distribution d’air (12) présente un orifice d’entrée d’air (12a) tourné et ouvert vers la face avant (10b) de l’élément de diffusion d’air (10), la paroi arrière (3a) de l’enceinte intérieure (3) du compartiment de réfrigération (RC) étant munie d’une ouverture (3c) alignée avec ledit orifice d’entrée d’air (12a), et le compartiment de réfrigération (RC) étant intérieurement muni d’une enceinte (30) fixée contre la paroi arrière (3a) de l’enceinte intérieure respective (3), de façon à avoir son intérieur maintenu en communication vis-à-vis des fluides avec l’orifice d’entrée d’air (12a) du conduit de distribution d’air (12) par l’intermédiaire de l’ouverture respective (3c) réalisée dans ladite paroi arrière (3a), et l’enceinte (30) étant maintenue en communication avec l’intérieur de l’enceinte intérieure (2) du compartiment de congélation (FC) de façon à recevoir l’écoulement d’air froid.

4. Réfrigérateur selon la revendication 3, caractérisé en ce qu’il comprend : des moyens de commande d’écoulement (CM) montés dans l’enceinte (30) et destinés à être respectivement actionnés d’une condition de libération d’écoulement à une condition de blocage d’écoulement de l’enceinte (30) au conduit de distribution d’air (12).

5. Réfrigérateur selon la revendication 4, caractérisé en ce qu’il comprend de plus des moyens d’actionnement (50) associés de façon fonctionnelle aux moyens de commande d’écoulement (CM) pour modifier la condition de fonctionnement de ces derniers ; et un capteur de température (60) monté dans le compartiment de réfrigération (RC), de façon à activer les moyens d’actionnement (50) de façon à amener les moyens de commande d’écoulement (CM) dans l’une de leurs conditions de fonctionnement du fait de la température régnant dans le compartiment de réfrigération (RC).

6. Réfrigérateur selon la revendication 5, caractérisé en ce que les moyens d’actionnement (50) sont définis par un thermostat.

7. Réfrigérateur selon l’une quelconque des revendications 4, 5 et 6, caractérisé en ce qu’ils les moyens de commande d’écoulement (CM) sont définis par un obturateur (40) monté à l’intérieur de l’enceinte (30).

8. Réfrigérateur selon la revendication 5, caractérisé en ce que les moyens de commande d’écoulement (CM) sont définis par un ventilateur (70) monté à l’intérieur de l’enceinte (30), les moyens d’actionnement (50) étant définis par un moteur électrique (75).

9. Réfrigérateur selon l’une quelconque des revendications 3 et 4, caractérisé en ce que l’élément de diffusion d’air (10) comprend un conduit d’entrée d’air (11), également sous la forme d’un canal, et comportant un orifice d’entrée d’air (11a) ouvert vers l’une des extrémités de l’élément de diffusion d’air (10) et en communication avec l’intérieur de l’enceinte intérieure (3) du compartiment de réfrigération (RC), et un orifice de sortie d’air (11b) tourné et ouvert vers la face avant (10b) de l’élément de diffusion d’air (10), la paroi arrière (3a) de l’enceinte intérieure (3) du compartiment de réfrigération (RC) étant munie d’une ouverture (3b) alignée avec ledit orifice de sortie d’air (11b) et en communication avec l’intérieur
10. Réfrigérateur selon la revendication 9, caractérisé en ce que l’orifice d’entrée d’air (11a) du conduit d’entrée d’air (11) est disposé dans une extrémité inférieure de l’élément de diffusion d’air (10), l’orifice de sortie d’air (11b) étant disposé dans une région supérieure à la fois de l’élément de diffusion d’air (10) et du compartiment de réfrigération (RC).

11. Réfrigérateur selon la revendication 10, caractérisé en ce que l’élément de diffusion d’air (10) comprend un conduit d’entrée d’air (11) qui est disposé de façon centrale, et deux conduits de distribution d’air (12) disposés chacun de chaque côté du conduit d’entrée d’air (11).
REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description