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(54) HOUSEHOLD APPLIANCE FOR REFRIGERATING FOODSTUFFS

(57) A household appliance for refrigerating food products, comprising:
- a compartment (2) for conserving foodstuffs, delimited at least by a front door for access to the compartment (2) and a rear wall (22) opposite the door in a closed position;
- cooling means (3) of the rear wall (22) located externally of the compartment (2) behind the rear wall (22);
- a box (4) for containing a part of the foodstuffs located in the compartment (2). The box (4) is positionable in a first and a second position internally of the compartment (2).

In the first position the box (4) is located higher than in the second position. The box (4) comprises an intercepting deflector (40) of an air current which flows down by natural convection along the rear wall (22); the deflector (40) heads the rear wall (22) and defines a deflector (40) for inlet of the air current into the box (4).

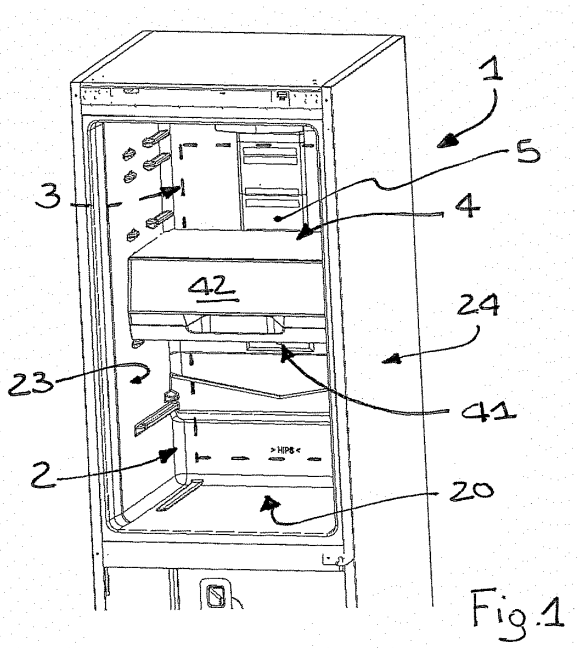


Fig.1

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Description

[0001] The present invention relates to a household appliance for refrigerating foodstuffs, such as for example a refrigerator or a refrigerator-freezer. Combined "no frost" refrigerators are known in which the cold air generated by the evaporator of the freezer is set in forced circulation and also used for cooling the refrigerator compartment.

[0002] Partial no-frost refrigerator-freezers are also known, comprising:

- a freezer compartment in which a no-frost technology is used, and a dedicated evaporator;
- a refrigerator compartment in which the subtraction of heat is done using an evaporating plate that is additional with respect to the evaporator used for cooling the freezer compartment.

[0003] In this context, the technical task underpinning the present invention is to provide a household refrigeration appliance and a method that obviate the drawbacks of the above-cited prior art.

[0004] In particular, an object of the present invention is to provide a method and a household refrigeration device which enable maximum use flexibility by users. A further aim of the present invention is to optimize the efficiency of a household refrigeration appliance, enabling optimal conservation of particular types of products. The technical task set and the objects specified are substantially attained by a method and a food refrigeration appliance, comprising the technical characteristics as set out in one or more of the accompanying claims.

[0005] Additional features and advantages of the present invention will become more apparent from the approximate, and hence non-limiting, description of a preferred but not exclusive embodiment of a household appliance and a method for refrigerating food products. In particular, in the appended drawings:

- figure 1 shows a perspective view of a household electrical appliance according to the present invention, with some parts removed better to evidence others;
- figure 2 shows a detail of figure 1, with further parts removed;
- figures 3 and 4 show a detail of the electrical appliance of figure 1;
- figure 5 shows a sectional view of a detail of the food refrigeration appliance of figure 1;

[0006] In the accompanying figures, reference number 1 denotes a food refrigeration appliance.

[0007] This household electrical appliance 1 typically comprises a refrigerator or in any case a refrigerator-freezer. In particular the household electrical appliance 1 comprises a partial no-frost refrigerator-freezer. In this case the cold air used for cooling the freezer is not used for cooling the refrigerator. The household electrical appliance 1 comprises a compartment 2 for conserving the foodstuffs.

[0008] The compartment 2 is delimited by at least:

- a front access hatch door to the compartment 2 (in figures 1 and 2 the hatch has been removed; in the closed position it is however destined to occlude a frontal opening for access to the compartment 2);
- a rear wall 22 opposite the hatch door when the hatch door is in a closed position;

[0009] The compartment 2 is also delimited by two lateral walls 23, 24 that extend between the hatch door in the closed position and the rear wall 22.

[0010] Lastly to complete the delimitation of the compartment 2 there is a lower base (which usually divides the compartment 2 from the freezer) and an upper ceiling.

[0011] The household appliance 1 further comprises cooling means 3 of said rear wall 22. The cooling means 3 are at least partly located externally of the compartment 2 behind the rear wall 22.

[0012] The household electrical appliance 1 further comprises a box 4 for housing a part of the foodstuffs located in the compartment 2. The box 4 is located internally of the compartment 2. The box 4 is positionable in a first and a second position. This box 4 is destined for conservation of foodstuffs. In said first position the box 4 is located higher than in the second position. The box 4 comprises an intercepting deflector 40 of an air current which flows downwards by natural convection along the rear wall 22. The deflector 40 heads said rear wall 22 and defines a deflector 40 for inlet of said air current into the box 4.

[0013] The deflector 40 advantageously comprises at least a fin which projects from the box 4 towards the rear wall. The deflector 40 develops transversally of a surface of the box 4 which faces said rear wall 22 and which is advantageously substantially vertical. By way of example the deflector 40 distances along a horizontal direction from said surface facing the rear wall 22.

[0014] The box 4 advantageously comprises a single deflector 40 which extends continuously.

[0015] The deflector 40 can adapt to the geometry of the rear wall 22. In the solution illustrated by way of example in the figures the deflector 40 embraces a central column 5 which in a total no-frost solution would comprise outlet mouths of the cooled air from the evaporator of the freezer. In the first position the box 4 defines a chiller; in the second position it defines a vegetable tray. In both the first and the second position the box 4 surmounts an underlying vegetable tray (not illustrated, and the position of which is not height-adjustable and in which the average temperature is appropriately about 6°C; the vegetable tray is usually positioned in a zone defined by reference numeral 20). In the first position the average temperature inside the box is lower than in the second position. The average internal temperature of the box 4 in the second

position is greater by more than 1 degree Celsius with respect to the average internal temperature of the box 4 in the first position.

[0016] In particular in the first position the average internal temperature of the box 4 is comprised between -2 and 3°C, while in the second position the average internal temperature of the box 4 is about 4°C. The precision in the regulation of the internal temperature of the box 4 is about 1°C.

[0017] The cooling means 3 advantageously comprise an evaporator plate which extends externally of the compartment 2 and behind said rear wall 22 (the means 3 are schematised by the broken line in figure 1). The localised cooling induced by said evaporating plate (or a like cooling system) at the rear wall 22 generate the air current which descends by natural convection along the rear wall 22.

[0018] In the first and the second position the box 4 is inserted respectively in first and second positioning guides located along said lateral walls 23, 24. When the box 4 is completely inserted in said first or second positioning guides the deflector 40 is advantageously located at a minimum distance from said rear wall 22 of lower than 5 millimetres, preferably lower than 4 millimetres. The box 4 comprises an extractable drawer 41. The box 41 comprise the deflector 40. During an extraction run thereof the box 41 slides along said first and second positioning guides. The box 41 and the positioning guides define, in combination, a stop of the extraction run of the box 41 from the compartment 2 (in order to completely extract the box 41 the user must perform specific additional manoeuvres).

[0019] The box 4 further comprises a frontal flap 42 which when the box is closed contributes to delimiting said box.

[0020] An extraction stroke of the drawer 41 determines an opening of said frontal flap 42 both in a case in which said box 4 is in the first position and in a case in which the box 4 is in the second position.

[0021] The frontal flap 42 rotates about a rotation axis 420 which remains stationary during the extraction stroke of the drawer 41. The axis 420 is substantially horizontal.

[0022] In this regard the drawer 41 comprises an arch 43 located in contact with a cam 44 fashioned in said flap 42 for transforming a translating motion of the drawer 41 into a rotary motion of the flap 42. The arch 43 advantageously identifies a concavity facing downwards. The cam 44 is advantageously defined by a rounded projection solidly constrained to remaining parts of the flap 42.

[0023] As shown by way of example in figure 3 or 4, the box 4 comprises a ceiling 45 which surmounts the closed drawer and remains fixed during the extraction run of the drawer. The rotation axis 420 of the flap 42 develops parallel to and at a side of the perimeter of the ceiling 45.

[0024] The box 4 (in particular the drawer 41) comprises a rear inlet opening 46 for said air current. The rear opening 46 is inferiorly delimited by said deflector 40. The opening 46 involves a surface of greater than 50 cm^2. The deflector 40 has a length of greater than 25% of the width extension of the box 4. The expression "width extension" relates to the development of the box 4 along a perpendicular direction to the lateral walls which delimit the compartment 2.

[0025] An object of the present invention is also a method for conserving foodstuffs in a household refrigeration appliance. This household appliance advantageously has one or more of the characteristics described herein above.

[0026] The method comprises the steps of:

- cooling the rear wall 22 by means of said cooling means 3;
- generating a cold air current which flows down along the rear wall 22 by natural convection;
- intercepting at least a part of said cold air current by means of said deflector 40 and deviating it at least partly inside the box 4 for refrigerating the inside of the box 4. In this way an effective cooling of the foodstuffs located in the box can be carried out. Further, according to the height at which the box is positioned in the compartment 2, the average temperature inside the box 4 can also be regulated.

[0027] The present invention has multiple advantages. Firstly it enables exploiting an air current generated by natural convection in order to improve the conservation of certain types of food products. The products can be placed in the box 4 in which a specific microclimate can be created that can be modified by regulating the height at which said box 4 is positioned internally of the compartment.

[0028] The invention as it is conceived is susceptible to numerous modifications and variants, all falling within the scope of the inventive concept characterized thereby. The materials used, as well as the dimensions, may in practice be of any type, according to needs. In practice, all the materials used, as well as the dimensions, can be any according to requirements.

Claims

1. A household electrical appliance being a refrigerator for foodstuffs, comprising:

- a compartment (2) for conserving foodstuffs, delimited at least by a front door for access to the compartment (2) and a rear wall (22) opposite the door in a closed position;
- cooling means (3) of said rear wall (22) located externally of the compartment (2) behind said rear wall (22);

characterised in that it comprises a box (4) in which a part of the foodstuffs located in the compartment

(2) is placed; said box (4) comprising an intercepting deflector (40) of an air current which flows down by natural convection along the rear wall (22); said deflector (40) heading said rear wall (22) and defining a deflector (40) for inlet of said air current into the box (4).

2. The household electrical appliance according to claim 1, **characterised in that** said box (4) is positionable in a first and in a second position inside said compartment (2); in said first position the box (4) is higher than in the second position; in the first position the box (4) defining a chiller, in the second position the box (4) defining a vegetable crisper; in the first position the mean temperature inside the box (4) being lower than in the second position.

3. The household electrical appliance according to claim 2, **characterised in that** in both the first and the second position the box (4) surmounts an underlying vegetable crisper.

4. The household electrical appliance according to claim 2 or 3, **characterised in that** it comprises lateral walls (23, 24) which contribute to delimiting said compartment (2) for conserving foodstuffs; in the first and the second position the box (4) being inserted respectively in first and second positioning guides located along said lateral walls (23, 24).

5. The household electrical appliance according to one of claims from 2 to 4, **characterised in that** said box (4) comprises:

- an extractable drawer (41);
- a frontal flap (42) which, with the drawer closed, contributes to delimiting said box; an extraction stroke of the drawer (41) determining an opening of said frontal flap (42) both in a case in which said box (4) is in the first position and in a case in which the box (4) is in the second position.

6. The household electrical appliance according to claim 5, **characterised in that** said frontal flap (42) rotates about a rotation axis (420) which remains stationary during the extraction stroke of the drawer (41); said box (4) comprising a ceiling (45) which surmounts the closed drawer and which remains fixed during the extraction stroke of the drawer (41).

7. The household electrical appliance according to claim 5 or 6, **characterised in that** said drawer (41) comprises an arch (43) located in contact with a cam (44) fashioned in said flap (42) for transforming a translating motion of the drawer (41) into a rotary motion of the flap (42).

8. The household electrical appliance according to claim 5 or 6 or 7, **characterised in that** the drawer (41) incorporates the deflector (40).

9. The household electrical appliance according to anyone of the preceding claims, **characterised in that** said cooling means (3) comprise an evaporator plate which extends outside the compartment (2) and behind said rear wall (22).

10. The household electrical appliance according to any one of the preceding claims, **characterised in that** said box (4) comprises a rear opening (46) for inlet of said air current, said rear opening (46) being inferiorly delimited by said deflector (40).

11. A method for conserving foodstuffs, in a household electrical appliance according to any one of claims from 1 to 10, **characterised in that** it comprises steps of:

- cooling the rear wall (22) by means of said cooling means (3);
- generating a cold air current which flows down along the rear wall (22) by natural convection;
- intercepting said cold air current by means of said deflector (40) and deviating said cold air current at least partly inside the box (4) for refrigerating the inside of the box (4).

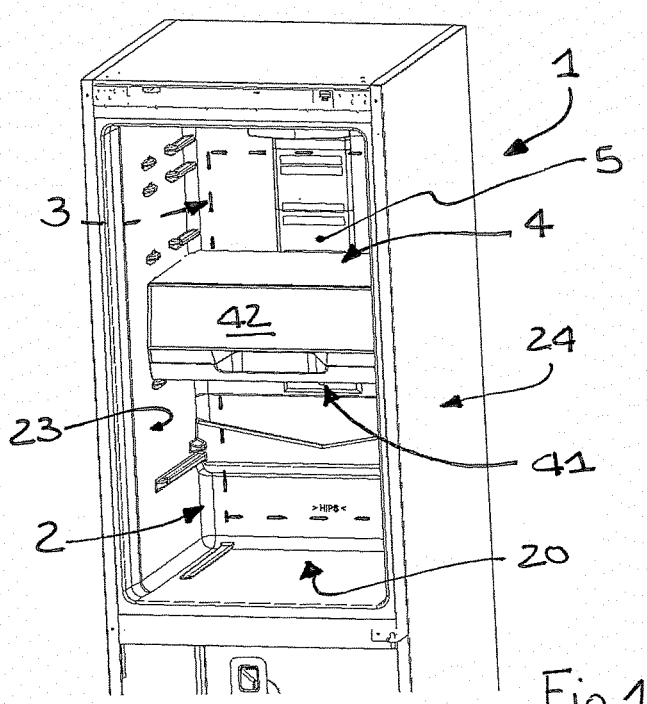


Fig.1

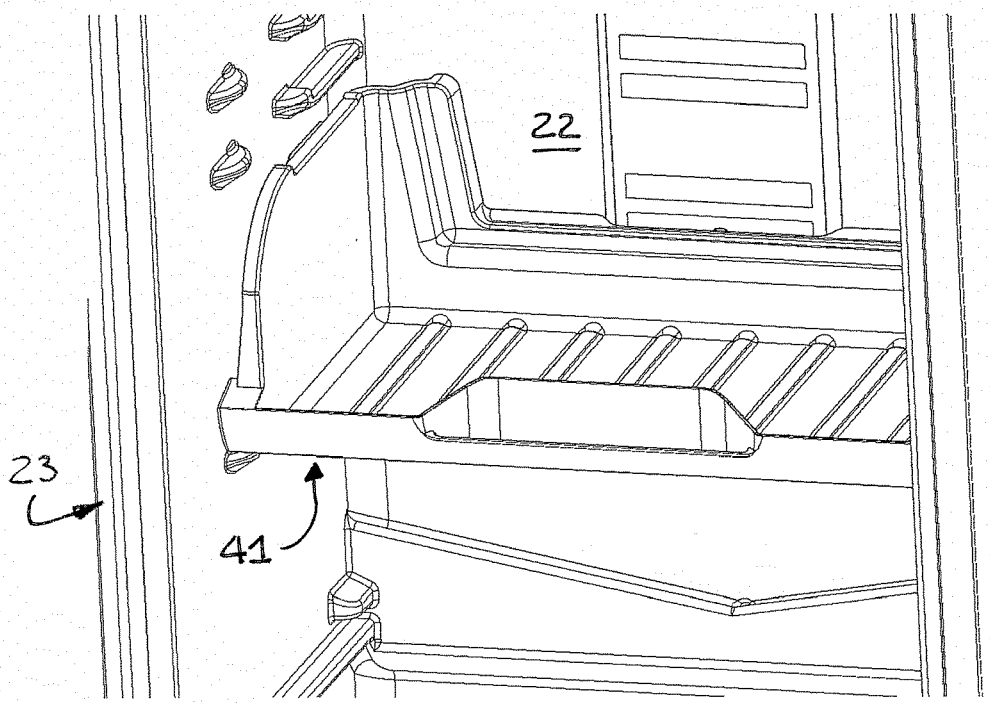


Fig.2

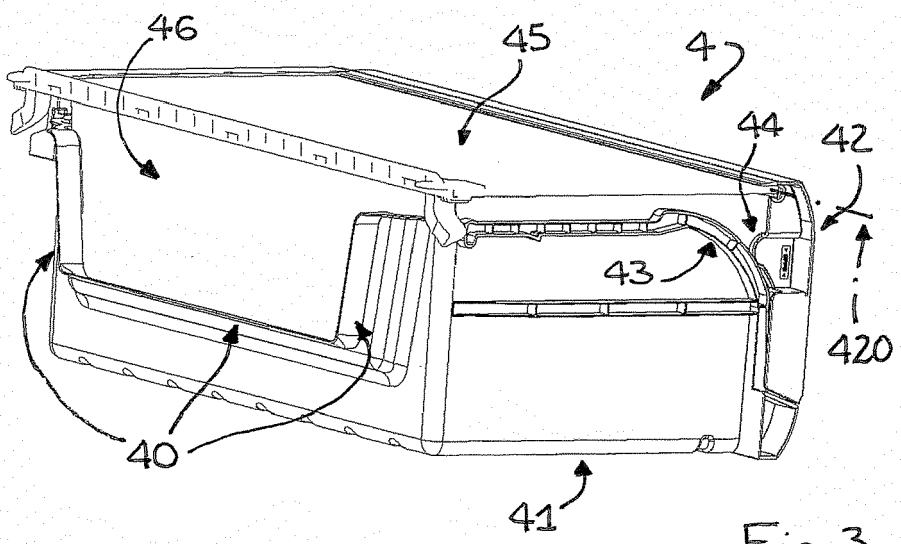


Fig.3

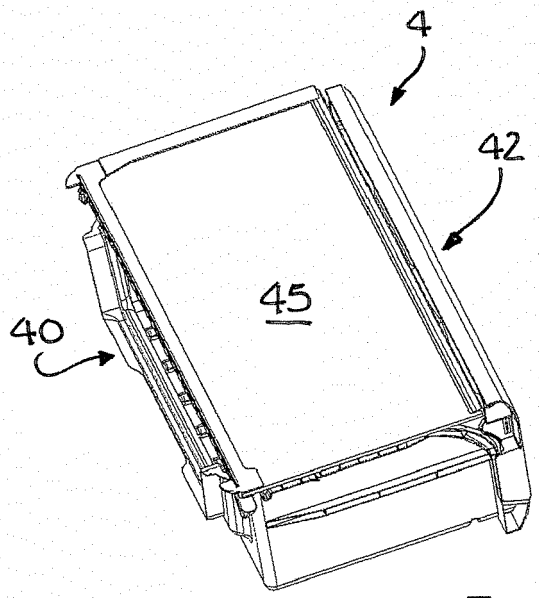


Fig.4

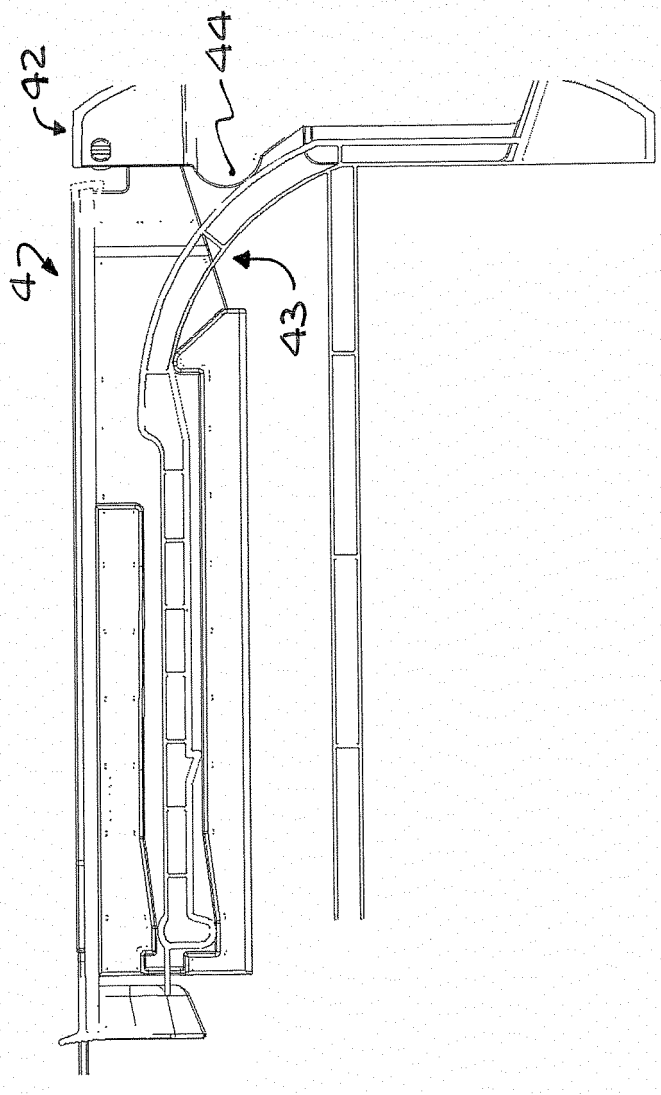


Fig. 5

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EUROPEAN SEARCH REPORT

Application Number
EP 15 19 9860

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	12 April 2016	Vigilante, Marco

CATEGORY OF CITED DOCUMENTS

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