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(54) Cooling appliance with a compartment with adjustable temperature

(57) Cooling appliance that comprises at least one refrigerator compartment (1), at least one freezer compartment (2) and at least one additional compartment (3). Said additional compartment (3) comprises at least one damper (14) that opens or closes in accordance with the set temperature and the temperature read by a temperature sensor (6). Said compartment (3) also comprises an air distribution cover (7) that comprises at least two channels, a first channel (8) that enables the circulation of cold air when the damper (14) opens, and a second channel (9) that enables the circulation of air when the damper (14) closes. The compartment (3) also comprises a fan (5) associated to said second channel (9).

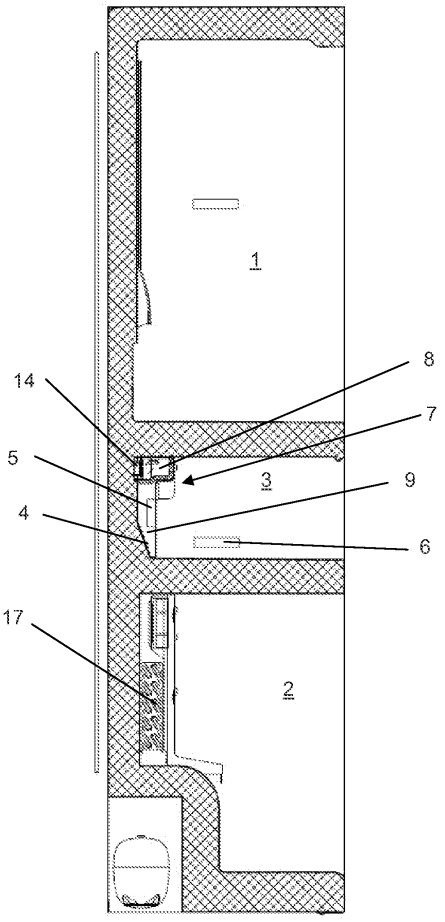

Fig. 2

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Description

TECHNICAL FIELD

[0001] The present invention relates to cooling appliances that comprise at least one compartment with a variable operating temperature range, thereby providing said compartment with different functions.

PRIOR ART

[0002] There are known cooling appliances that include a compartment with a variable operating temperature range.

[0003] JP 11211319 A discloses a cooling appliance with various compartments such as a freezer and refrigerator for meat and fish and vegetables. It also comprises a compartment with a variable temperature range, as a result of which it comprises two air intake conduits, each of them with a damper. The first channel is connected to the freezer compartment and the second channel is connected to the air return pipe of the refrigerator and meat and fish compartments, which are connected to each other. As a result, if the "freeze" function is selected for the latter compartment, the damper located in said first channel opens and reaches a temperature close to the temperature of the freezer compartment. If, however, the "refrigeration" function is selected, the damper located in said first channel closes, and if the temperature read by a temperature sensor located in said compartment is below the set temperature, the damper located in the second channel opens fully and reaches a temperature of -3°C, and if the temperature of the sensor is higher than the set temperature, the damper of the second channel does not open fully and reaches a temperature of 0°C.

DISCLOSURE OF THE INVENTION

[0004] It is the object of the invention to provide a cooling appliance that comprises at least one compartment with an optimum operating temperature that varies within a range, thereby providing said compartment with different functions.

[0005] The cooling appliance of the invention comprises at least one refrigerator compartment, at least one freezer compartment and at least one additional compartment. Said additional compartment comprises at least one temperature sensor and a damper that opens or closes in accordance with the result of the comparison between a set temperature and the temperature read by the temperature sensor. Said additional compartment also comprises at least one air distribution cover that delimits, along with the back wall of the additional compartment, at least two channels:

- a first channel that enables the circulation of cold air inside the additional compartment when the damper is open, and
- a second channel that enables the circulation of non-cooled air inside the additional compartment when the damper closes.

[0006] The cooling appliance also comprises at least one fan associated to the circulation of said non-cooled air.

[0007] With the cooling appliance of the invention at least one compartment is created, the operating temperature of which may be easily regulated in a temperature range. As a result, depending on the set temperature that is selected, the compartment performs a different function.

[0008] These and other advantages and characteristics of the invention will be made evident in the light of the drawings and the detailed description thereof.

DESCRIPTION OF THE DRAWINGS

[0009]

Figure 1 shows a perspective view of an embodiment of the cooling appliance of the invention.

Figure 2 is a longitudinal cross-section of the cooling appliance of Figure 1.

Figure 3 is an elevated view of the air distribution cover that comprises the cooling appliance of Figure 1.

DETAILED DISCLOSURE OF THE INVENTION

[0010] Figure 1 shows the cooling appliance 100 of the preferred embodiment of the invention, said cooling appliance 100 comprising:

- a refrigerator compartment 1,
- a freezer compartment 2, and
- an additional compartment 3.

[0011] The additional compartment 3 also comprises, as shown in Figure 2, a temperature sensor 6 and a damper 14. The damper 14 opens or closes in accordance with the result of the comparison between a set temperature, entered by means of a control panel 16, and the temperature read by the temperature sensor 6.

[0012] Said additional compartment 3, as shown in Figure 2, also comprises an air distribution cover 7 that delimits, along with the back wall of the additional compartment 3, two channels:

- The first channel 8 enables the circulation of cold air inside the additional compartment 3 when the damper 14 is open, and
- The second channel 9 enables the circulation of non-cooled air inside the additional compartment 3 when the damper 14 closes.

[0013] The cooling appliance 100 also comprises a fan 5 located in the second channel 9 and associated to the circulation of non-cooled air, with the result that it forces the circulation of air of the additional compartment 3 when the damper 14 closes. In a preferred embodiment, the fan 5 is fixed in the housing 15 of the air distribution cover 7, as shown in Figure 2. In another possible embodiment the fan 5 may be fixed to the back wall of the additional compartment 3.

[0014] In the preferred embodiment, the air distribution cover 7 of the invention is made of plastic. As a result, a light cover 7 is achieved. The preferred embodiment of the invention comprises a single piece although arrangements such as those comprising two or more components in order to reduce manufacturing costs, for example, are possible. A metallic arrangement is also possible.

[0015] If the temperature read by the temperature sensor 6 is higher than or substantially equal to the set temperature, the fan 5 is switched off and the damper 14 of the additional compartment 3 opens to enable cold air to enter the compartment 3 through the holes 10 located in the first channel 8 of the air distribution cover 7, as shown in Figure 3, and allowing the additional compartment 3 to cool down. Said cold air circulates through an intake channel, not shown in the figures, which connects the evaporator 17 and the damper 14. The air of the inside of the additional compartment 3 returns through the holes 11 located in the first channel 8 of the air distribution cover 7, as shown in Figure 3. The holes 11 of the distribution cover 7 are connected to a return channel, not shown in the figures, which takes the air to the bottom part of the evaporator 17.

[0016] If the temperature read by the temperature sensor 6 is below the set temperature the damper 14 closes. When said damper 14 closes the depression is cancelled, which is necessary for the air to circulate, and more cold air is prevented from entering the additional compartment 3. The fan 5, housed in the second channel 9 of the distribution cover 7, is also switched on to force the circulation of air inside the additional compartment 3, thereby generating the circulation of air, considered "non-cooled air", through the holes 12 and 13 of the second channel 9 of the distribution cover 7. As shown in Figure 3, the preferred embodiment comprises two holes 12, the first located in the top left part and the second in the top right part. The holes 13 are located in the bottom part of said second channel 9. The air of the additional compartment 3 is sucked out by means of the fan 5 through the holes 12 and is returned to the compartment 3 through the holes 13. The preferred embodiment also contemplates a threshold temperature, preferably 11°C, which must be exceeded for the fan to be switched on in accordance with the aforementioned condition. This threshold temperature is useful for optimising the energy consumption of the fan 5.

[0017] If the cooling appliance 100 of the invention is located in environments where the temperature is, for example, approximately 10°C, it is difficult for the temperature to rise above said temperature in any of the compartments of the cooling appliance 100. To address this problem by providing heat, the preferred embodiment of the invention comprises a heating element 4, preferably a resistor, associated to the circulation of non-cooled air of the additional compartment 3 and which is located in the second channel 9 and is fixed on the back wall of the additional compartment 3, as shown in Figure 2. As a result, the air sucked out through the holes 12 by means of the fan 5 is heated and returned to the compartment 3 through the holes 13. Said heating element 4 is switched on or off in accordance with the same conditions, which are described above for the fan 5.

[0018] With this arrangement, the optimum operating temperature of the additional compartment 3 of the cooling appliance 100 of the invention may be regulated in a temperature range of approximately -14°C to 14°C, even when the cooling appliance 100 is located in environments where the temperature is, for example, approximately 10°C. This temperature range enables the additional compartment 3 to perform different functions, among them the wine cellar function, the optimum operating temperature of which is approximately 12°C, which is the ideal temperature for storing for example wine. In the preferred embodiment, the storage conditions of the wine, in this case, are optimised due to the homogenisation of the temperature inside the additional compartment 3, even when the cooling appliance 100 is located in environments where the temperature is approximately 10°C, this being due to the fact that the fan 5 remains switched on when the temperature read by the temperature sensor 6 is below the set temperature. By selecting another set temperature of said temperature range, the additional compartment 3 becomes ideal for storing, for example, meat and fish, fruit and vegetables, ice cream, etc.

Claims

1. Cooling appliance comprising at least one refrigerator compartment (1), at least one freezer compartment (2) and at least one additional compartment (3), said additional compartment (3) comprising at least one temperature sensor (6) and at least one damper (14) that opens or closes in accordance with the result of the comparison between a set temperature and the temperature read by said temperature sensor (6), **characterised in that** said additional compartment (3) comprises at least one air distribution cover (7) that delimits, along with the back wall of the additional compartment (3), at least two channels, a first channel (8) that enables the circulation of cold air inside the additional compartment (3) when the damper (14) opens, and a second channel (9) that enables the circulation of non-cooled air inside the additional compartment (3) when the damper (14) closes, the cooling appliance (100) compris-

ing at least one fan (5) associated to the circulation of said non-cooled air.

2. Cooling appliance according to claim 1, wherein said fan (5) is located in the second channel (9).

3. Cooling appliance according to claim 2, wherein said fan (5) is fixed in a housing (15) of said distribution cover (7).

4. Cooling appliance according to claim 2, wherein said fan (5) is fixed to the back wall of the additional compartment (3).

5. Cooling appliance according to any of the preceding claims, comprising a heating element (4) connected to the circulation of non-cooled air of the additional compartment (3).

6. Cooling appliance according to claim 5, wherein the heating element (4) is located in the second channel (9).

7. Cooling appliance according to claim 6, wherein the heating element (4) is fixed to the back wall of the additional compartment (3).

8. Cooling appliance according to any of claims 5 to 7, wherein the heating element (4) is a resistor.

9. Cooling appliance according to any of the preceding claims, wherein the air distribution cover (7) is made of plastic or metal.

10. Method for distributing cold air or non-cooled air to a compartment (3) of a cooling appliance (100) by means of the opening or closing of a damper (14) in accordance with the result of the comparison between a set temperature and the temperature measured inside the compartment (3), the circulation of cold air being caused by the opening of the damper (14) and the circulation of non-cooled air being caused by the closing of said damper (14), **characterised in that**, during the circulation of non-cooled air a fan (5) associated to said circulation of non-cooled air is switched on if the temperature measured inside the compartment (3) is below the set temperature.

11. Method according to claim 10, wherein, during the circulation of non-cooled air, if the temperature measured inside the compartment (3) is below the set temperature, the fan (5) is switched on only if the temperature measured inside the compartment (3) is higher than or substantially equal to a threshold temperature.

12. Method according to claims 10 or 11, wherein, during the circulation of non-cooled air, a heating element (4) associated to said circulation of non-cooled air is switched on if the temperature measured inside the compartment (3) is below the set temperature.

13. Method according to claim 12, wherein, during the circulation of non-cooled air, if the temperature measured inside the compartment (3) is below the set temperature, the heating element (4) is switched on only if the temperature measured inside the compartment (3) is higher than or substantially equal to a threshold temperature.

14. Method according to any of claims 10 to 13, wherein said threshold temperature is approximately 11°C.

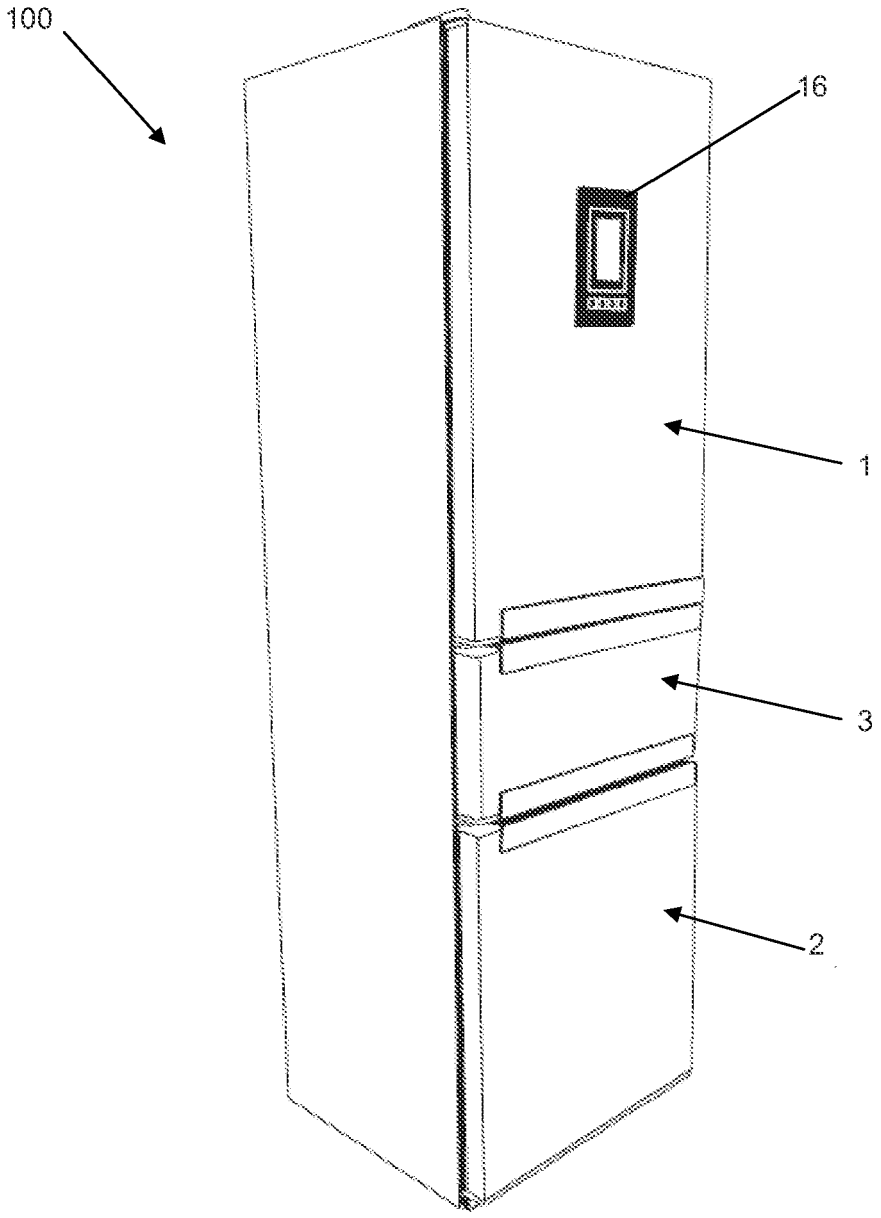

Fig. 1

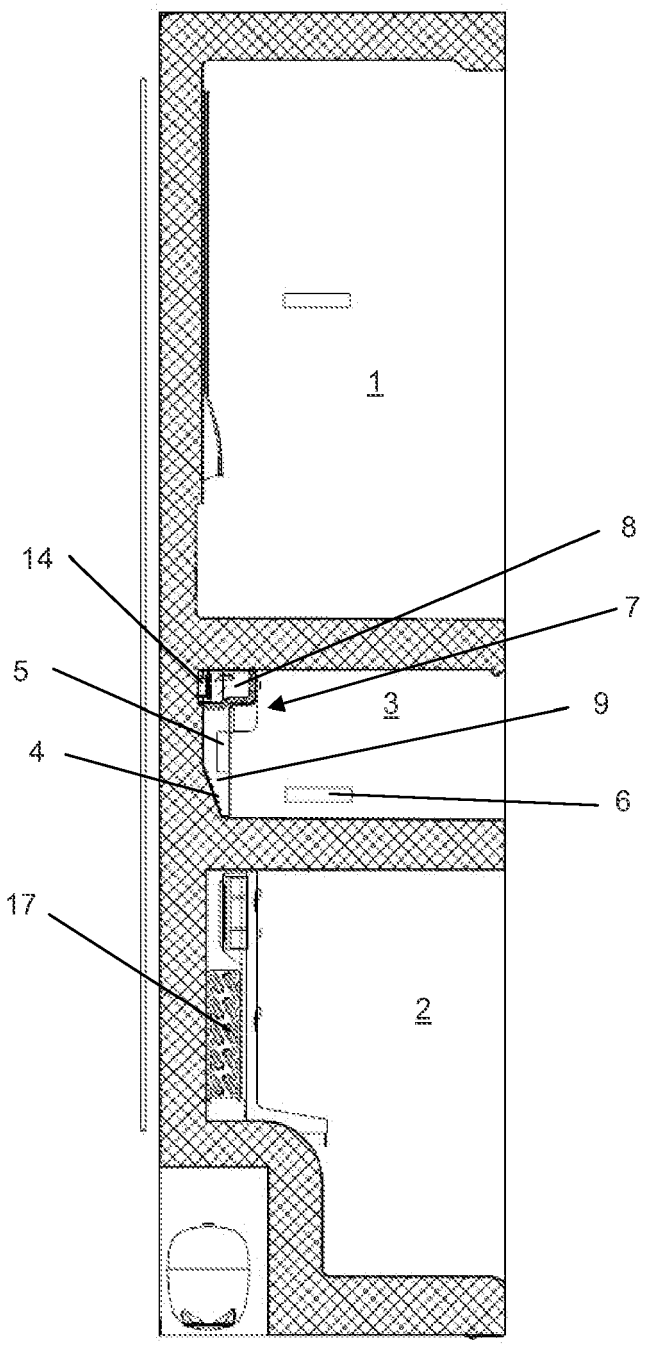

Fig. 2

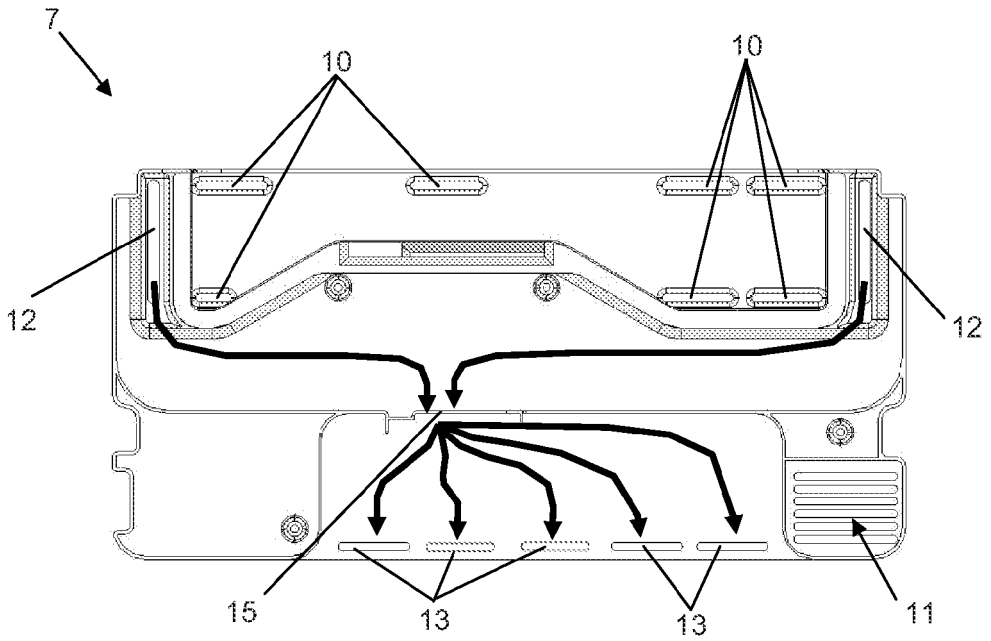

Fig. 3

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 11211319 A **[0003]**