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(54) **Cooling device**

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Description

[0001] This invention relates to a cooling device for foods. Particularly, it concerns a combined no-frost-type refrigerator/freezer (such devices are also known as no-frost fridge-freezers).

[0002] Well known are no-frost fridge-freezers comprising of:

- a refrigeration compartment for the preservation of foods;
- a freezer compartment for the preservation of foods;
- a finned evaporating device that cools at least a first fluid flow coming from said refrigerating compartment and at least a second fluid flow deriving from said freezing compartment.

[0003] The fluid of the first and of the second fluid flow, after having been cooled by said finned evaporating device, is in fluid contact with the freezer compartment and periodically, by opening a specific valve, also with the refrigeration compartment. As a result, a cooling of the refrigerator compartment and of the freezer compartment is therefore achieved.

[0004] The finned evaporating device is located in a chamber which is external to the freezer compartment and the refrigerator compartment. The first and the second fluid flows pour into said chamber, just underneath the finned evaporating device, and they then are transferred from the bottom to the top of the finned evaporating device.

[0005] An inconvenience of these no-frost fridge-freezers is that the first and the second fluid flows are mixed, at least in part, when entering the finned evaporating device. The contact of a cold fluid flow coming from the freezer compartment and a fluid flow which is warmer and more humid coming from the refrigerator compartment increases the probability of a block of ice forming at the entrance of the finned evaporating device. Said block of ice may obstruct a large part of the finned evaporating device thus reducing the efficiency of its thermal exchange and may generate turbulence that can cause dynamic fluid leakage and noise.

[0006] In this context, the technical task that is the objective of this invention is to propose a cooling device that overcomes the inconvenience of the known technique described above.

[0007] Particularly, the objective of this invention is to create a cooling device capable of improving the thermal efficiency.

[0008] A further purpose of this invention is to propose a cooling device capable of facilitating and expediting assembly.

[0009] The defined technical task and the specified objectives are substantially achieved by means of a cooling device, comprising the technical characteristics described in one or more of the attached claims.

[0010] Further characteristics and advantages of this

invention will become clearer from the indicative, but not limited to, description of the preferred, although non-exclusive, embodiment of a cooling device, as illustrated in the attached Drawings, in which:

- Drawing 1 shows a schematic view of a section of the cooling device;
- Drawing 2 shows a section view of a portion of the cooling device;
- Drawing 3 shows a perspective view of what is illustrated in Drawing 2;
- Drawing 4 shows a perspective view of an element of the cooling device;
- Drawings 5 and 6 show two views of the same component of the cooling device. With reference to the attached Drawings, the cooling device has been indicated with reference number 1. Said cooling device 1 is specifically used to refrigerate foods for the purpose of allowing a longer-lasting preservation.

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[0011] Patent document US 3,287,930 *discloses a refrigerator having below and above freezing compartments assisted by separate air circuits cooled by a single evaporator.*

[0012] In this context, the technical task that is the objective of this invention is to propose a cooling device that overcomes the inconvenience of the known technique described above.

[0013] Particularly, the objective of this invention is to create a cooling device capable of improving the thermal efficiency.

[0014] A further purpose of this invention is to propose a cooling device capable of facilitating and expediting assembly.

[0015] The defined technical task and the specified objectives are substantially achieved by means of a cooling device, comprising the technical characteristics described in one or more of the attached claims.

[0016] Further characteristics and advantages of this invention will become clearer from the indicative, but not limited to, description of the preferred, although non-exclusive, embodiment of a cooling device, as illustrated in the attached Drawings, in which:

- Drawing 1 shows a schematic view of a section of the cooling device;
- Drawing 2 shows a section view of a portion of the cooling device;
- Drawing 3 shows a perspective view of what is illustrated in Drawing 2;
- Drawing 4 shows a perspective view of an element of the cooling device;

- Drawings 5 and 6 show two views of the same component of the cooling device. With reference to the attached Drawings, the cooling device has been indicated with reference number 1. Said cooling device 1 is specifically used to refrigerate foods for the purpose of allowing a longer-lasting preservation.

[0017] Device 1 comprises a first cooled compartment 2 for the conservation of foods. Device 1 also comprises a second cooled compartment 3 for the conservation of foods.

[0018] Appropriately the first and second compartments 2 and 3 could be two compartments refrigerated at different temperatures, for example one of the compartments could have a thermostat regulated at a nominal temperature greater than 0°C and the other compartment could have a thermostat regulated at a nominal temperature less than 0°C.

[0019] Also depending on the type of foods kept in the first and in the second compartments 2 and 3, humidity conditions of said compartments 2 and 3 may be different.

[0020] In the preferred solution, the first cooled compartment 2 is conveniently a refrigerator compartment. Normally, in a refrigerator compartment there is a thermostat regulated at a nominal temperature ranging between 3°C and 8°C. Obviously, every thermostat also allows small temperature fluctuations (some centigrade degrees) around the nominal value.

[0021] In the preferred solution, the second cooled compartment 3 is a freezer compartment. Normally in a freezer compartment there is a thermostat regulated at a nominal temperature comprised between -20°C and -10°C. In this case also, the thermostat allows for small temperature fluctuations around the nominal value.

[0022] In an alternative solution, which is not illustrated, the first and the second compartments 2 and 3 could be, respectively, the freezer and the refrigerator compartments.

[0023] Device 1 comprises a cooling means 4 of at least one first fluid flow 5 deriving from said first compartment 2 and of at least a second fluid flow 6 coming from said second compartment 3.

[0024] Appropriately, the first fluid flow 5 is a flow of air. Appropriately, the second fluid flow 6 is a flow of air.

[0025] The first fluid flow 5 is taken from the interior of the first compartment 2. The first fluid flow 5 has therefore the humidity and temperature conditions of the air present in the first compartment 2.

[0026] Similarly, the second fluid flow 6 is taken from the interior of the second compartment 3. The second fluid flow 6 has therefore the humidity and temperature conditions of the air present in the first compartment 3.

[0027] Usefully, the cooling means 4 comprises a finned evaporating device 41.

[0028] The cooling means 4 are passed through by the first and by the second fluid flows 5 and 6.

[0029] Usefully, the finned evaporating device 41 is equipped with fins. The finned device 41 comprises of at

least one first conduit 42 in which flows a corresponding first operative fluid flow diminishing the heat of the first and the second fluid flows 5 and 6, although remaining fluid-dynamically isolated from them. Said 'at least one first conduit' 42 is equipped with a number of fins 43. The fins 43 appropriately allow the improvement of the thermal exchange between the first operative fluid and the first and the second fluid flow 5 and 6. The first and the second fluid flows 5 and 6, passing through the cooling means 4, therefore come into contact with the fins 43 and said first conduit 42.

[0030] Usefully, the device 1 also comprises deflector means 8 that are situated in proximity of an inlet 40 to the cooling means 4 of said first and/or of said second fluid flows 5 and 6. The deflector means 8 obstruct the mixing of the first and of the second fluid flows 5 and 6 (see for example Drawing 4, or 5 or 6). Specifically, the deflector means 8 obstruct the mixing of the first and second fluid flows 5 and 6 at the inlet 40 of the first and of the second fluid flows 5 and 6 in the cooling means 4. By reducing the mixing of the first and of the second fluid flows 5 and 6 the turbulence and the dynamic fluid leakages that would derive from two fluid flows mixing, are generally reduced.

[0031] Furthermore, by reducing the mixing of the first and second fluid flows 5 and 6, the formation of ice in proximity of the cooling means 4 is also reduced.

[0032] Said ice represents an obstruction that, in addition to worsening the fluid-dynamics, also reduces the efficiency of the thermal exchange. Heating means are strategically placed in the interior of the cooling means 4 that, when activated, contribute to melting, or in any case reducing the formation of, said ice. The heating means are usefully equipped with a resistance that is placed inside the cooling means 4.

[0033] The deflector means 8 extend mainly in a vertical direction.

[0034] Appropriately, the deflector means 8 direct at least one of the first and second fluid flows 5 and 6 towards at least one of the cooling means 4, separately from the one towards which the other fluid flow moves. Specifically, the deflector means 8 direct at least the second fluid flow 6. As a result, the controlled distribution of the first and of the second fluid flows 5 and 6 is obtained through the cooling means 4. Appropriately, the concentration of the fins 43 in the area towards which said fluid flow 5 is directed is different from the concentration of fins 43 in the area towards which the second fluid flow 6 is directed. Specifically, the concentration of fins 43 may be better examined case by case taking into account the possible humidity and temperature of the first and of the second fluid flows 5 and 6.

[0035] As an exemplification, but not limited to indications in Drawings 1 or 3, the cooling means 4 are inside a chamber 7 in which flow said first and said second fluid flows 5 and 6.

[0036] The chamber 7 is external to the first and to the second compartments 2 and 3. In the preferred case in

which the second compartment 3 is a freezer compartment, the chamber 7 is appropriately placed adjacent to the second compartment 3.

[0037] The cooling device 1 comprises the first conveyance means 12 of the first fluid flow 5 from the first compartment 2 to the chamber 7. Appropriately, said conveyance means 12 comprises a conduit 121 that extends itself from the first compartment 2 to the chamber 7.

[0038] In Drawing 1, the interface between conduit 121 and the first compartment 2 is depicted as an exemplification, but not limited to, in the upper portion of the first compartment 2, but could also be placed corresponding to the lower portion, this would make it possible to obtain an optimal air circulation in the first compartment 2, particularly useful if vegetable containers are placed in the lower portion of the first compartment 2.

[0039] The cooling device 1 also comprises a second conveyance means 13 for the second fluid flow 6 from the second compartment 3 to the chamber 7. Said second conveyance means 13 comprise at least one conduit 131 that extends from the first compartment 2 to the chamber 7.

[0040] The deflector means 8 expand at least in part towards the interior of said chamber 7 in order to separate, at least in part, said first and said second fluid flows 5 and 6. Specifically, the deflector means 8 extend between the edge of chamber 7 and the cooling means 4. With regards to the direction of the flow of said first and said second fluid flows 5 and 6, said deflector means 8 extend at least in part over the cooling means 4.

[0041] The cooling device 1 comprises at least a first opening 71 and at least a second opening 72. Usefully, the device 1 can comprise at least a third opening 73.

[0042] One between the first and the second fluid flows 5 and 6 may flow into the chamber 7 through the first opening 71, whilst the other fluid flow may flow into the chamber 7 by means of said second and said third openings 72 and 73. Appropriately, the first opening 71 is substantially placed between the second and the third openings 72 and 73.

[0043] Usefully, through said opening 71, said first fluid flow 5 flows into said chamber 7 and it is the second opening 72 that allows the second fluid flow 6 to enter into said chamber 7.

[0044] Usefully, the third opening 73 allows the second fluid flow 6 to enter into chamber 7.

[0045] In an alternative constructive solution, the second fluid flow 6, in the case that it comes from said freezer compartment, flows into said chamber 7 by means of the first opening 71, whilst the first fluid flow 5, in the case that it comes from the refrigerator compartment, flows into chamber 7 by means of the second and of the third openings 72 and 73.

[0046] This reduces the thermal gradient and heat dissipation from the moment in which the fluid flow deriving from the freezer compartment flows between two flows coming from the refrigerator compartment.

[0047] The deflector means 8 comprise:

- a first deflector 81 situated between the first and the second openings 71 and 72;
- a second deflector 82 situated between the first and the third openings 71 and 73. In the preferred solution, the second fluid flow 6, at least within the cooling means 4, provides two flows 6a and 6b, between which flows said first fluid flow 5. These two flows 6a and 6b of the second fluid flow 6 enter the chamber 7 from the second and from the third opening 72 and 73 respectively.

[0048] The cooling means 4 are situated above the first, the second and the third openings 71, 72 and 73. Specifically, the first fluid flow 5 will mostly affect the part of the cooling means 4 that intersects an imaginary vertical parallelepiped, a face of which is determined by the vertical projection of the first opening 71. The second fluid flow 6 will mostly affect the part of the cooling means 4 that intersects an imaginary vertical parallelepiped, a face of which is determined by the vertical projection of the second opening 72. Usefully, the second fluid flow 6 will also affect the part of the cooling means 4 that intersects an imaginary vertical parallelepiped, a face of which is determined by the vertical projection of the third opening 73.

[0049] Thanks to the placement of the deflector means 8 over the cooling means 4, the flow distribution described above will occur advantageously even in absence of a specific conduit to separate the fluid flows inside the cooling means 4.

[0050] Usefully, the first and the second fluid flows 5 and 6 enter into the chamber 7 through two opposite sides of the chamber 7. In any case, the deflector means 8 contribute to obstruct the mixing of the first and of the second fluid flows 5 and 6. Appropriately, the first, the second and the third opening 71, 72 and 73, the first and the second deflectors 81 and 82 are symmetrically placed with respect to an imaginary plane 9. Usefully, the chamber 7 is significantly symmetrical with respect to said imaginary plane 9. Usefully, said imaginary plane 9 is vertical. The parallelepiped, that substantially envelops the exterior of the cooling means 4 (particularly the evaporating device 41), is significantly symmetrical with respect to the imaginary plane 9. In accordance with the above description, it is possible to generate, corresponding to the cooling means 4, a significantly symmetrical movement of the first and of the second fluid flows 5 and 6. Said symmetry of motion allows the reduction of turbulence and, therefore, of fluid-dynamic leakages. Usefully, the device 1 comprises a housing structure 10 for said cooling means 4. Appropriately, the housing structure 10 is situated inside the chamber 7. Helpfully, the housing structure 10 is bound inside said chamber 7. Specifically, said housing structure 10 is bound by interference inside said chamber 7. There could also be means of connection between said housing structure 10 and said chamber 7, such as for example coupling means or threaded connection means.

[0051] Usefully, there could also be coupling means to attach the cooling means 4 to the housing structure 10.

[0052] Preferably, the deflector means 8 are part of said housing structure 10. Specifically, the deflector means 8 are assembled with the remaining parts of the housing structure 10 in such a way that from a functional viewpoint, they are one unit. In an alternative solution, the deflector means 8 could structurally constitute one unit with the remaining parts of the housing structure 10.

[0053] As indicated as an exemplification in Drawing 5, there is a plane 11 which is orthogonal to the direction of crossing of the cooling means 4 by the first and by the second fluid flows 5 and 6, in which said housing structure 10 envelops on at least three sides the said cooling means 4.

[0054] The housing structure 10 comprises a basic panel 101, that is preferably four-sided, corresponding to at least two opposite ends 102 and 103 of the basic panel 101, (and where there are) a first and a second fins 104 and 105 between which the cooling means 4 may be interposed. The basic panel 101 is adjoining a wall of the chamber 7.

[0055] The first and the second fins 104 and 105 extend transversally to the basic panel 101 and preferably extend orthogonally to the basic panel 101.

[0056] Usefully, a third fin 107 extends along one side 106 of the basic panel 101 interposed between the first and the second fins 104 and 105. Helpfully, said third fin 107 connects the first and the second fins 104 and 105 (see Drawing 5). Usefully, the basic panel 101, the first and the second fins 104 and 105 (and advantageously also the third fin 107) combined are placed in a concavity 108 in which the cooling means 4 are at least partially accommodated.

[0057] Usefully, the deflector means 8 extend from the basic panel 101. The deflector means 8 extend inside said concavity 108. Between the first deflector 81 and the first fin 104 is interposed the second opening 72. In the constructive solution shown in the attached Drawings, the first opening 71 is situated in fluid contact with the space interposed between the first and the second deflectors 81 and 82. Specifically, said first opening 71 is located above (with respect to the physical vertical) the space interposed between the first and the second deflectors 81 and 82.

[0058] Between the second deflector 82 and the second fin 105 is interposed a third opening 73.

[0059] As an exemplification, but not limited to, in the preferred solution the fluid exiting from the second opening 72 is directed by the contribution of the first fin 104 and the first deflector 81. Similarly, the fluid exiting from the third opening 73 is therefore directed by the contribution of the second fin 105 and the second deflector 82. Therefore, the fluid flow exiting from the second and from the third openings 72 and 73 is directed upwards along two imaginary corridors between which is interposed the first opening 71. The deflector means 8 will obstruct the movement of the fluid flow exiting from the second and

from the third openings 72 and 73 towards the first opening 71 in order to minimize contact between two fluid flows 5 and 6 that have different thermodynamic properties.

[0060] Appropriately, the housing structure 10 is made of thermo-insulating material. Appropriately, the basic panel 101 and/or the first and/or the second and/or the third fin 104, 105 and 107 and/or the deflector means 8 are made of thermo-insulating material. Said thermo-insulating material is, usefully, Styrofoam. Appropriately, an element that is made of thermo-conductor material is interposed between at least a portion of the housing structure 10 and the cooling means 4. Specifically, said thermo-conductor material element is the coating of at least a portion of the housing structure 10. Said coating may affect the part of the housing structure 10 that is in contact with and/or interfaces the cooling means 4. Said coating reduces the risk of adhesion (due to the freezing of the humidity present in the air) of the cooling means 4 with the housing structure 10.

[0061] Said coating usefully comprises a sheet of aluminum. Usefully, the coating protects the housing structure 10 from the heat generated by the resistance that develops inside the cooling means 4.

[0062] Appropriately, the cooling means 4 lean against the deflector means 8 (solution not shown) unloading onto them at least part of their weight.

[0063] Therefore, the deflector means 8 perform a double function: fluid-dynamic guide of the first and/or of the second fluid flows and structural, by contributing to sustaining the weight of the cooling means 4.

[0064] The fluid of the first and/or of the second fluid flows 5 and 6, after the thermal exchange with said cooling means 4, is directed towards the first and/or the second compartments 2 and 3 for the refrigeration of the first and/or the second compartments 2 and 3. In the preferred solution, said fluid is directed towards the freezer compartment and by means of an appropriate valve 17 (in the specific technical field said valve is normally called "damper") is periodically also directed toward the refrigerator compartment. Below the cooling means 4 with respect to the direction of flow of the first and of the second fluid flows 5 and 6, a first duct 14 extends from the chamber 7, which allows to direct the flow of the first and of the second fluid flows 5 and 6 towards the first compartment 2 and a second duct 15 that allows to direct the flow of the first and of the second fluid flows 5 and 6 towards the second compartment 3. The first and the second compartments 2 and 3 are therefore cooled. Both the first and the second ducts 14 and 15 could comprise a number of interconnected conduits. The cooling device 1 usefully comprises fluid motion means 16. Said fluid motion means 16 are operatively interposed between the cooling means 4 and the first and/or the second ducts 14 and 15. Said fluid motion means 16 comprises a fan. Said fluid motion means 16 allow the extraction of fluid from the first and from the second fluid flows exiting from the cooling means 4 and direct it towards the first and/or the

second ducts 15 and 16.

[0065] The invention has important advantages.

[0066] Firstly, these advantages are linked to the reduction of risk of ice forming in the cooling means. This in turn is linked to the increase of thermal efficiency of the cooling device and to an improvement of the fluid-dynamics of the device.

[0067] A further important advantage is connected to the increased speed and ease of assembly. In fact, it will now be possible to connect the cooling means to the housing structure outside of the chamber and then insert them as a unit into the chamber. The speed of assembly saves time and/or reduce the number of operations performed on the assembly line.

[0068] In fact, the cooling means 4 and the housing structure 10 may easily be preassembled obtaining a compact unit that can easily be attached to the remaining parts of the cooling device 1 directly along the assembly line (with simple positioning and attachment operations). Specifically, the positioning operation becomes much easier in the case that the housing structure 10 also has the function of supporting, at least in part, the cooling means 4.

[0069] The invention thus conceived is susceptible to numerous modifications and variations, all falling within the scope of the inventive concept that characterizes it. Furthermore, all details are replaceable by other technical equivalent elements. In practice, all materials used, as well as dimensions, may vary in accordance with requirements.

Claims

1. A cooling device comprising:

- a first cooled compartment (2) for the preservation of food;
- a second cooled compartment (3) for the preservation of food;
- means (4) of cooling at least a first fluid flow (5) coming from the first compartment (2) and at least a second fluid flow (6) coming from the second compartment (3), the cooling means (4) being crossed by the first and the second fluid flow (5, 6); wherein said cooling means are positioned inside a chamber (7) into which the first and the second fluid flow (5,6) enter and wherein below the cooling means (4), with respect to the direction of flow of the first and of the second fluid flows (5) and (6), a first duct (14) extends from the chamber (7), which allows to direct the flow of the first and of the second fluid flows (5) and (6) towards the first compartment (2) and a second duct (15) that allows to direct the flow of the first and of the second fluid flows (5) and (6) towards the second compartment (3);
- fluid motion means (16), comprising a fan, op-

eratively interposed between the cooling means (4) and the first and/or the second ducts (14) and (15) allowing the extraction of fluid from the first and from the second fluid flows exiting from the cooling means (4) and direct it towards the first and/or the second ducts (15) and (16);

characterized in that said cooling device comprises:

- deflector means (8) extending close to an inlet (40) through which the first and/or the second fluid flow (5, 6) run into the cooling means (4), the deflector means (8) obstructing the mixing of the first and the second fluid flow (5, 6).

2. The device according to claim 1, **characterised in that** the deflector means (8) extend at least partially towards the inside of the chamber (7) to separate at least in part the first and the second fluid flow (5, 6); the deflector means (8) extending at least partly upstream of the cooling means (4) relative to the direction of flow of the first and the second fluid flow (5, 6).

3. The device according to claim 2, **characterised in that** it comprises:

- at least a first opening (71) through which the first fluid flow (5) enters into the chamber (7);
- a second and a third opening (72, 73) which permit the entry into the chamber (7) of the second fluid flow (6); the first opening (71) being substantially positioned between the second and the third opening (72, 73); the deflector means (8) comprising:

- i) a first deflector (81) positioned between the first and the second opening (71, 72);
- ii) a second deflector (82) positioned between the first and the third opening (71, 73).

4. The device according to claim 3, **characterised in that** the first, the second and the third opening (71, 72, 73) and the first and the second deflector (81, 82) are distributed symmetrically with respect to an imaginary plane (9).

5. The device according to any of the foregoing claims from 2 to 4, **characterised in that** it comprises a structure (10) for housing the cooling means (4), the housing structure (10) being located inside the chamber (7).

6. The device according to claim 5, **characterised in that** the deflector means (8) form part of the housing structure (10).

7. The device according to claim 5 or 6, **characterised in that** there is a plane (11) at right angles to the imaginary direction of crossing the cooling means (4) by the first and the second fluid flow (5, 6) where the housing structure (10) surrounds the cooling means (4) on at least three sides. 5
8. The device according to any of the foregoing claims, **characterised in that** the cooling means (4) rest on the deflector means (8). 10
9. The device according to any of the foregoing claims, **characterised in that** the deflector means (8) extend mainly in a vertical direction. 15
10. The device according to any of the foregoing claims, **characterised in that** the deflector means (8) guide at least one of the first and the second fluid flow (5, 6) towards at least one area of the cooling means (4) different to that towards which the other fluid flow is directed, thus permitting a controlled distribution of the first and the second fluid flow (5, 6) across the cooling means (4). 20
11. The device according to any of the foregoing claims, **characterised in that** the cooling means (4) comprise a finned evaporating device (41) comprising a first conduit (42) in which a first operational fluid flows that draws heat from the first and the second fluid flow (5, 6) whilst remaining fluid-dynamically isolated from them, the first conduit (42) having a plurality of fins (43); the concentration of the fins (43) in the area towards which the first fluid flow (5) runs being different from the concentration of the fins (43) in the area towards which the second fluid flow (6) runs. 25 30 35
12. The device according to any of the foregoing claims, **characterised in that** the second fluid flow (6) at least inside the cooling means (4) has two flows (6a, 6b) between which the first fluid flow (5) runs. 40
13. The device according to any of the foregoing claims, **characterised in that** the first compartment (2) is a refrigerator compartment and the second compartment (3) is a freezer compartment. 45
14. The device according to any of the foregoing claims, **characterised in that** the fluid of the first and/or the second fluid flow (5, 6), after the heat exchange with the cooling means (4), is guided towards the first and/or the second compartment (2, 3) for cooling the first and/or the second compartment (2, 3). 50

Patentansprüche

1. Kühlvorrichtung, umfassend:

- ein erstes gekühltes Fach (2) zur Haltbarmachung von Lebensmitteln;
- ein zweites gekühltes Fach (3) zur Haltbarmachung von Lebensmitteln;
- Mittel (4) zum Kühlen mindestens eines ersten Fluidstroms (5), der von dem ersten Fach (2) kommt, und mindestens eines zweiten Fluidstroms (6), der von dem zweiten Fach (3) kommt, wobei die Kühlmittel (4) von dem ersten und dem zweiten Fluidstrom (5, 6) gekreuzt werden; wobei die Kühlmittel innerhalb einer Kammer (7) positioniert sind, in die der erste und der zweite Fluidstrom (5, 6) eintreten und wobei sich unter den Kühlmitteln (4) in Bezug auf die Fließrichtung des ersten und des zweiten Fluidstroms (5) und (6) eine erste Rohrleitung (14) von der Kammer (7) erstreckt, die es ermöglicht, den Strom des ersten und des zweiten Fluidstroms (5) und (6) zu dem ersten Fach (2) zu leiten, sowie eine zweite Rohrleitung (15), die es ermöglicht, den Strom des ersten und des zweiten Fluidstroms (5) und (6) zu dem zweiten Fach (3) zu leiten;
- Mittel zum Bewegen von Fluid (16), umfassend einen Ventilator, der betriebsfähig zwischen den Kühlmitteln (4) und der ersten und/oder der zweiten Rohrleitung (14) und (15) eingesetzt ist, der das Extrahieren von Fluid aus dem ersten und aus dem zweiten Fluidstrom, das aus den Kühlmitteln (4) austritt, ermöglicht, und es zu der ersten und/oder zweiten Rohrleitung (15) und (16) leitet;

dadurch gekennzeichnet, dass die Kühlvorrichtung Folgendes umfasst:

- Ablenkmittel (8), die sich nahe einem Einlass (40) erstrecken, durch den der erste und/oder der zweite Fluidstrom (5, 6) in die Kühlmittel (4) strömen, wobei das Ablenkmittel (8) das Vermischen des ersten und zweiten Flüssigkeitsstroms (5, 6) verhindert.

2. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Ablenkmittel (8) sich mindestens teilweise zu dem Inneren der Kammer (7) erstrecken, um mindestens teilweise den ersten und den zweiten Fluidstrom (5, 6) zu trennen; die Ablenkmittel (8) erstrecken sich zumindest teilweise oberhalb der Kühlmittel (4) in Bezug auf die Strömungsrichtung des ersten und des zweiten Fluidstroms (5, 6).
3. Vorrichtung nach Anspruch 2, **dadurch gekennzeichnet, dass** sie Folgendes umfasst:

- mindestens eine erste Öffnung (71), durch die der erste Fluidstrom (5) in die Kammer (7) eintritt;

- eine zweite und eine dritte Öffnung (72, 73), die das Eintreten des zweiten Fluidstroms (6) in die Kammer (7) zulassen; wobei die erste Öffnung (71) im Wesentlichen zwischen der zweiten und dritten Öffnung (72, 73) positioniert ist; wobei die Ablenkmittel (8) Folgendes umfassen:
- i) eine erste Ablenkplatte (81), die zwischen der ersten und der zweiten Öffnung (71, 72) positioniert ist;
 - ii) eine zweite Ablenkplatte (82), die zwischen der ersten und der dritten Öffnung (71, 73) positioniert ist.
4. Vorrichtung nach Anspruch 3, **dadurch gekennzeichnet, dass** die erste, die zweite und die dritte Öffnung (71, 72, 73) und die erste und die zweite Ablenkplatte (81, 82) in Bezug auf eine imaginäre Ebene (9) symmetrisch verteilt sind.
5. Vorrichtung nach einem der vorstehenden Ansprüche 2 bis 4, **dadurch gekennzeichnet, dass** sie eine Konstruktion (10) zum Unterbringen der Kühlmittel (4) aufweist, wobei sich die Gehäusekonstruktion (10) innerhalb der Kammer (7) befindet.
6. Vorrichtung nach Anspruch 5, **dadurch gekennzeichnet, dass** die Ablenkmittel (8) einen Teil der Gehäusekonstruktion (10) bilden.
7. Vorrichtung nach Anspruch 5 oder 6, **dadurch gekennzeichnet, dass** es eine Ebene (11) gibt, die in rechten Winkeln zu der imaginären Richtung der Kreuzung der Kühlmittel (4) durch den ersten und zweiten Fluidstrom (5, 6) liegt, wo die Gehäusekonstruktion (10) die Kühlmittel (4) auf mindestens drei Seiten umgibt.
8. Vorrichtung nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** die Kühlmittel (4) auf den Ablenkmitteln (8) aufliegen.
9. Vorrichtung nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** sich die Ablenkmittel (8) hauptsächlich in einer vertikalen Richtung erstrecken.
10. Vorrichtung nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** die Ablenkmittel (8) mindestens einen des ersten und des zweiten Fluidstroms (5, 6) zu mindestens einem Bereich der Kühlmittels (4) leiten, der sich von dem unterscheidet, zu dem der andere Fluidstrom geleitet wird, wodurch eine kontrollierte Verteilung des ersten und des zweiten Fluidstroms (5, 6) über die Kühlmittel (4) ermöglicht wird.
11. Vorrichtung nach einem der vorstehenden Ansprüche

che, **dadurch gekennzeichnet, dass** die Kühlmittel (4) eine Verdampfungsvorrichtung mit Rippen (41) umfassen, umfassend eine erste Leitung (42), in der ein erstes Betriebsfluid strömt, das dem ersten und zweiten Fluidstrom (5, 6) Wärme entzieht, während es fluiddynamisch von ihnen isoliert ist, wobei die erste Leitung (42) eine Vielzahl von Rippen (43) aufweist; wobei sich die Konzentration der Rippen (43) in dem Bereich, zu dem der erste Fluidstrom (5) strömt, von der Konzentration der Rippen (43) in dem Bereich, zu dem der zweite Fluidstrom (6) strömt, unterscheidet.

12. Vorrichtung nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** der zweite Fluidstrom (6) mindestens innerhalb der Kühlmittel (4) zwei Ströme (6a, 6b) aufweist, zwischen denen der erste Fluidstrom (5) verläuft.

13. Vorrichtung nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** das erste Fach (2) ein Kühlfach ist und das zweite Fach (3) ein Tiefkühlfach ist.

14. Vorrichtung nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** das Fluid des ersten und/oder zweiten Fluidstroms (5, 6) nach dem Wärmeaustausch mit den Kühlmitteln (4) zu dem ersten und/oder dem zweiten Fach (2, 3) zum Kühlen des ersten und/oder des zweiten Fachs (2, 3) geleitet wird.

Revendications

1. Dispositif de refroidissement comprenant :

- un premier compartiment (2) refroidi pour la préservation d'aliments ;
- un deuxième compartiment (3) refroidi pour la préservation d'aliments ;
- des moyens (4) de refroidissement d'au moins un premier flux de fluide (5) provenant du premier compartiment (2) et d'au moins un deuxième flux de fluide (6) provenant du deuxième compartiment (3), les moyens de refroidissement (4) étant croisés par les premier et deuxième flux de fluide (5, 6) ; dans lequel lesdits moyens de refroidissement sont positionnés à l'intérieur d'une chambre (7) dans laquelle les premier et deuxième flux de fluide (5, 6) entrent et dans lequel, au-dessous des moyens de refroidissement (4), par rapport au sens d'écoulement des premier et deuxième flux de fluide (5) et (6), depuis la chambre (7) s'étend un premier conduit (14) qui permet de diriger l'écoulement des premier et deuxième flux de fluide (5) et (6) vers le premier compartiment (2) et un deuxième

conduit (15) qui permet de diriger l'écoulement des premier et deuxième flux de fluide (5) et (6) vers le deuxième compartiment (3) ;

- des moyens de déplacement de fluide (16), comprenant un ventilateur, interposés de manière opérationnelle entre les moyens de refroidissement (4) et le premier et/ou le deuxième conduit (14) et (15), permettant l'extraction d'un fluide du premier et du deuxième flux de fluide sortant des moyens de refroidissement (4) et de le diriger vers le premier et/ou le deuxième conduit (15) et (16) ;

caractérisé en ce que ledit dispositif de refroidissement comprend :

- des moyens de déflecteur (8) s'étendant à proximité d'une entrée (40) à travers laquelle le premier et/ou le deuxième flux de fluide (5, 6) s'écoulent dans les moyens de refroidissement (4), les moyens de déflecteur (8) obstruant le mélange du premier et du deuxième flux de fluide (5, 6).

2. Dispositif selon la revendication 1, **caractérisé en ce que** les moyens de déflecteur (8) s'étendent au moins partiellement vers l'intérieur de la chambre (7) pour séparer au moins en partie les premier et deuxième flux de fluide (5, 6) ; les moyens de déflecteur (8) s'étendant au moins partiellement en amont des moyens de refroidissement (4) par rapport au sens d'écoulement du premier et du deuxième flux de fluide (5, 6).

3. Dispositif selon la revendication 2, **caractérisé en ce qu'il** comprend :

- au moins une première ouverture (71) à travers laquelle le premier flux de fluide (5) entre dans la chambre (7) ;

- une deuxième et une troisième ouverture (72, 73) qui permet l'entrée dans la chambre (7) du deuxième flux de fluide (6) ; la première ouverture (71) étant sensiblement positionnée entre la deuxième et la troisième ouverture (72, 73) ; les moyens de déflecteur (8) comprenant :

i) un premier déflecteur (81) positionné entre la première et la deuxième ouverture (71, 72) ;

ii) un deuxième déflecteur (82) positionné entre la première et la troisième ouverture (71, 73).

4. Dispositif selon la revendication 3, **caractérisé en ce que** la première, la deuxième et la troisième ouverture (71, 72, 73) et le premier et le deuxième déflecteur (81, 82) sont répartis symétriquement par

rapport à un plan imaginaire (9).

5. Dispositif selon l'une quelconque des revendications 2 à 4, **caractérisé en ce qu'il** comprend une structure (10) pour loger les moyens de refroidissement (4), la structure de logement (10) étant située à l'intérieur de la chambre (7).

6. Dispositif selon la revendication 5, **caractérisé en ce que** les moyens de déflecteur (8) forment une partie de la structure de logement (10).

7. Dispositif selon la revendication 5 ou 6, **caractérisé en ce qu'il** y a un plan (11) à angles droits par rapport au sens imaginaire de croisement des moyens de refroidissement (4) par le premier et le deuxième flux de fluide (5, 6) où la structure de logement (10) entoure les moyens de refroidissement (4) sur au moins trois côtés.

8. Dispositif selon l'une quelconque des revendications précédentes, **caractérisé en ce que** les moyens de refroidissement (4) reposent sur les moyens de déflecteur (8).

9. Dispositif selon l'une quelconque des revendications précédentes, **caractérisé en ce que** les moyens de déflecteur (8) s'étendent principalement dans un sens vertical.

10. Dispositif selon l'une quelconque des revendications précédentes, **caractérisé en ce que** les moyens de déflecteur (8) guident au moins l'un du premier et du deuxième flux de fluide (5, 6) vers au moins une zone des moyens de refroidissement (4) différente de celle vers laquelle l'autre flux de fluide est dirigé, en permettant ainsi une répartition régulée du premier et du deuxième flux de fluide (5, 6) à travers les moyens de refroidissement (4).

11. Dispositif selon l'une quelconque des revendications précédentes, **caractérisé en ce que** les moyens de refroidissement (4) comprennent un dispositif d'évaporation à ailettes (41) comprenant une première conduite (42) dans laquelle s'écoule un premier fluide opérationnel qui tire de la chaleur du premier et du deuxième flux de fluide (5, 6) tout en restant isolé de ceux-ci de manière dynamiquement fluide, la première conduite (42) comportant une pluralité d'ailettes (43) ; la concentration des ailettes (43) dans la zone vers laquelle s'écoule le premier flux de fluide (5) étant différente de la concentration des ailettes (43) dans la zone vers laquelle s'écoule le deuxième flux de fluide (6).

12. Dispositif selon l'une quelconque des revendications précédentes, **caractérisé en ce que** le deuxième flux de fluide (6) au moins à l'intérieur des moyens

de refroidissement (4) comporte deux flux (6a, 6b) entre lesquels s'écoule le premier flux de fluide (5).

13. Dispositif selon l'une quelconque des revendications précédentes, **caractérisé en ce que** le premier compartiment (2) est un compartiment de réfrigérateur et le deuxième compartiment (3) est un compartiment de congélateur. 5
14. Dispositif selon l'une quelconque des revendications précédentes, **caractérisé en ce que** le fluide du premier et/ou du deuxième flux de fluide (5, 6), après l'échange de chaleur avec les moyens de refroidissement (4), est guidé vers le premier et/ou le deuxième compartiment (2, 3) pour refroidir le premier et/ou le deuxième compartiment (2, 3). 10 15

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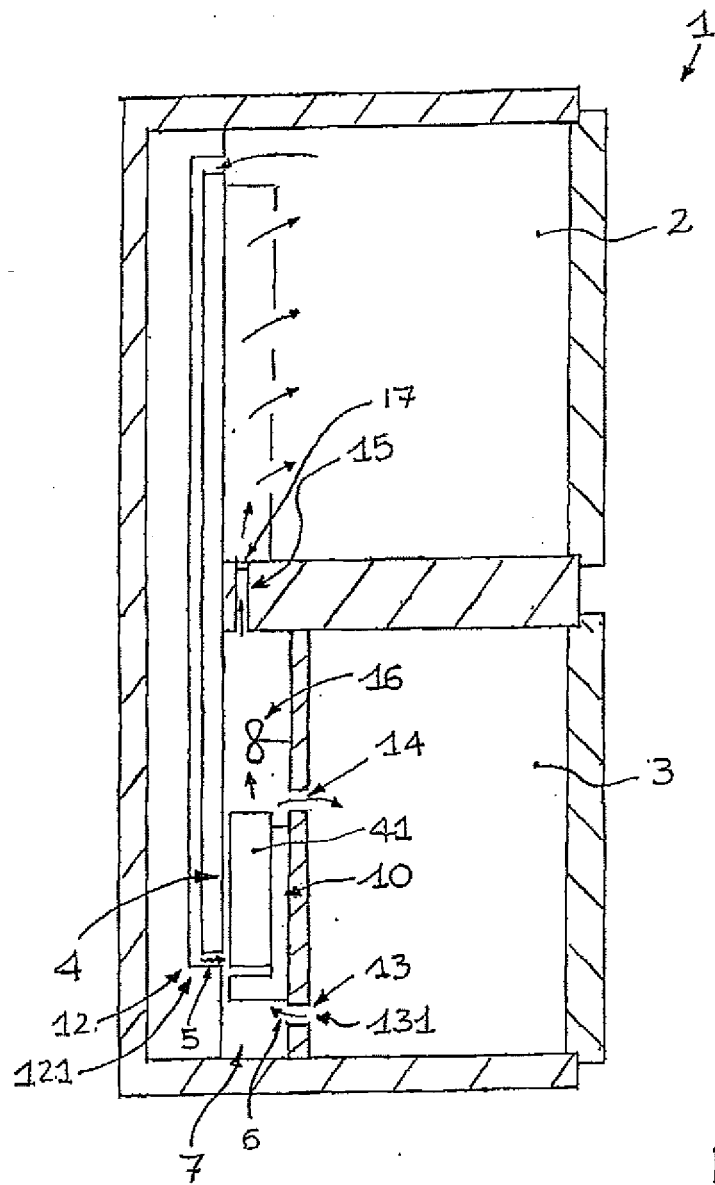


Fig. 1

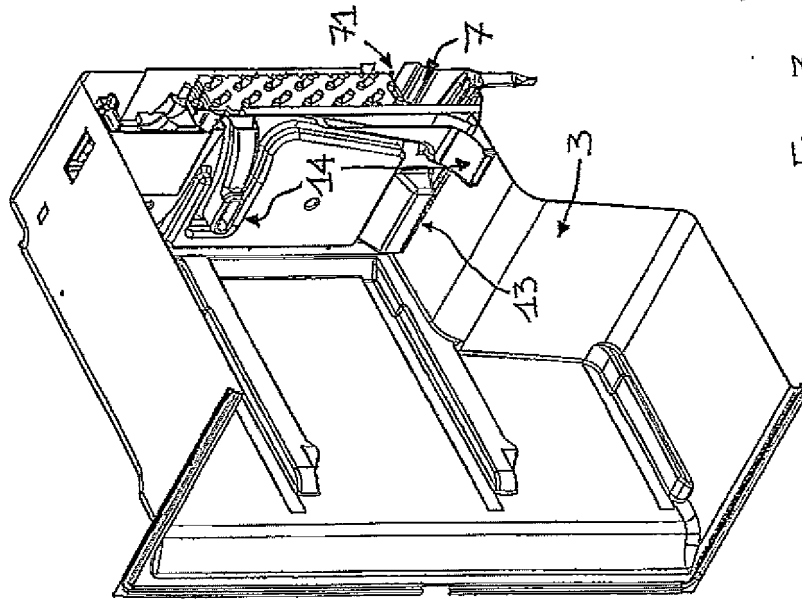


Fig. 3

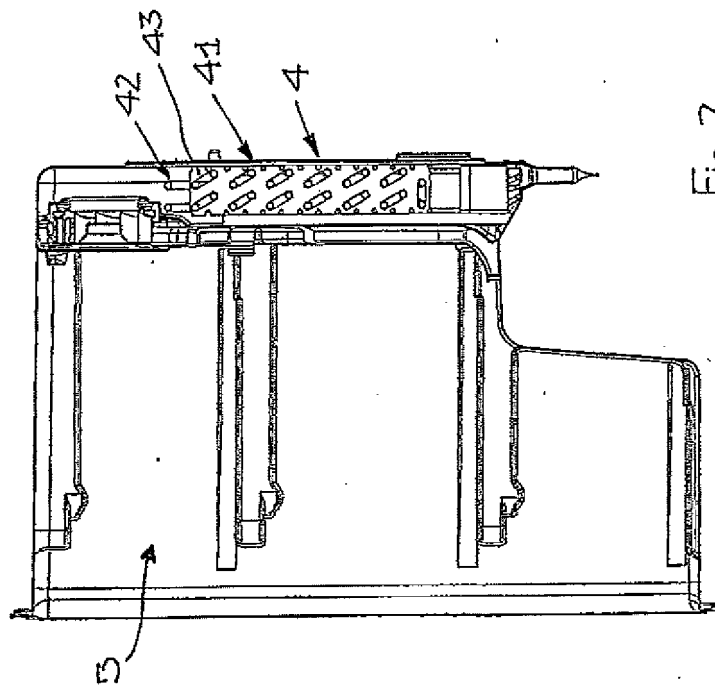
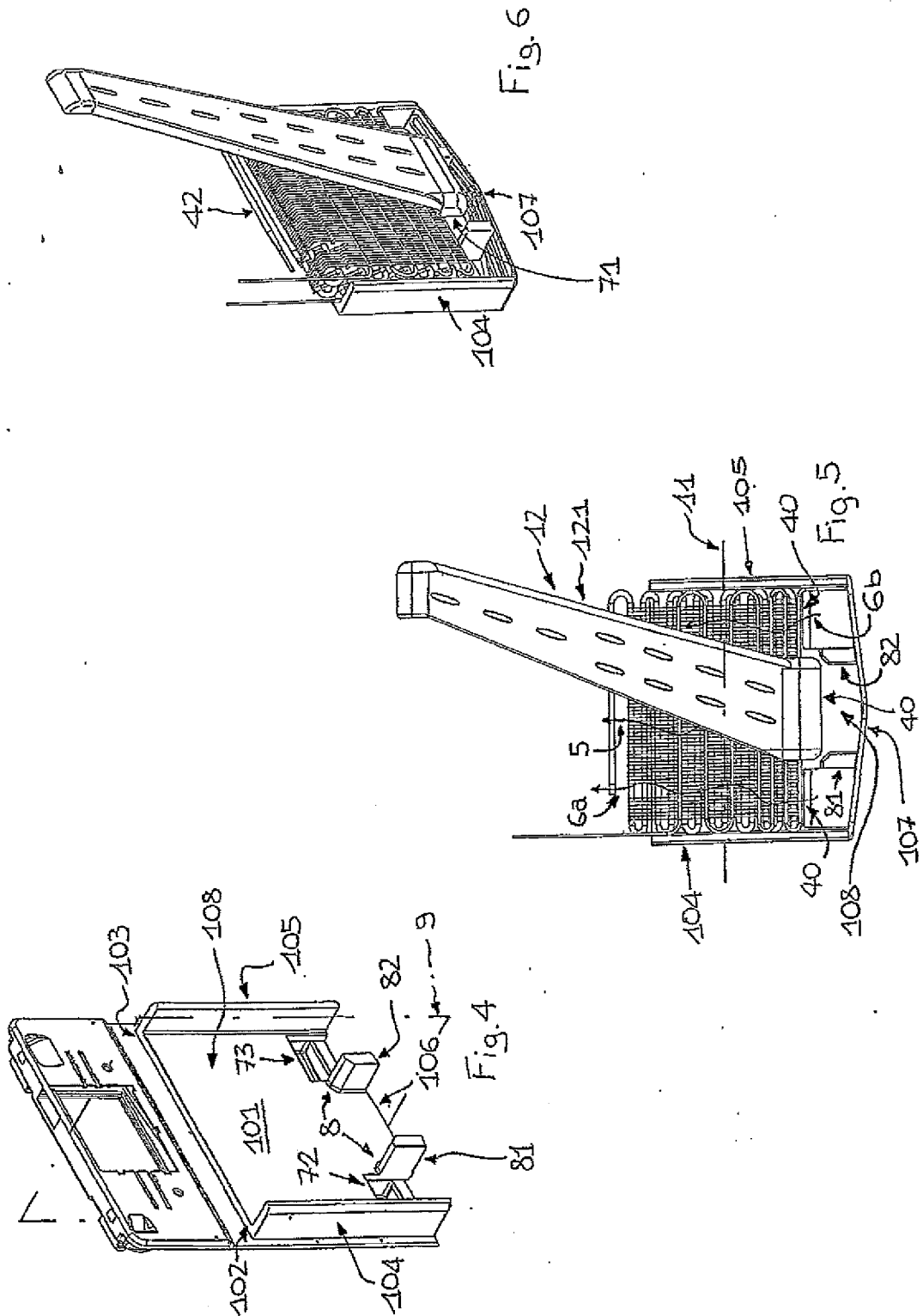


Fig. 2



REFERENCES CITED IN THE DESCRIPTION

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