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(54) Arrangement to quickly remove the frost from the lower temperature wall of a 0 °C cavity of a refrigerator

(57) An arrangement for rapidly removing condensate from the lower temperature wall (10) of a 0°C compartment or drawer (4) in a refrigerator (1), said compartment (4) being bounded by side walls (6, 7), an upper wall (9), a lower wall (8) and a rear wall (10), the rear wall (10) being refrigerated and presenting on a face (11) facing the interior of the compartment (4) a series of drainage ribs (15) arranged to direct the defrost water and/or condensate formed on it towards a drainage hole (20) positioned at the bottom of said wall (10), a defrost resistance element (18) being present on a second face (12) of the rear wall (10) opposite the first (11). Each rib (15) presents at least two portions (15A, 15B) with different inclinations on the wall (10), the defrost resistance element (18) being arranged to generate greater heat in proximity to a lower portion (1 0K) of the wall (10) close to the lower wall (8) of the compartment (4).

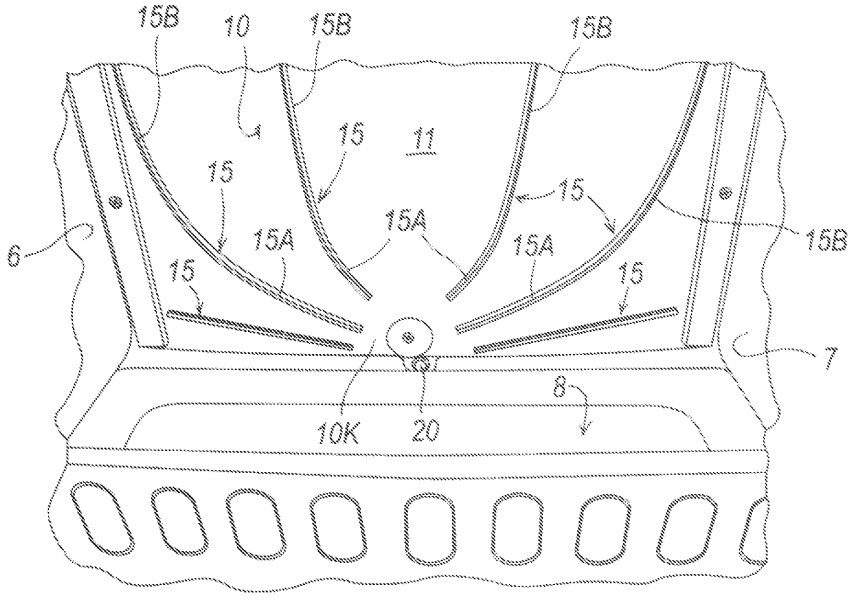

FIG. 2

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Description

[0001] The present invention relates to an arrangement for rapidly removing the condensate which forms on a lower temperature wall of a 0°C compartment in a refrigerator, in accordance with the introduction to the main claim.

[0002] A 0°C compartment or drawer, also known as a crisp drawer, is a cavity present in an upright refrigerator usually between an underlying freezer compartment and an overlying cooling compartment. This 0°C compartment can be simply closed by its own door, and may also contain a movable drawer to contain for example vegetables or similar products. This compartment is usually refrigerated by the movement (generally forced) of cold air which grazes a compartment rear wall having a first face facing the compartment and a second face, opposite the first, grazed by this flow of cold air. This latter originates from the freezer compartment and grazes said wall, possibly being deviated onto it by a conduit which transfers this air from the freezer compartment to the preservation compartment. The 0°C compartment is hence cooled by convection or by conduction/convection to enable temperatures between -2°C and +3°C to be obtained in the compartment, with an average of around 0°C to enable proper preservation of elements such as meat, fish and vegetables.

[0003] A heating element in the form of an electrical resistance element is preferably and advantageously present at the second face of said rear wall to enable automatic defrosting of the 0°C compartment and removal from the first face of said rear wall of any ice which may form on it. The water generated by the ice thawing descends along the wall and is collected in a tray positioned below it, from which the water passes into a drainage hole provided in a lower part of this wall close to the bottom wall of the 0°C compartment or directly in this latter. From there the water is removed in known manner from said compartment and subsequently evaporated.

[0004] An object of the present invention is to provide an arrangement enabling rapid and fast drainage of the defrost water and/or of the condensate which forms on the lower temperature wall, i.e. on the rear wall of a 0°C compartment of a refrigerator.

[0005] Another object is to provide an arrangement of the stated type which is of simple construction and application even in currently produced refrigerators.

[0006] These and further objects which will be apparent to the expert of the art are attained by an arrangement in accordance with the accompanying claims.

[0007] The present invention will be more apparent from the accompanying drawings, which are provided by way of non-limiting example and in which:

Figure 1 is a partly sectional side view of a refrigerator provided with the arrangement of the invention;
Figure 2 is a perspective front view of part of the interior of a 0°C compartment of the refrigerator of Figure 1;
Figure 3 is a front view of a wall of the compartment of Figure 2; and
Figure 4 is a rear view of the compartment wall of Figure 3.

[0008] With reference to said figures, these show a refrigerator 1 having a freezer compartment 2 and a preservation compartment 3 closed by corresponding doors 2A and 3A. In the embodiment shown in the figures, a known compartment 4, temperature controlled substantially at zero degrees, is present between the compartments 2 and 3; the compartment 4 is provided with its own door 4A.

[0009] Said compartment 4 is bounded by side walls 6 and 7, a lower wall 8, an upper wall 9 and a rear wall 10. This latter presents a first face 11 facing the interior of the compartment 4 and a second face 12 facing a usual conduit 13 for circulating forced air originating in known manner from the compartment 2 and directed towards the compartment 3. The wall 10 is cooled by the air passing through the conduit 13, this air also cooling the interior of the compartment 4 by convection or by conduction/convection. Ribs 15 are present on the first face 11 of the rear wall 10 and comprise at least two consecutive portions 15A and 15B of different inclinations to the plane of the face 11 of the wall 10, or rather to an axis K lying in that plane and perpendicular to the wall 8 of the compartment (see Figure 3). Water runs along these ribs on thawing of the ice which forms on said face 11 following activation of a usual heating member or element or defrosting resistance element 18 associated with the second face 12 of the wall 10. The ribs 15 also enable condensate water formed on the wall 10 to flow towards a lower part 10K of this wall close to the lower wall 8 of the compartment 4, towards a drainage hole 20 provided in this latter at the lower part 10K of said wall 10.

[0010] The different inclination of the consecutive portions 15A, 15B of the ribs 15 enables the water droplets to move rapidly along them, these droplets accelerating along those portions 15B more distant from the drainage hole 20 (and of greater inclination) and slowing down when they reach the portion 15A closer to said hole (of lesser inclination). This enables more rapid defrosting of the of the wall 10 to be achieved. It should be noted that each rib 15 can be formed as a broken line and be defined by rectilinear portions or comprise a rectilinear portion (such as the portion 15B in Figures 2 and 3) and a curved portion (such as the portion 15A in Figures 2 and 3), the inclination of this latter being defined by the tangents at its external points, these tangents varying their inclination to the vertical axis K lying on the wall 10 and perpendicular to the lower wall. Finally, it should be noted that the term "inclination"" means the angle formed by the rib portion to the vertical axis K lying in the plane of the wall: in this case the more the angle approaches zero degrees, the greater the inclination of that rib portion, this inclination reaching its maximum (angle of 0 degrees) if the rib

portion were perfectly parallel to or coinciding with said vertical axis.

[0011] The defrosting is achieved, as stated, by the heating element or resistance element 18 present on the second face 11 of the wall 10. According to a further characteristic of the invention, this resistance element 18 is arranged to generate greater heat in proximity to the lower part 10K of the wall 10. To achieve this, in one embodiment shown in Figure 4, the resistance element 18 is of serpentine shape and comprises a part 18A presenting a series of close-together portions which give this part a greater "resistive density" such that when traversed by current, this part 18A heats up more than the remaining part of the resistance element 18 disposed above the part 18A on the second face 12 of the wall 10.

[0012] The part 18A is disposed on the second face 12 of the rear wall 10 at the lower part 10K of the first face 11. In this embodiment, the resistivity of the resistance element is constant.

[0013] In a variant of the invention, the resistance element 18 has a variable power density, with a greater power density at the lower part 10K of the wall 10. In this case, the resistance element 18 is present on the face 11 of the wall 10 at a uniform pitch.

[0014] In a further variant, a combination of the two aforesaid solutions is provided, in this case the resistance element 18 having a variable power density which is greater in a portion positioned at the lower part 10K of the wall 10, the greater density part being shaped as the aforesaid part 18A shown in Figure 4.

[0015] By virtue of the present invention, a zero degree preservation compartment is obtained which can be rapidly defrosted because of the particular arrangement of the ribs 15 and the resistance element 18. Other embodiments are possible in the light of the aforegoing description and are therefore to be considered as falling within the scope of the present document.

Claims

1. An arrangement for rapidly removing the condensate and/or defrost water from the lower temperature wall (10) of a 0°C compartment or drawer (4) in a refrigerator (1), said compartment (4) being bounded by side walls (6, 7), an upper wall (9), a lower wall (8) and a rear wall (10), the rear wall (10) being refrigerated and presenting on a face (11) facing the interior of the compartment (4) a series of drainage ribs (15) arranged to direct the defrost water and/or condensate towards a drainage hole (20) positioned at the bottom of said wall (10), a defrost resistance element (18) being present on a second face (12) of the rear wall (10) opposite the first (11), **characterised in that** the ribs (15) present at least two portions (15A, 15B) with different inclinations, the defrost resistance element (18) being arranged to generate greater heat in proximity to a lower portion (10K) of the wall (10) close to the lower wall (8) of the compartment (4).

2. An arrangement as claimed in claim 1, **characterised in that** the rib (15) has at least one rectilinear portion (15B).

3. An arrangement as claimed in claim 1, **characterised in that** the rib (15) has at least one curved portion (15A).

4. An arrangement as claimed in claims 2 and 3, **characterised in that** the rib presents a first curved portion (15A) at least terminating in the lower portion (10K) of the rear wall (10), and a second rectilinear portion (15B) connected to the first and positioned along a wall part distant from said lower part (10K).

5. An arrangement as claimed in claim 1, **characterised in that** the defrost resistance element (18) is of serpentine shape and presents a wall (18A) having a series of close-together portions which confer a high resistive density on said part, said part (18A) corresponding with the lower portion (10K) of the rear wall (10) of the compartment (4).

6. An arrangement as claimed in claim 1, **characterised in that** the defrost resistance element (18) has a variable power density which is greater in a part positioned at the lower portion (10K) of the wall (10) of the compartment (4).

7. An arrangement as claimed in claims 5 and 6, **characterised in that** the greater power density part is the close-together portion part of the resistance element (18A) corresponding in position with the lower portion (10K) of the rear wall (10) of the compartment (4).

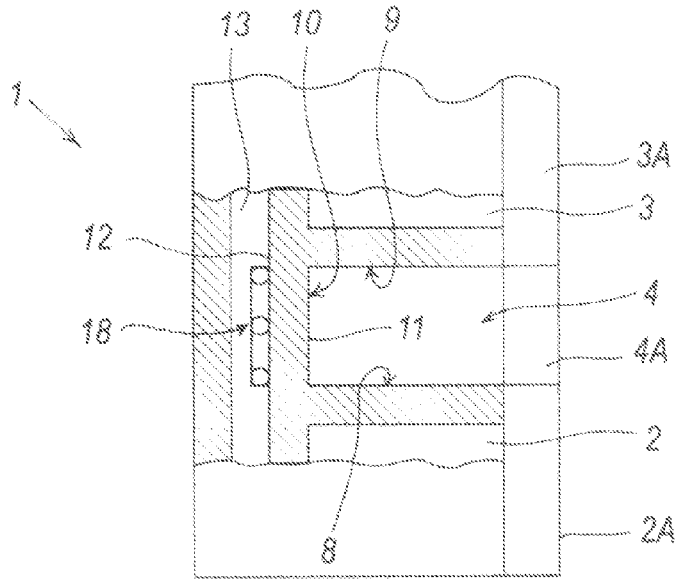
13
10
9
1
3A
3
12
4
18
11
4A
2
8
2A

FIG. 1

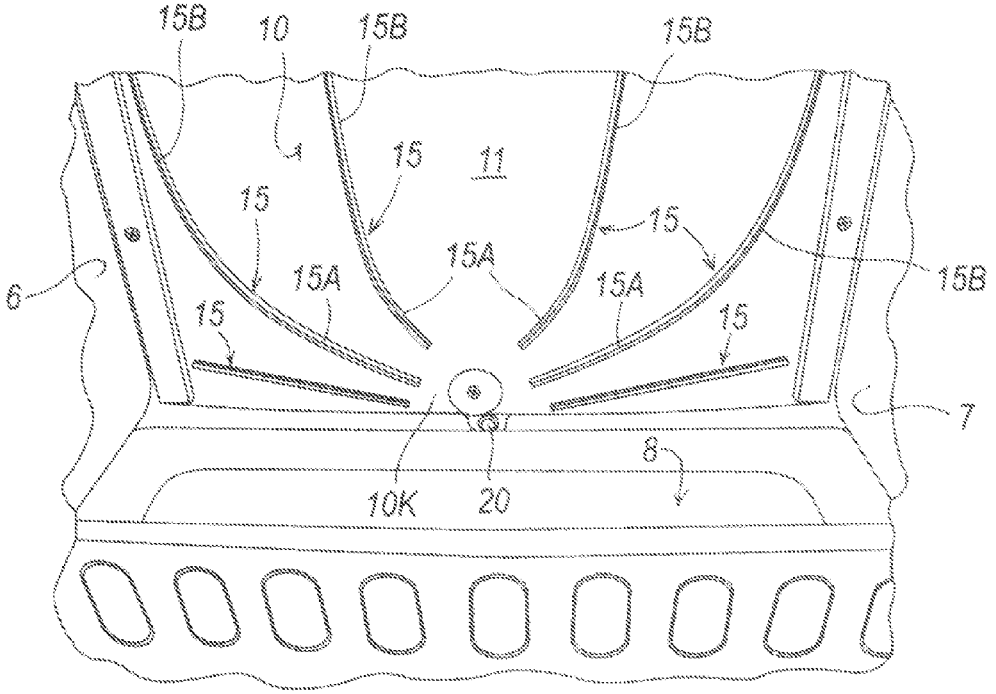
15B
10
15B
15B
15
11
15
15
15A
15A
15A
6
15B
15
15
7
8
10K
20

FIG. 2

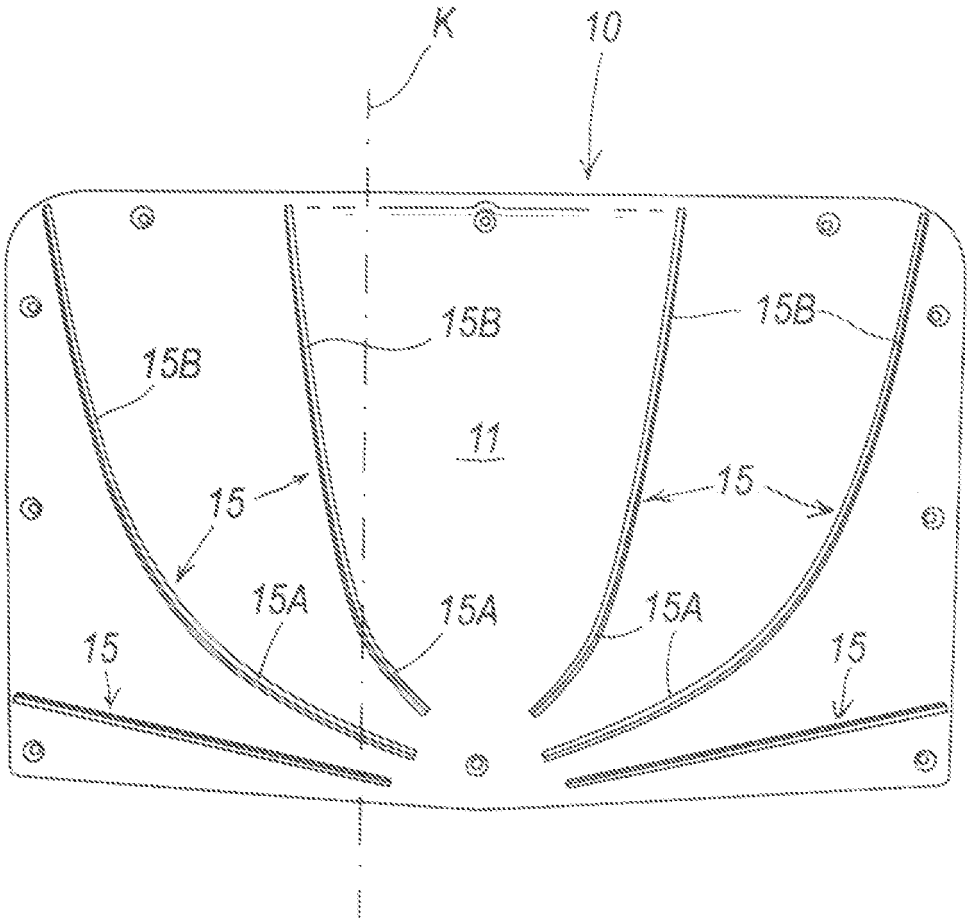

FIG. 3

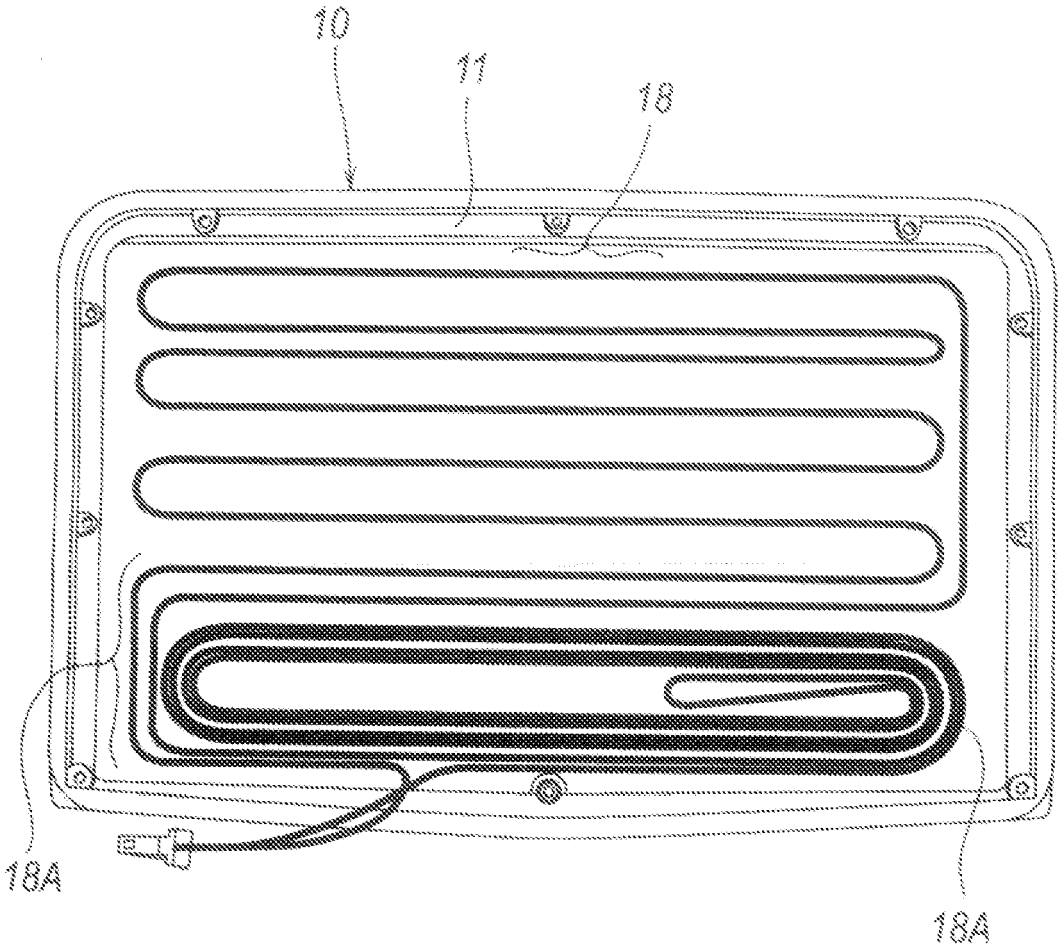

FIG. 4