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(54) Modular zero degree compartment for refrigerator

(57) Modular zero degrees compartment (10, 20) for a refrigerator. The compartment comprises at least two adapters (110') opposite to each other, operatively connected to the lateral walls of the refrigerator, an insulated bottom assembly (220) operatively connected to the adapters (110')and an insulated top lid assembly (130) operatively connected to the adapters (110'); the top lid assembly comprising conveying means forcing the air into the compartment (10).

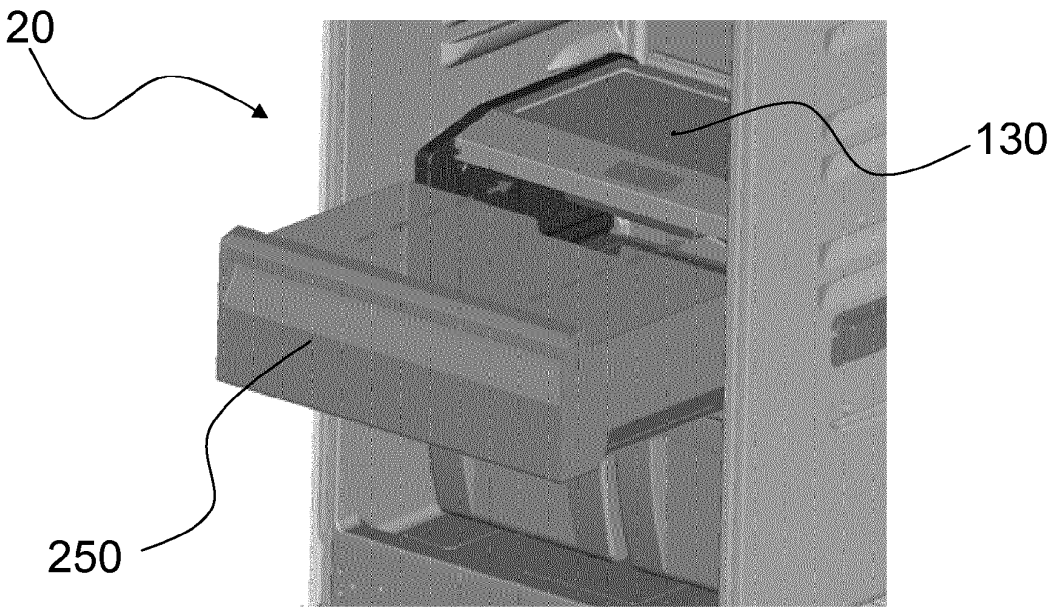

FIG. 8

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Description

[0001] The present invention relates to a compartment for refrigerator. In particular, the present invention relates to a modular compartment to house a "zero degree" container in an internal portion of the refrigerator.

[0002] A "zero degree" compartment is an internal portion of a refrigerator that maintains the temperature at about 0°C,thus lowering the standard temperature inside the refrigerator. The compartment is useful to store and preserve under optimal conditions meat and fish, that require said lower temperature to avoid quick deterioration.

[0003] Refrigerators are usually partitioned in more compartments to allow the storage of food of different type and size. These compartments are useful to help the users in storing food by minimizing the required space and selecting a suitable temperature to preserve different foods. There are several known methods and types of partitions for the internal space of the refrigerator. Also, there are several known methods and types of control systems for the compartment temperature of a refrigerator. These methods and types of compartments help, in combination, the user to store different kind of food in a correct way.

[0004] EP1152201 describes a refrigerator provided with a refrigeration compartment for preserving food at temperature different from that of the main compartment. The main object of the invention is to provide a refrigerator with a chamber with a variable volume suitable to contain different type of food. The refrigeration compartment contains a chamber defined by the inner walls of the main compartment, operating at temperatures different from those of the main compartment. In order to vary the volume of the chamber, the refrigeration compartment comprises a removable structure which can be located at different heights of the main compartment. In particular, the removable structure comprises a plate supporting the structure at a desired height on conventional support elements provided in the main compartment, forming also the roof of the refrigeration compartment. The removable structure also comprises a front door to ensure access to the refrigeration compartment; the front door can be extended depending on the location of the removable structure.

[0005] Although the device above permits to store food with different size by varying the height of the chamber, the temperature of the compartment cannot be decreased below the temperature of the main compartment. Therefore this device permits to store food at the standard operating temperature of the refrigerator, or at higher temperature, like vegetables, fruit or other food, which can be preserved at a temperature higher than that of the main compartment.

[0006] EP0849553 describes a refrigerator provided with a device that controls the temperature of a chamber within the refrigeration compartment and used at a predetermined temperature for preserving particular food such as fresh meat and fish. The device comprises a temperature sensor, positioned in the chamber, which measures the temperature of the preservation compartment, so that the control of the refrigeration circuit is effected in accordance with at least two operating modes by comparing the temperatures measured by the sensor with different preset temperatures on the basis of the presence or absence of a selection signal generated by selector means.

[0007] With a refrigerator as described above it is possible to set the temperature within a chamber as desired, and to control it by using the temperature sensor. A main disadvantage, however, relates to the impossibility to control and set different temperatures, particularly temperatures lower than the main compartment temperature, in refrigerators that do not have the device built-in. As consequence, only if the refrigerator is designed with the device built-in it is possible to control the temperature as desired for different chambers.

[0008] It would therefore be desirable to have a modular compartment for refrigerator, suitable to provide a separate chamber inside the main compartment of the refrigerator. Moreover, it would be desirable to have a modular compartment that maintains the temperature at about zero degrees. It would also be desirable that this modular compartment be of quick and simple mounting for initial installation or for subsequent replacements. It would be further desirable to have a modular compartment that is advantageously manufactured and assembled, so that it can be installed in a refrigerator that is not designed for said modular compartment. Finally, it would be desirable to have a modular compartment in which the costs of production and assembly with other system components are reduced.

[0009] The object of this invention is therefore to provide a modular compartment with a control system for the zero degrees temperature that sets and maintains the temperature at about zero degrees (0°C)and, as consequence, extends the shelf-lifeof the food stored in the compartment.

[0010] A further object of this invention is to provide a modular zero degree compartment that is easy to mount in the initial installation or in case of replacement in any type of refrigerator. Yet another object of this invention is to provide a modular zero degree compartment that can reduce the production costs of the compartment itself.

[0011] According to the present invention, the above-mentioned objects are achieved thanks to the features listed in the appended claims. According to one main aspect of the invention, a modular zero degrees compartment for refrigerator comprises at least two adapters opposite to each other, operatively connected to the lateral walls of the refrigerator, an insulated bottom assembly operatively connected to the adapters and an insulated top lid assembly operatively connected to the adapters; the top lid assembly comprising conveying means forcing the air within the refrigerator into the com-

partment.

[0012] With a modular zero degree compartment according to the present invention it is possible to provide a compartment in refrigerators that were not provided with it during the manufacturing of the refrigerator. The modular compartment also makes possible to maintain a lower temperature inside it by forcing the cold air that circulates into the main compartment of the refrigerator.

[0013] Preferably the compartment comprises two lateral insulated portions, opposite to each other. More preferably the insulated bottom lid assembly and the lateral insulated portions are made in a single element.

[0014] Preferably the compartment further comprises two side portions opposite to each other, operatively connected to the lateral walls of the refrigerator and comprising the adapters.

[0015] Preferably the conveying means comprise at least a fan forcing the air into the compartment. More preferably the fan is housed in the top lid assembly. In addition or alternatively, the conveying means comprise an air conduit conveying the forced air of the fan into the compartment.

[0016] In this way, it is possible to force the cold air of the evaporator to enter into the modular compartment and, consequently, to cool down the food stored in it.

[0017] Preferably the compartment comprises at least a temperature sensor for measuring the temperature inside the compartment. More preferably the compartment further comprises electronic control means operatively connected to the fan and/or to the temperature sensor.

[0018] In this way, the electronic control means of the compartment adjust the temperature inside the compartment independently, namely without interacting with the control device of the refrigerator.

[0019] Preferably the electronic control means maintain the temperature in the compartment between -2 and +2 °C. More preferably the electronic control means maintain the temperature in the compartment between -1 and +1°C. Most preferably the electronic control means maintain the temperature in the compartment at 0°C.

[0020] This temperature permits to store under optimal conditions meat and fish, which are better preserved at said lower temperature.

[0021] Preferably the compartment further comprises a container insertable between the insulated top lid assembly and the insulated bottom lid assembly. More preferably the container is provided with a front transparent panel. This allows to store food in a simple way.

[0022] Preferably the compartment comprises electrical supply means operatively connected with the electrical connection of the refrigerator. In this way power supply to the modular compartment is provided by the electrical connection of the refrigerator itself, which avoids providing separate electrical supply means to the modular compartment.

[0023] These and other features and advantages of the present invention will become more apparent from the following detailed description of preferred embodiments thereof, which are illustrated by way of non-limitative example in the accompanying drawings, in which:

- figure 1 shows a schematic three-dimensional view of an adapter of the compartment according to the preferred embodiment of the present invention, mounted on a refrigerator;
- figure 2 shows a schematic three-dimensional view of a top lid assembly of the compartment, connected to the adapters of figure 1;
- figure 3 shows a schematic three-dimensional view of a container with the insulated encasement mounted below the top lid assembly of figure 2;
- figure 4 shows a schematic three-dimensional view of a preferred embodiment of the compartment according the present invention;
- figure 5 shows a schematic three-dimensional view of a side portion of another embodiment for the compartment according the present invention;
- figure 6 shows a schematic three-dimensional view of a bottom insulated assembly of the compartment, connected to the adapters of figure 5;
- figure 7 shows a schematic three-dimensional view of a top lid assembly of the compartment, connected to the adapters of figure 5;
- figure 8 shows a schematic three-dimensional view of a container mounted between the top lid assembly of figure 7 and the insulated bottom assembly of figure 6;
- figure 9 shows a schematic three-dimensional view of a top lid assembly for the compartments of the present invention;
- figure 10 shows a section view of the top lid assembly of figure 9.

[0024] With reference to the figures 1-4, a preferred embodiment of the modular zero degrees compartment 10 is described below. The figures show a portion of a main compartment of a refrigerator in which the modular zero degrees compartment 10 is installed.

[0025] The modular zero degrees compartment 10 comprises two adapters 110 opposite to each other, operatively connected to the lateral walls of the refrigerator. The adapters 110 have a size that permits to fit with the lateral walls of the refrigerator without interferences with the front panel (not illustrated) of the refrigerator. Preferably, these are manufactured in plastic material, but can be also manufactured by using a different material ensuring substantially the same properties and functions.

[0026] In the preferred embodiment the adapters 110 have a parallelepiped elongated shape and are provided with two holes 111, 111', in correspondence of the two extremities, for the engagement of screws, or the like, with the later walls of the refrigerator. Moreover, these adapters 110 are provided with a slot 112 in the upper portion for the insertion of the top lid assembly 130, as described below.

[0027] Hence, the compartment 10 also comprises an insulated top lid assembly 130, operatively connected to the adapters 110. The top lid assembly 130 has a parallelepiped shape with a size suitable to form a cover plate into the main compartment of the refrigerator, and is made of plastic material. As the adapters 110, the top lid assembly 130 can be also manufactured with different materials. The top lid assembly 130 is provided with two engagement portion 132, 132' formed in correspondence of the extremities in contact with the adapters 110 for the connection with slots 112.

[0028] As shown in figures 9 and 10, the top lid assembly 130 comprises a rear portion 134, in contact with the rear panel 100 of the main compartment of the refrigerator, in which conveying means are positioned to force the air within the refrigerator into the compartment 10. In particular, the conveying means comprising a fan 300 that forces the air into the compartment 10. Moreover, the conveying means are provided with an air conduit conveying the forced air produced by the fan 300 into the compartment 10. Said conduit, which extends into the internal surface of the top lid assembly 130, as shown in figure 10, conveys the air forced by the fan 300 into the compartment 10, by appropriate ventilation slits (not illustrated).

[0029] The compartment 10 also comprises a temperature sensor 370 for measuring the temperature inside the compartment 10. In the preferred embodiment here described the sensor 370 is positioned in the top lid assembly 130. Moreover, a second temperature sensor (not shown) can be present to measure the temperature of the main compartment of the refrigerator in which the modular compartment 10 is installed. In such configuration the second temperature sensor can be preferably placed in the rear portion of the top lid assembly 130, externally to the same modular compartment 10. Advantageously the second temperature sensor can be located in contact with the rear wall of a static refrigerator, nearby the evaporator, or near the air inlet of a "no-frost" refrigerator. Further, it is possible to have additional temperature sensors to measure the temperature in different points of the compartment 10, so as a desired temperature is set and maintained.

[0030] In the described embodiments thermistors are preferably used as temperature sensors. The control of the fan 300, such as the turn-on or turn-off of the same or setting the fan speed, and the collection of the measurements of the temperature, are provided by electronic control means operatively connected to the fan 300, to the temperature sensor 370 and optionally to the second sensor and to the additional sensors. In the preferred embodiment here described these electronic control means (not illustrated), are positioned in the top lid assembly 130, and ensure an independent temperature control of compartment 10, without the influence of the temperature control of the main compartment of the refrigerator.

[0031] In an alternative embodiment the electronic control is in communication with the control of the refrigerator for receiving a signal related to the temperature of the main compartment in which the modular compartment 10 is installed, and/or to the status of the compressor. In a second alternative embodiment the electronic control itself is provided with means for determining the status of the compressor of the refrigerator, for instant based on the measurement of the current absorbed by the refrigerator.

[0032] Finally, the top lid assembly 130 houses electrical supply means 350, connected to the fan 300 and to the temperature sensor 370 to provide electric power to the same. In turn the electrical supply means 350 are connected to the main power supply line of the refrigerator. In particular, this last connection is ensured by power magnetic induction means (not illustrated) that collect the electrical energy from the main power line without physical contact with the same. It is also possible to provide electrical supply means 350 with a battery, to make them independent from the refrigerator power supply.

[0033] The compartment 10 also comprises an insulated bottom assembly and lateral insulated portions made in a single element 122, as an insulated encasement. The insulated encasement 122 is made of the same material used to form the insulated portion of the top lid assembly 130, but it can be also made of different materials maintaining the same technical features. In the preferred embodiment here described, the insulated encasement 122 is formed as an external portion of a container 150. This is insertable between the insulated top lid assembly 130 and a bottom lid assembly of a refrigerator. Moreover, this container 150 is provided with a front transparent panel 152 that allow seeing the foods stored inside.

[0034] Finally, the insulated bottom assembly and the lateral insulated portions of the insulated encasement 122 are operatively connected to the adapters 110. In particular the two opposite extremities of the insulated encasement 122 are adjacent to the adapters 110, forming, with the insulation of the insulated top lid assembly 130, a continuous insulation on at least four sides of the container 10.

[0035] To set up the compartment 10, the user has to fix the two adapters 110, opposite to each other, to the lateral walls of the refrigerator, at the desired height. To effect this fixing each adapter 110 is provided with two holes 111, 111' engaging corresponding screws, or the like. Afterwards, the user mounts the insulated top lid assembly 130 by connecting it to the adapters 110, to form a cover plan into the main compartment of the refrigerator. The connection is ensured by the insertion of the two engagement portion 132, 132', formed in correspondence of the extremities in contact with the adapters 110, with the slots 112 of the two adapters 110. To complete the compartment 10 the container 150 is inserted between the insulated top lid assembly 130 and a bottom lid assembly of the refrigerator, by using the slot formed on the front transparent panel 152. The user connects

electrically the compartment 10, to ensure electrical supply to the fan 300, the sensor 370, and the electronic control means that control the functioning of compartment 10. This electrical connection is formed by the electrical supply means 350. In particular, in this preferred embodiment, the user places the power magnetic induction means in contact with a lateral side of the refrigerator, near an electrical connection of the same, without the need for a physical contact.

[0036] When powered on, the electronic control means of the modular zero degrees compartment 10 maintains the internal temperature at about 0°C. In particular, the electronic control means collect the temperature data from the temperature sensor 370 and compare said data to maintain the temperature in the compartment 10 between -2 and +2°C or, preferably, between -1 and +1°C. If the temperature rises, the electronic control means activate the fan 300 until it reaches a temperature between 0 and +2°C. If the temperature drops, the electronic control means deactivate the fan 300 until it reaches a temperature between -2 and 0 °C.

[0037] In a preferred mode the modular compartment 10 is installed and operated within the main compartment of a refrigerator. The temperature of the modular compartment 10 is adjusted by managing the fan 300 according two preferred operating modes, named as "Cold mode" and "Warm mode".

[0038] The "Cold" operating mode, is operated when it is required to decrease the temperature within the modular compartment 10, for instance because the temperature of the modular compartment 10 sensed by the temperature sensor 370 is above 0°C, or because the trend of the sensed temperature increases towards 0°C in a relatively quick manner, or for any other equivalent reason. In the "Cold" mode the fan 300 is activated only when the temperature of the main compartment is decreasing or it is managed to be decreased.

[0039] The temperature of the main compartment can be for instance determined on the basis of a temperature value or trend sensed by a second sensor placed in the main compartment of the refrigerator. The temperature of the main compartment is managed to be decreased, for instance, when the status of the compressor of the refrigerator is or becomes active.

[0040] The "Warm" operating mode can be activated when it required to increase the temperature within the modular compartment 10, for instance because the temperature of the compartment sensed by the temperature sensor 370 is below -2°C, or because the sensed temperature trend decreases towards -2°C in a relatively "quick" manner, or for any other equivalent reason.

[0041] If the "Warm" mode is operated, the fan 300 is switched on only when the temperature of the main compartment of the refrigerator in which the modular compartment 10 is increasing or it is managed to be increased. The requirement to increase the temperature can be for instance determined on the basis of a temperature value or trend sensed by a second sensor placed in the main compartment of the refrigerator, or it is determined by the not-active status of the compressor of the refrigerator. Other hybrid modes derivable from the two above described ones are also applicable to the modular compartment of the present invention, in order to adjust the internal temperature.

[0042] In some other cases, it is not necessary to force the temperature increase in the modular compartment 10 and the temperature is left increasing for thermal inertia, after the compressor has been de-activated.

[0043] Another embodiment of the modular zero degrees compartment 20 according to the present invention is shown in figures 5-8. As described for the previous embodiment, these figures show a portion of a main compartment of a refrigerator in which the modular zero degrees compartment 20 is installed.

[0044] The modular zero degrees compartment 20 shown in figures 5-8 comprises two side portions 210 opposite to each other, operatively connected to the lateral walls of the refrigerator. Each of these side portions 210 is provided with connecting means, like the adapters 110 of the previous preferred embodiment, and are made with insulated material to provide two lateral insulation sides for the compartment 20. The side portions 210 have a size that fits with the lateral walls of the refrigerator without interferences with the front panel (not illustrated) of the refrigerator. Preferably, these portions are manufactured in plastic material, but a different material with the same or similar properties can also be used.

[0045] In the second embodiment here described, the side portions 210 have a parallelepiped shape and are provided with connecting means in their middle portion. The connecting means comprise, for each side portion, two holes 212, 212' in correspondence of the two extremities, in which are housed screws or the like to be fixed to the later walls of the refrigerator.

[0046] Moreover, these side portions 210 are provided with a first slot 213 in the upper portion, for the insertion of the top lid assembly 130, and with a second slot 214 in the lower portion, for the insertion of the insulated bottom assembly 220, as described below.

[0047] Hence, the compartment 20 also comprises an insulated top lid assembly 130, operatively connected to the side portions 210. The top lid assembly has a parallelepiped shape with a size suitable to form a cover plate in the main compartment of the refrigerator. The top lid assembly 130 is made of plastic material but can be also manufactured with different materials, as the side portions 210. The top lid assembly 130 is provided with two engagement portions 132, 132', formed in correspondence of the extremities in contact with the side portions 210 for the connection with the first slot 13.

[0048] As shown in figures 9 and 10, the top lid assembly 130 comprises a rear portion 134, in contact with the rear panel 100 of the main compartment of the refrigerator, in which the conveying means are positioned to force the air within the refrigerator into the compartment 20. In particular, the conveying means comprising a fan

300 that forces the air into the compartment 20. Moreover, the conveying means are provided with an air conduit conveying said forced air from the fan 300 into the compartment 20. Said conduit, which extends into the internal surface of the top lid assembly 130, as shown in figure 10, conveys the air by ventilation slits (not illustrated).

[0049] The compartment 20 also comprises a temperature sensor 370 for measuring the temperature inside the compartment 20. The sensor 370 is positioned in the top lid assembly 130. More than one temperature sensor may be provided to measure the temperature in different point so the compartment 20 and ensure that a desired temperature is set and maintained.

[0050] The control of the fan 300, such as the turn-on or turn-off of the same or setting the fan speed, and the collection of the measurements of the temperature, are provided by electronic control means operatively connected to the fan 300 and to the temperature sensor 370. In the preferred embodiment here described these electronic control means (not illustrated), are positioned in the top lid assembly 130, and ensure an independent temperature control of compartment 20, without the influence of the temperature control of the main compartment of the refrigerator.

[0051] Finally, the top lid assembly 130 houses electrical supply means 350, connected to the fan 300 and to the temperature sensor 370 to provide electric power to the same. In turn the electrical supply means 350 are connected to the main power supply line of the refrigerator. In particular, this last connection is ensured by power magnetic induction means (not illustrated) that collect the electrical energy from the main power line without physical contact with the same. It is also possible to provide electrical supply means 350 with a battery, to make them independent from the refrigerator power supply.

[0052] The compartment 20 also comprises an insulated bottom assembly 220 operatively connected to the second slot 214 of the side portions 210. This bottom insulation, together with the lateral insulation of the side portions 210, forms an insulated encasement for the compartment 20. Hence, the insulated parts form a continuous insulation on at least for side of the container 20.

[0053] Finally, the compartment 20 also comprises a container 250. This is made in plastic material and is insertable between the insulated top lid assembly 130 and a bottom lid assembly 220 of a refrigerator.

[0054] To set up the compartment 20, the user has to fix the two side portions 210 opposite to each other, to the lateral walls of the refrigerator, at the desired height, by the adapter portions 211. To effect this fixing each adapter portion 211 is provided with two holes 212, 212' engaging corresponding screws, or the like.

[0055] Afterwards, the user mounts the insulated top lid assembly 130 by connecting it to the side portions 210, to form a cover plan into the main compartment of the refrigerator. The connection is ensured by the insertion of the two engagement portion 132, 132', formed in correspondence of the extremities in contact with the side portions 210, with the first slots 213 of the side portions 210. Furthermore, the user has to mounts the insulated bottom assembly 220, to form a second plan into the main compartment of the refrigerator, by the insertion of the two engagement portion 222, 222' of the same into the second slots 214 of the in the side portions 210. To complete the compartment 20 the container 150 is inserted between the insulated top lid assembly 130 and the insulated bottom assembly 220, by using the slot formed on the front panel of the container 150. The user connects electrically the compartment 20, to ensure electrical supply to the fan 300, the sensor 370, and the electronic control means that control the functioning of compartment 10. This electrical connection is formed by the electrical supply means 350. In particular, in this preferred embodiment, the user places the power magnetic induction means in contact with a lateral side of the refrigerator, near an electrical connection of the same, without the need for a physical contact. When powered on, the electronic control means of the modular zero degrees compartment 10 maintain the internal temperature at about 0°C. In particular, the electronic control means collect the temperature data from the temperature sensor 370 and compare said data to maintain the temperature in the compartment 10 between a first and a second predetermined temperature values (the operating temperature range of the compartment), typically between - 2 and +2°C or, preferably, between -1 and +1°C. If the temperature rises above a switch-on temperature, the electronic control means activate the fan 300 until it reaches a temperature within the operating range, typically between 0 and +2°C. If the temperature drops below a switch-off temperature, the electronic control means deactivate the fan 300 until it reaches a temperature within the operating range, typically between -2 and 0°C.

[0056] The already described operating modes, in particular the "cold" and "Warm" operating modes can be also applied to the second described embodiment of the modular compartment with similar results.

[0057] It is finally here pointed out that, as a variant of the above described embodiments, the bottom assembly 220 can be replaced by the lower wall of the of the main compartment of the refrigerator in which the modular compartment 10 is installed.

[0058] The technical solutions adopted for the modular zero degrees compartment fully achieve their task and pre-set objects. In particular, the connection and disconnection of the compartment is simple and time-inexpensive. Moreover, said connection and disconnection are achieved without using special tools and without special technical skills. Furthermore, the modular zero degrees compartment allows to set and maintain the desired temperature of the food stored in the compartment at can be also manufactured using different materials about zero degrees, thus extending their shelf-life. The minimisation of the components also results in a simple structure of the compartment.

[0059] Lastly, the use of the compartment as described

above enables a minimisation of the production costs thanks to an easy mounting for initial installation or for replacement in any type of refrigerator.

[0060] The modular zero degrees compartment has a relatively simple structure, which can be manufactured in a relatively cheap way by using known industrial processes.

Claims

1. Modular zero degrees compartment (10, 20) for refrigerator **characterised in that** it comprises at least two adapters (110') opposite to each other, operatively connected to the lateral walls of said refrigerator, an insulated bottom assembly (220) operatively connected to said adapters (110') and an insulated top lid assembly (130) operatively connected to said adapters (110'); said top lid assembly comprising conveying means forcing the air within said refrigerator into said compartment (10).

2. Modular zero degrees compartment (10) according to claim 1, **characterised in that** it comprises two lateral insulated portions, opposite to each other.

3. Modular zero degrees compartment (10) according to claim 2, **characterised in that** said insulated bottom lid assembly and said lateral insulated portions are made as a single element (122).

4. Modular zero degrees compartment (20) according to any claims from 1 to 3, **characterised in that** it comprises two side portions (210') opposite to each other, operatively connected to the lateral walls of said refrigerator; said side portions (210') comprising said adapters.

5. Modular zero degrees compartment (10, 20) according to any claims from 1 to 4, **characterised in that** said conveying means comprise at least a fan (300) forcing the air into said compartment (10, 20).

6. Modular zero degrees compartments (10, 20) according to claim 5, **characterised in that** said top lid assembly (130, 230) comprises said fan (300).

7. Modular zero degrees compartment (10, 20) according to claim 5 or 6, **characterised in that** said conveying means comprise an air conduit conveying said forced air of said fan (300) into said compartment (10, 20).

8. Modular zero degrees compartment (10, 20) according to one or more claims from 1 to 7, **characterised in that** it comprises at least a temperature sensor (370) for measuring the temperature inside said compartment (10, 20).

9. Modular zero degrees compartment (10, 20) according to one or more claims from 5 to 8, **characterised in that** it comprises electronic control means operatively connected to said fan (300) and/or to said temperature sensor.

10. Modular zero degrees compartment (10, 20) according to claim 9, **characterised in that** said electronic control means maintain the temperature in said compartment between a first predetermined temperature and a second predetermined temperature, preferably between -2 and +2°C.

11. Modular zero degrees compartment (10, 20) according to claim10, **characterised in that** said electronic control means maintain the temperature in said compartment between -1 and +1°C.

12. Modular zero degrees compartment (10, 20) according to one or more claims from 1 to 12, **characterised in that** it comprises a container (150, 250) insertable between said insulated top lid assembly (130, 230) and said insulated bottom lid assembly (120, 220).

13. Modular zero degrees compartment (10) according to claim13, **characterised in that** said container (150) is provided with a front transparent panel (152).

14. Modular zero degrees compartment (10, 20) according to one or more claims from 1 to 14, **characterised in that** it comprises electrical supply means operatively connected to the electrical supply line of said refrigerator.

15. Method for adjusting the temperature in a modular compartment according to any of the claims between 9 and 15 whenever said modular compartment is installed and operated within the main compartment of a refrigerator, **characterized in that** it comprises at least one the following steps:

    - to decrease the temperature within the modular compartment 10 the fan300 is activated only when the temperature of the main compartment is decreasing or it is managed to be decreased;
    - to increase the temperature within the modular compartment 10 the fan is activated only when the temperature of the main compartment of the refrigerator is increasing or it is managed to be increased.

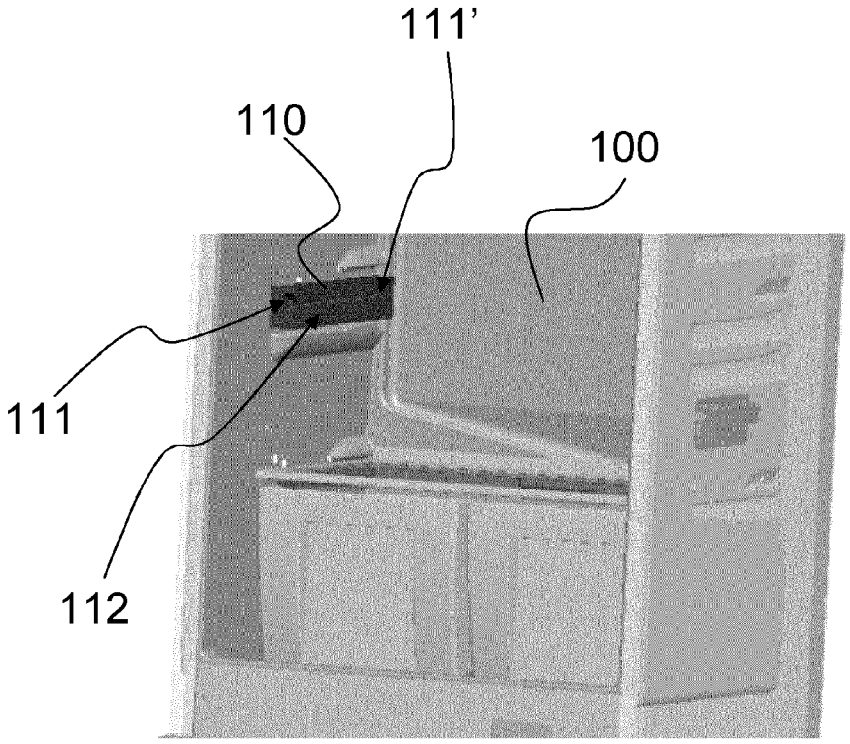

FIG. 1

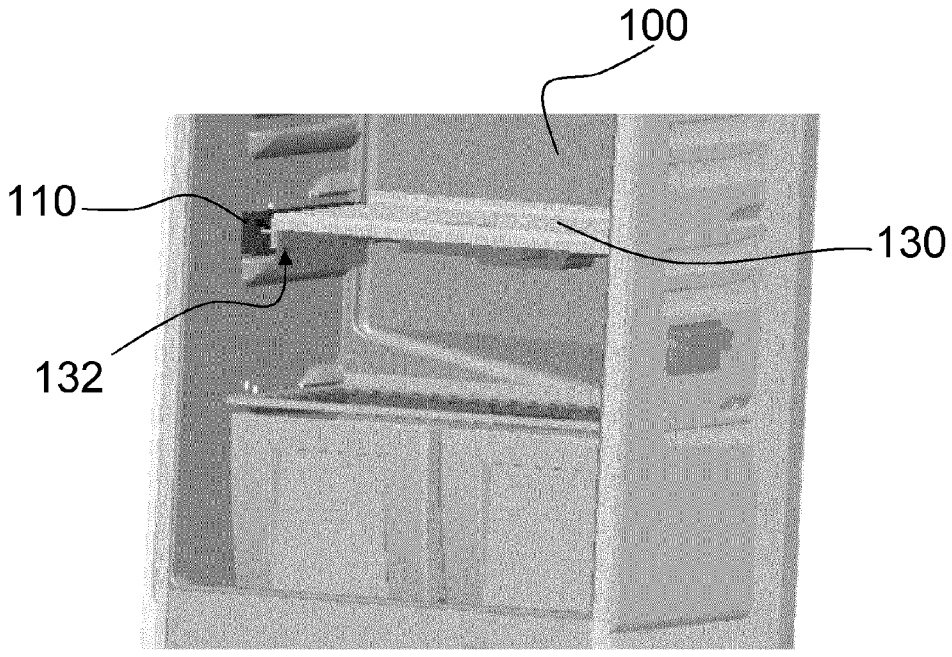

FIG. 2

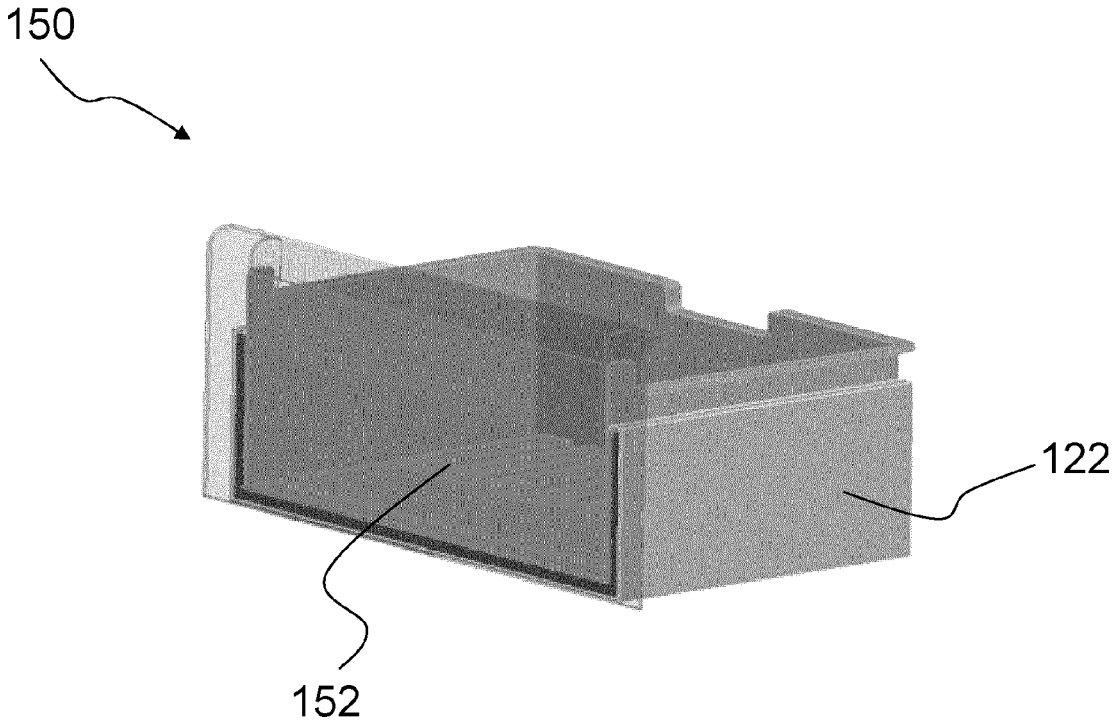

FIG. 3

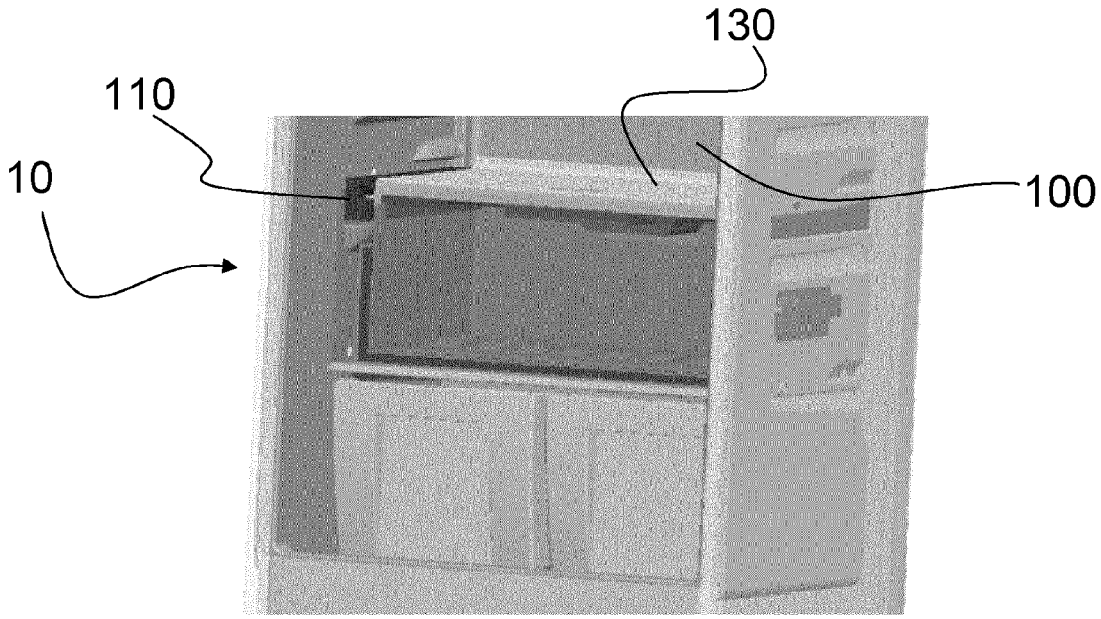

FIG. 4

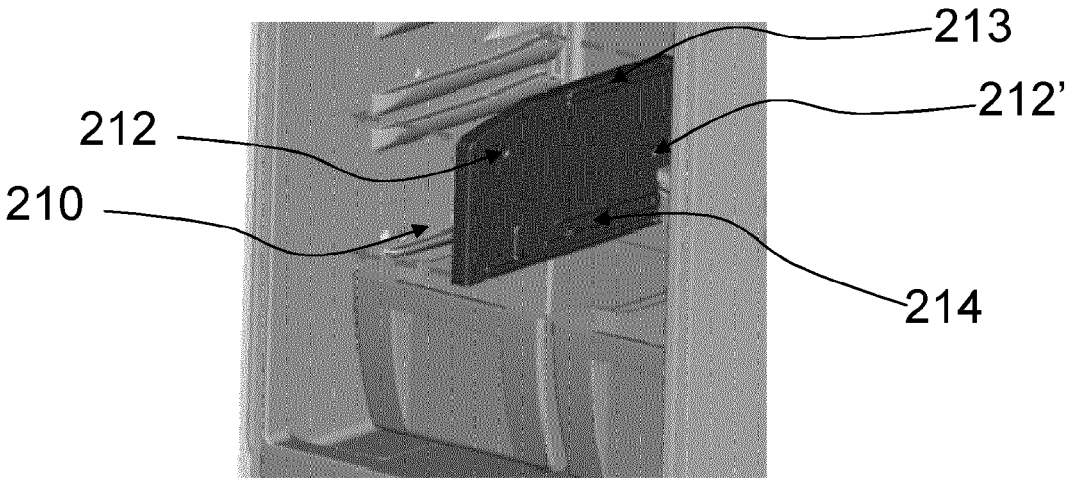

FIG. 5

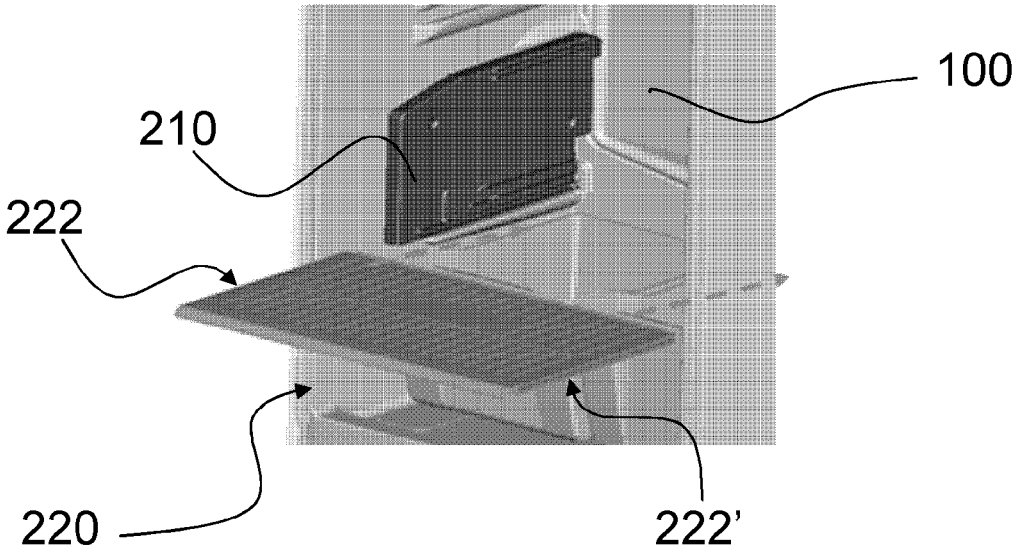

FIG. 6

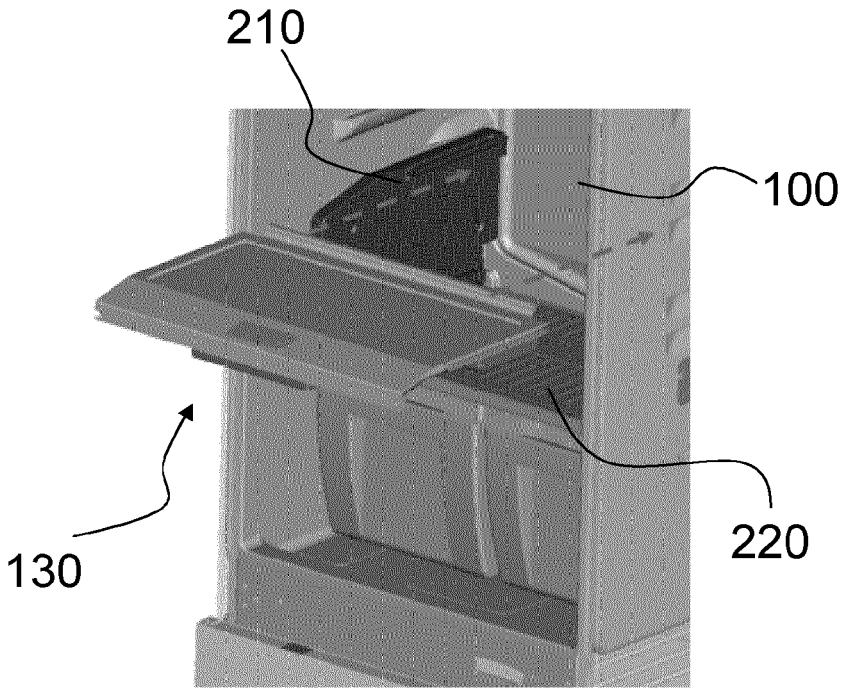

FIG. 7

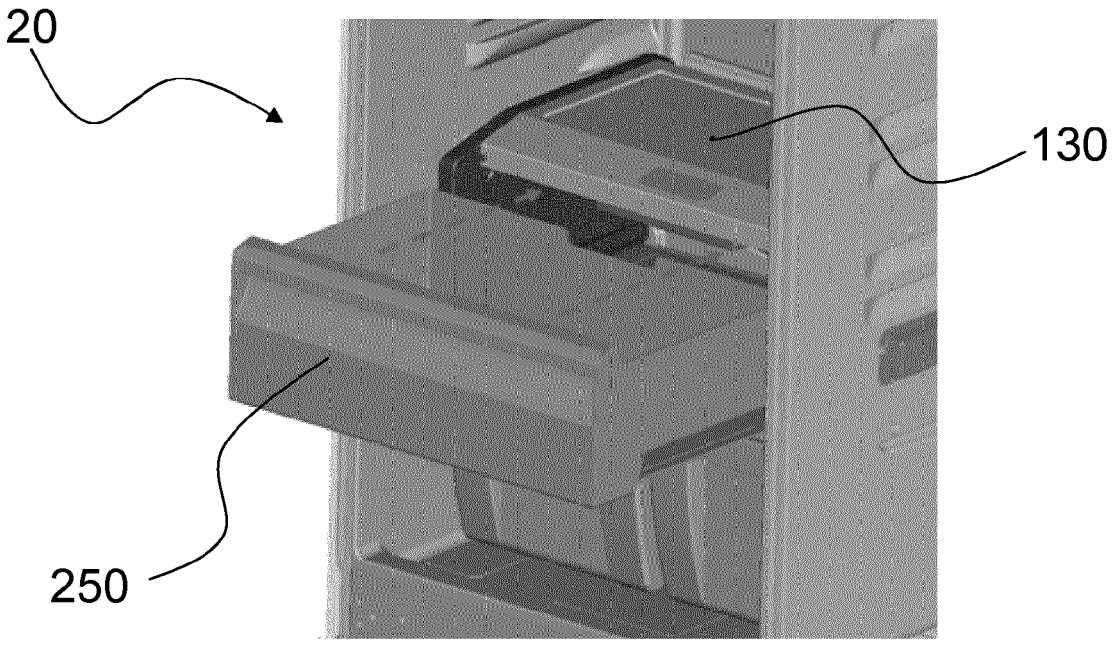

FIG. 8

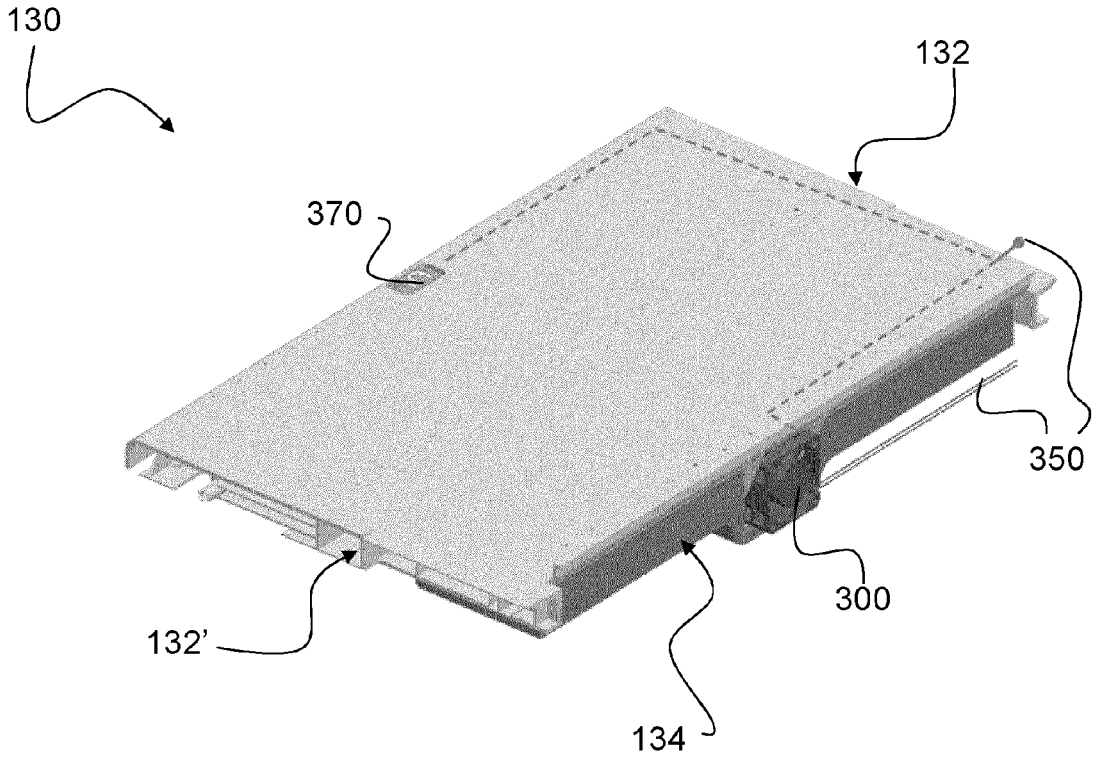

FIG. 9

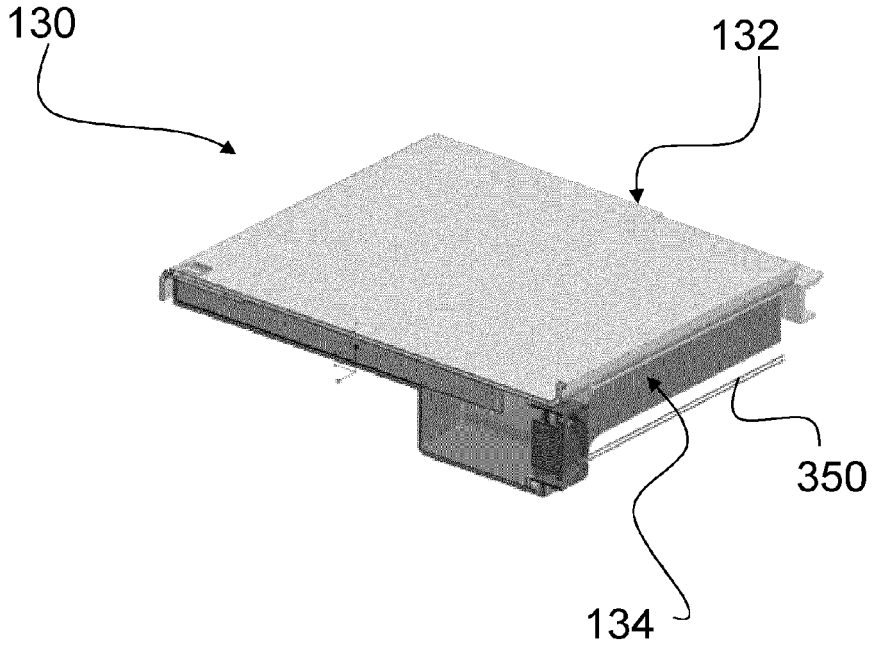

FIG. 10

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EUROPEAN SEARCH REPORT

Application Number
EP 11 18 6818

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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F25D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	6 March 2012	Amous, Moez

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