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(54) **REFRIGERATOR**
KÜHLSCHRANK
REFRIGERATEUR

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EP 1 581 777 B1

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Description

[0001] This invention relates to a refrigerator according to the preamble of claim 1.

[0002] In the prior art, cooling appliances, especially in refrigerators, when the door is opened, the cool air inside immediately replaces warm air in the environment. The cool air is entirely discharged and warm air is filled during the opening and closing of the door in 10 seconds. If the door is kept open, a permanent airflow occurs due to the effect of the cool surfaces inside and both the heat and heat/mass are transferred by means of the conveyance from surface inside and the concentration of the water steam in the surfaces.

[0003] When the door is opened, as the dry and cool air inside is replaced with the warm and humid air outside, it is loaded with heat and humidity in proportion with the extent of the volume inside. The so-called extent of this load depends on the factors like the geometry of the refrigerator (extent of the volume), the number of the shelves inside, the presence of the packaged foods and the additional cool surface area.

[0004] After the door is closed, this additional heat load is required to be discharged by the cooling system to return to the previous conditions. In this case, in comparison with the close condition of the door, compressor works for a longer duration. In case there is food inside, both the humid load and heat load exceed.

[0005] Since the kids may consider the opening and closing of the doors as a need or a game, the opening-closing number of doors of particularly families with kids rather increases.

[0006] The opening and closing of the door is not taken in to consideration in the measurement methodology of the standard energy consumption. However it naturally affects in the real use. Therefore the producer is expected to design a low-energy consuming and more functional refrigerator in respect with not only the standard condition but also the real use conditions.

[0007] When it is handled from the easy use (ergonomics) perspective, it is observed that the consumers due to their easy use mostly prefer the shelves on the refrigerator door.

[0008] On the other hand the cool preservation of the foods is required at a rare shifting (almost stable) temperature interval from the hygienic and food quality perspective. The high level of temperature oscillations on the foods badly affects the quality of the goods. Due to the warm airflow particularly during the opening of the door, the temperatures close to the surfaces of the foods may increase and the quality and freshness of the foods may be badly affected.

[0009] When the consumers are observed, it can be viewed that fresh food compartment is mostly occupied by water/juices (especially in warm weather) and raw-consumed vegetable/fruits.

[0010] In patent document No. US4898294, a service cart comprising a frozen food container is defined for

aircraft usage for passengers.

[0011] In patent document No. US4821530, a refrigerator comprising an air conditioning unit is disclosed as another embodiment.

[0012] In patent document No. DE10063691, a protector, which prevents the effect of the temperature values, on those of the shelves on the door.

[0013] In patent document No. JP2001280821, a side door comprising a window of transparent material is defined.

[0014] In patent document No. DE19545270, more than one door and/or stripes preferably of transparent material are defined for the separation of the inner part from the outer door.

[0015] In patent document No. DE19802765, an inner door separate from the outer door having shelves on and providing energy saving is disclosed.

[0016] In patent document No. US2712733, a refrigerator having air circulation through ventilation mounted in a rear and down position, body and door opening is defined.

[0017] In patent document No. US5100213, a structure that provides the access to a compartment (chiller) in the cover is defined.

[0018] In patent document No. US5209082, a fresh food storage compartment that can be opened from the front and mounted on the main door is disclosed.

[0019] In patent document No. US4368622, a refrigerator comprising a freezer having a quick freeze compartment accessible from a separate door is defined.

[0020] In patent document No. US4586347, a fresh food compartment accessible from an outer door in a refrigerator comprising a side by side freezer and fresh food compartment is defined.

[0021] A refrigerator according to the preamble of claim 1 is known from FR-A-1 121 256.

[0022] The object of this invention is to provide an ergonomic refrigerator comprising more than one door, which stores the quality of drugs, foods and particularly the fast-consumed foods/beverages in the door part by means of an easy access and reduces the load of heat and humidity during the opening and closing of the door, and to facilitate the air circulation.

[0023] In order to achieve the object of this invention the refrigerator comprises the features of claim 1. Further details are shown with the attached drawings described below.

Figure 1a - is a perspective view of a refrigerator comprising an outer door and an inner door, which can be viewed from the outside,

Figure 1b - is a perspective view of a refrigerator comprising an outer door in the freeze compartment and an outer door and an inner door, which can be viewed from the outside in the freshfood compartment,

Figure 1c - is a perspective view of a refrigerator comprising an outer door and a kid door having an opening axis on the outer door on the opening side of the outer door, which can be opened and closed with or without the outer door,

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Figure 1d - is a perspective view of a refrigerator comprising an outer door and a kid door having the same opening axis with the rotating side of the outer door on the rotating side of the outer door, which can be opened and closed without the outer door,

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Figure 1e - is a perspective view of a refrigerator comprising outer doors in the freeze and refrigeration compartments, an inner door and a kid door having an opening axis on the outer door on the rotating side of the outer door, which can be opened and closed with or without the outer door,

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Figure 1f - is a perspective view of a refrigerator comprising an outer door and an inner door both in the freeze compartment and refrigeration compartment,

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Figure 2a - is a perspective view of a refrigerator comprising an outer door and an inner door, which cannot be viewed from the outside in the refrigeration compartment,

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Figure 2b - is a perspective view of a refrigerator comprising an inner door, which can not be viewed from the outside in the freeze compartment, an inner door which can not be viewed from the outside in the freshfood compartment and an outer door which closes both of these doors,

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Figure 3a - is schematic view of a one-compartment refrigerator comprising an outer door and an inner door having a funnel inlet hole and funnel outlet hole,

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Figure 3b - is a schematic view of a one-compartment refrigerator comprising an outer door and an inner door which can not be viewed from the outside having a funnel inlet hole and funnel outlet hole having a fan,

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Figure 3c - is a schematic view of a one-compartment refrigerator comprising an outer door and an inner door which can not be viewed from the outside having on a funnel outlet hole and a funnel inlet hole having a lid which can be opened and closed by means of a shelf on the outer door,

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Figure 3d - is a schematic view of a one-compartment refrigerator comprising an outer door and an inner door which can not be viewed from the outside having on a funnel outlet hole and a funnel inlet hole having a lid which can be opened and closed by means of a control card,

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Figure 4a - is a schematic view of a double-compartment refrigerator comprising an outer door and an inner door which can not be viewed from the outside having a funnel inlet hole and a funnel outlet hole,

Figure 4b - is a schematic view of a double-compartment refrigerator comprising an outer door and an inner door which can not be viewed from the outside having a funnel outlet hole and funnel inlet hole having a fan,

Figure 4c - is a schematic view of a double-compartment refrigerator comprising an outer door and an inner door which can not be viewed from the outside having a funnel outlet hole and a funnel inlet hole having a lid, which can be opened and closed by means of a shelf on the outer door,

Figure 4d - is a schematic view of a double-compartment refrigerator comprising an outer door and an inner door, which can not be viewed from the outside having a funnel outlet hole and a funnel inlet hole having a lid which can be opened and closed by means of a control card,

Figure 4e - is a schematic view of a double-compartment refrigerator comprising an outer door and an inner door which can not be viewed from the outside having a funnel outlet hole and a funnel inlet hole opposing the cool air flow channel in the inner body,

Figure 4f - is a schematic view of a double-compartment refrigerator comprising an outer door and an inner door which can not be viewed from the outside having a funnel inlet hole opposing the cool air flow channel in the inner body and an inner door having a funnel outlet hole comprising a fan,

Figure 4g - is a schematic view of a double-compartment refrigerator comprising an outer door and an inner door which can not be viewed from the outside having a funnel outlet hole opposing the cool air flow channel in the inner body and an inner door having a lid, which can be opened and closed by means of a shelf on the outer door,

Figure 4h - is a schematic view of a double-compartment refrigerator comprising an outer door and an inner door, which can not be viewed from the outside having a funnel outlet hole opposing the cool air flow channel in the inner body and an inner door having a lid which can be opened and closed by means of a control card,

Figure 4i - is a schematic view of a double-compartment refrigerator comprising an outer door and an inner door, which can not be viewed from the outside having a funnel inlet hole opposing the cool air flow

channel in the inner body at one end and a funnel outlet hole at the other end and a funnel channel having one or more holes among them,

Figure 5 - is a schematic view of an outer door and an inner door comprising more than one shelf, which can be attached and removed from the projections above,

Figure 6a - is a schematic top view of a refrigerator comprising an outer door in a closed position isolated by a gasket and an inner door in a closed position which can not be viewed from the outside,

Figure 6b - is a schematic top view of a refrigerator comprising an inner door in a closed position isolated by a gasket having more than one shelves and viewed partially from the outside and an outer door in a closed position having a gasket above which isolate the inner door and the part therein,

Figure 6c - is a schematic top view of a refrigerator comprising an inner door in a closed position which is isolated by a gasket above and can not be viewed from the outside and an outer door in a closed position in a closed position having a gasket above which isolate the inner door and the part therein,

Figure 6d - is a schematic top view of a refrigerator comprising an inner door in a closed position which is isolated by a gasket above and can not be viewed from the outside and an outer door in a closed position in a closed position having a gasket above which isolate the inner door and the part therein,

Figure 7a - is a perspective view of a one-compartment refrigerator comprising an outer door in an open position and an inner door in an open position which can not be viewed from the outside,

Figure 7b - is a perspective view of a one-compartment refrigerator comprising an outer door in an open position and an inner door in an open position which can not be viewed from the outside comprising a funnel channel dividing itself into more than one compartments, and holes thereon,

Figure 7c - is a perspective view of a one-compartment refrigerator comprising an outer door in an open position, a kid door in an open position which can not be viewed from the outside and can be opened and closed connected to the outer door and an inner door in an open position which can not be viewed from the outside,

Figure 7d - is a perspective view of a one-compartment refrigerator comprising an outer door in an open position; a kid door in an open position which

can viewed from the outside, opened and closed from the axis of opening and closing of the outer door independent from the outer door and an inner door in an open position and which can not be viewed from the outside.

[0024] The figures have been each numbered corresponding the following:

1. Refrigerator
2. Outer door
3. Inner door
4. Refrigerator shelf
5. Body
6. Evaporator
7. Air distribution channel
8. Fan
9. Opening handle of the inner door
10. Opening handle of the outer door
11. Gasket
12. Hinge
13. Funnel inlet
14. Funnel outlet
15. Lid
16. Additional compartment door
17. Funnel cover
18. Vegetable compartment
19. Funnel fan
20. Door shelf
21. Funnel channel
22. Funnel blowing opening
23. Collection channel
24. Door cooling channel
25. Refrigeration compartment
26. Freeze compartment
27. Additional inter-compartment
28. Extensive door shelf
29. Inter-compartment
30. Ventilation opening

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[0025] Refrigerators (1) comprise a body (5) comprising at least one compartment in which the food/beverages are put, one or more refrigerator shelf (4) on which the food/beverages are put, a vegetable compartment (18) preferably under the body (5), one or more inner doors (3) closing the body (5), one or more inner door opening handle (9) providing the opening and closing of the inner door (3), one or more outer doors (2) closing the inner door (3), one or more outer door opening handle (10) providing the opening and closing of the outer door (2), one or more inter-compartments (29) between the inner door (3) and the outer door (2), one or more hinges (12) providing the opening and closing of the inner door (3) and the outer door (2), one or more gaskets (11) closing the inner door (3) and the outer door (2) by means of entire isolation, one or more door shelves (20) in which foods/beverages are put and which can be attached and removed from the shelf projections on both the inner door

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(3) and the outer door (2) in a way not to force the hinges and prevent the air circulation, at least one evaporator (6) providing the cooling by means of the circulation of the refrigeration fluid, one or more fans (8) cooling the air inside by transferring it over the evaporator (6), one or more air distribution channels (7) providing the transfer of the cooled air to the required places and one or more lids (15) providing the control and the passage of the cooled air preferably in the air distribution channel (7).

[0026] Refrigerator comprises on or more funnel inlet (13) preferably on the inner door (3) providing the air flow to the inter-compartment (29) through the body (5) and one or more funnel outlets (14) providing the air flow to the body (5) through between the inner door (3) and the outer door (2).

[0027] In another embodiment of the invention, funnel inlet (13) and funnel outlet (14) are mounted on the body (5).

[0028] In order to facilitate the air circulation, door shelves (20) comprise one or more shelf ventilation openings (30).

[0029] The fans (8) provides the absorption of the heated air through inside the body (5) and the inter-compartment, the cooling of the absorbed air by transferring it over the evaporator (6) by the air distribution channel (7) and redelivering it to the lower part of the body (5). Due to the cooled air funnel inlet (13) at the lower part, the body (5) is engaged between the inner door (3) and the outer door (2) and joined to the refrigeration cycle by means of the absorption by the funnel outlet (14) and the fan (8).

[0030] The air circulation carried by means of the air distribution channel (7) is transferred to between funnel inlets (13) preferably on the inner door (3), the inner door (3) and the outer door, and included in the refrigeration cycle by being transferred from the funnel outlet (14) and the inner door (3) and the outer door (2). The transfer of the cool air into the refrigerator shelves (4) is enabled by means of the holes and valves on the air distribution channel (7). The air distribution channel (7) provides the air circulation through the upper and lower parts of the vegetable compartment (18). In a preferred embodiment of the invention, the cool air directed by means of the air distribution channel (7) is directed to the funnel inlet (13) following the circulation around the vegetable compartment (18).

[0031] The lid (15) is controlled by the data obtained for the temperature measurements from thermostat or sensor, mechanic methods or control card. Therefore it enables to reach the required temperatures in the refrigerator (1) by turning on or off the refrigeration cycle when the temperature values obtained for the refrigerator (1) goes above or below the required values. In case the temperature of the inter-compartment goes above or below the required values, lid (15) opens or blocks the air flow to the body (5) preferably by the control card and directs the cooled air into the inter-compartment or vice versa.

[0032] In another embodiment of the invention, refrigerator (1) comprises a funnel channel (21) directing the cool air circulation and joining the funnel inlet (13) with the funnel outlet (14) and one or more funnel blowing opening (22) on the funnel channel (21) transferring the cool air in the funnel channel (21) to the inter-compartment (29). The funnel channel (21) divides the inter-compartment into more than one compartment and they are cooled by the funnel blowing openings (22).

[0033] In another embodiment of the invention, refrigerator (1) comprises at least one funnel fan (19) preferably on the funnel inlet (13) of the inner door (3) absorbing the cool air directed from the evaporator (6) and blowing to the inter-compartment (29).

[0034] In another embodiment of the invention, refrigerator (1) comprises at least one funnel cover (17) preferably on the funnel inlet (13) of the inner door (3), a funnel cover hinge providing the movement of the funnel cover around its axis, a funnel cover spring providing the movement of the funnel cover (17) around the hinge of the funnel cover and an extensive door shelf (28) which open the funnel cover (17) by moving with itself when the outer door (2) is closed and closes the funnel cover (17) by moving with itself when it is opened.

[0035] In another embodiment of the invention, funnel cover (17) is controlled by the control card of the refrigerator (1). In this embodiment, the control card which detects the opening of the outer door (3) by means of the sensors closes the funnel cover (17) and closes the part opened by the funnel cover (17) between the inter-compartment and the body (5). Hence the transfer of heat and humidity from the body (5) is reduced. Furthermore when the temperature values in the inter-compartment (29) goes above or below the required values, the control card turns on or off the refrigeration cycle and provides the inter-compartment (29) with the required values by means of the sensors in the inter-compartment (29).

[0036] In another embodiment of the invention, refrigerator (1) comprises one or more refrigeration compartment (25) in which the foods like vegetables and fruits are stored, an inner door (3) which closes the refrigeration compartment (25), an outer door (2) which closes the inner door, one or more freeze compartment (26) in which the foods which should be kept at low temperatures like meat are stored and an outer door (2) which closes the freeze compartment. In this embodiment the refrigerator (1) comprises one or more collection channels (23) collecting the air flow and directing it to the evaporator (6) and a door cooling channel (24) which is connected to the air distribution channel (7) distributing the cool air through the evaporator (6) to the body (5) and the funnel inlet (13) transferring the cool air to the inter-compartment (29).

[0037] In another embodiment of the invention, refrigerator (1) comprises one or more additional inter-compartment (27) preferably on the inner door (3) isolated from the other inter-compartments between the inner door (3) and the outer door (2) and an additional com-

partment door (16) closing the additional inter-compartment (27). The additional inter-compartment (27) is isolated from the inter-compartment by the sides of the inner door (3) and the outer door (2), funnel channel (21) and a wall engaging the funnel channel (21) with the inner and/or the outer door (2,3). Additionally the additional inter-compartment is easily isolated by means of the gasket (11) on the additional compartment door (16) closing these walls. When the additional compartment door (16) is opened, the air circulation in the inter-compartment is not affected due to this structure. If required by the user, the additional inter-compartment (27) can be used for the storage of the goods for various purposes such as foods, drugs or clothes or their kids without affecting the refrigeration cycle.

[0038] In an embodiment of the invention, refrigerator (1) is isolated by the closing of the body (5) by the gasket (11) comprising preferably magnetic material placed in a position to cover all sides of the outer door (2) on the inner surface of the outer door (2) facing with the body (5). In this embodiment, each hinge (12) is mounted on and under the outer door (2) and the outer door (2) is opened by rotating around the axis of the hinges by means of the outer door opening handle (10). In this embodiment, the inner door (3) is opened by means of the hinges (12) on the upper and lower sides independent from the outer door (2) (Fig. 6a). The inner door (3) is isolated by any gasket (11) as it does not contact with the outside of the refrigerator (1). The inner door (3) contacts with the outer environment only when the outer door (2) is opened. In this case, as the inner door (3) made of isolation material preventing the heat transfer from the body to the outer environment, heat is transferred only through the small spaces between the sides of the inner door (3) and the inner surfaces of the body (5). The heat transfer from the outer environment to the body (5) is considerably reduced as the opening and closing duration of the outer door (2) is rather short. Therefore either the compressor is not operated or it is operated for a short while to achieve the required environment conditions for the refrigeration of the body (5). In this way the energy consumption is reduced and the spoilage of the foods/beverages in the body is prevented. The problem that may arise from the isolation of the body is minimized with the use of gasket (11) only on the outer door and accordingly the additional costs for the gaskets (11) for all doors on the body (5) are avoided (Fig. 6c).

[0039] In another embodiment of the invention, the outer door (2) and the inner door (3) are opened and closed by means of the same hinges (11). In this embodiment the isolation of the spaces between the doors and the body is provided by the hinge (11) placed on the outer door (2).

[0040] In another embodiment of the invention, the outer door (2) and the inner door (3) are opened and closed by means of different hinges independent from each other. In this embodiment, the isolation of the spaces between the doors and the body is provided by the hinges

(11) placed both on the inner door (3) and the outer door (2).

[0041] In another embodiment of the invention, in order to make it possible for the user to see the foods and/or beverages behind the doors, a part or the entire of the outer (2) and/or inner doors (3) opening preferably the fresh food compartment is made from transparent materials such as glass.

[0042] As the refrigerator (1) comprises more than one transparent doors (2,3), various advantages are obtained concerning the isolation in addition to the easy storage and use of the foods and/or beverages in the body (5) depending on the request of the user due to more than one doors (2,3) and more than one compartments (25,26,27). Therefore the spoilage of the foods/beverages, which are forgotten or not used is prevented.

[0043] By means of this invention, the access by the user to the drugs, clothes and especially frequently consumed foods/beverages placed in the compartment between the outer door (2) and the inner door (3) where the foods like fruits and vegetables and beverages are put is provided by means of only the outer door (2) for the storage of the quality of the foods with the minimum contact with the outer air. Therefore the entire or a part of the body (5) is filled with the warm and humid air and heat gained by the opening and closing of the door is minimized. Furthermore it provides the reduction in the humid load and potential heat gain together with high performance and rare defrosting by means of low snowing on the evaporator.

Claims

1. A refrigerator (1) comprising a body (5) having at least one compartment in which foods/beverages are placed, one or more inner doors (3) closing the compartment and/or the body (5), one or more outer doors (2) closing the inner door (3) and one or more inter-compartments (29) between the inner door (3) and the outer door (2), one or more funnel inlets (13) preferably on the inner door (3) providing the transfer of the cool air to the inter-compartment (29), one or more funnel outlets (14) preferably on the inner door providing the absorption and retransfer of the transferred air between the inner doors (3) and/or to the body (5) and with one or more door shelves (20), which can be attached to housings and/or projections on the outer door (2) where the foods and beverages are placed, **characterized in that** the one or more door shelves (20) have one or more shelf ventilation opening (30) for providing the air circulation.
2. A refrigerator (1) as in Claim 1 **characterized** with a funnel channel (21) preferably on the inner door (3) engaging the funnel inlet (13) with the funnel outlet (14) and directing the circulation of the cool air.

3. A refrigerator (1) as in Claim 2 **characterized** with one or more funnel blowing openings (22) on the funnel channel (21) providing the transfer of the cool air in the funnel channel (21) to the inter-compartment (29).
4. A refrigerator (1) as any of the Claims above **characterized** with one or more air distribution channel (7) providing the transfer of the cool air to the required placed in the body (5).
5. A refrigerator (1) as in Claim 4 **characterized** with an evaporator (6), one or more collection channel (23) collecting and directing the air flow to the evaporator (6) and a door cooling channel (24) directing the cool air to the inter-compartment, connected to the air distribution channel (7) distributing the cooled air to the body (5) following cooling the air absorbed by the collection channel (23) over the evaporator (6) and funnel inlet (13).
6. A refrigerator as in Claim 4 **characterized** with one or more lids providing the control and the passage of the cooled air preferably in the air distribution channel (7).
7. A refrigerator (1) as in Claim 1 **characterized** with an additional inter-compartment (27) isolating the sides of the inner door (3) and the outer door (2) by a wall engaging the funnel channel (21) with the side of the inner and/or outer door (2,3) from the inter-compartment (29), providing the storage of the goods to be kept in a cool environment like clothes, drugs and etc. together with the foods and beverages and the use by the kids without affecting the refrigeration cycle, and including the refrigeration cycle by means of the funnel blowing openings (22) on the funnel channel (21) when requested by the user.
8. A refrigerator (1) as in Claim 7 **characterized** with an additional compartment door (16) isolating and closing the additional inter-compartment (27) preferably by means of the gasket (11).
9. A refrigerator (1) as any of the Claims above **characterized** with a funnel fan (19) placed preferably in the funnel inlet (13) of the inner door for absorbing and blowing the directed cool air to the inter-compartment (29).
10. A refrigerator (1) as any of the Claims **characterized** with a funnel cover (17) preferably in the funnel inlet (13) of the inner door (3) opening and closing the passage to the inter-compartment.
11. A refrigerator (1) as in Claim 10 **characterized** with an extensive door shelf (28) having a projection providing the opening and closing of the funnel cover

(17) by pushing and moving along with itself when the outer door (2) is closed.

12. A refrigerator (1) as any of the Claims **characterized** with an outer (2) and/or inner door (3) partially or entirely made of transparent material such as glass making it possible for the user to see foods and beverages behind the doors without opening the door.

Patentansprüche

1. Kühlschrank (1), umfassend einen Gehäusekörper (5) mit wenigstens einem Fach, in dem Lebensmittel/Getränke untergebracht werden, eine oder mehrere Innentüren (3), die das Fach und/oder den Gehäusekörper (5) schließen, eine oder mehrere Außentüren (2), die die Innentür (3) schließen, und ein oder mehrere Zwischenfächer (29) zwischen der Innentür (3) und der Außentür (2), einen oder mehrere Trichtereinlässe (13) vorzugsweise an der Innentür (3), die die Übertragung der Kühlluft in das Zwischenfach (29) ermöglichen, einen oder mehrere Trichterauslässe (14) vorzugsweise an der Innentür, die das Absorbieren und Zurückübertragen der zwischen den Innentüren (3) und/oder dem Gehäusekörper (5) übertragenen Luft ermöglichen, und mit einem oder mehreren Türregalen (20), die an Gehäusen und/oder Vorsprüngen an der Außentür (3) angebracht werden können, und in denen die Lebensmittel und Getränke untergebracht werden, **dadurch gekennzeichnet, dass** das oder die Türregale (20) eine oder mehrere Fachbelüftungsöffnungen (30) aufweisen, die eine Luftzirkulation ermöglichen.
2. Kühlschrank (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** ein Trichterkanal (21) vorzugsweise an der Innentür (3) den Trichtereinlass (13) mit dem Trichterauslass (14) in Eingriff bringt und die Zirkulation der Kühlluft lenkt.
3. Kühlschrank (1) nach Anspruch 2, **gekennzeichnet durch** eine oder mehrere Trichterblasöffnungen (22) am Trichterkanal (21), die die Übertragung der Kühlluft im Trichterkanal (21) an das Zwischenfach (29) ermöglicht.
4. Kühlschrank (1) nach einem der vorangehenden Ansprüche, **gekennzeichnet durch** einen oder mehrere Luftverteilungskanäle (7), die das Übertragen von Kühlluft an die notwendigen Orte im Gehäusekörper (5) ermöglicht.
5. Kühlschrank (1) nach Anspruch 4, **gekennzeichnet durch** einen Verdampfer (6), einen oder mehrere Auffangkanäle (23), die den Luftstrom auffangen und an den Verdampfer (6) lenken, und einen Türkühlkanal (24), der die Kühlluft an das Zwischenfach

lenkt, und der mit dem Luftverteilungskanal (7) verbunden ist, der die Kühlluft an den Gehäusekörper (5) überträgt, nachdem die Luft, die vom Auffangkanal (23) absorbiert wurde, über dem Verdampfer (6) und dem Trichtereinlass (13) gekühlt wurde.

6. Kühlschrank nach Anspruch 4, **gekennzeichnet durch** einen oder mehrere Deckel, die das Steuern und Strömen der Kühlluft vorzugsweise im Luftverteilungskanal (7) ermöglichen.
7. Kühlschrank (1) nach Anspruch 1, **gekennzeichnet durch** ein zusätzliches Zwischenfach (27), das die Seiten der Innentür (3) und der Außentür (2) **durch** eine Wand trennt, die den Trichterkanal (21) mit der Seite der Innentür und/oder der Außentür (2, 3) vom Zwischenfach (29) in Eingriff bringt, und das kühle Lagern von Gegenständen wie Kleidung, Medikamenten usw. gemeinsam mit den Lebensmitteln und Getränken und die Benutzung **durch** Kinder ermöglicht, ohne den Kühlzyklus zu beeinflussen, und das den Kühlzyklus mittels der Trichterblasöffnungen (22) am Trichterkanal (21) einschließt, wenn dies vom Benutzer gewünscht wird.
8. Kühlschrank (1) nach Anspruch 7, **gekennzeichnet durch** eine zusätzliche Abteilungstür (16), die das zusätzliche Zwischenfach (27) vorzugsweise mittels einer Dichtung (11) isoliert und schließt.
9. Kühlschrank (1) nach einem der vorangehenden Ansprüche, **gekennzeichnet durch** ein Trichtergebläse (19), das vorzugsweise im Trichtereinlass (13) der Innentür angeordnet ist, und das die herangeführte Kühlluft absorbiert und zum Zwischenfach (29) bläst.
10. Kühlschrank (1) nach einem der vorangehenden Ansprüche, **gekennzeichnet durch** eine Trichterabdeckung (17), die vorzugsweise im Trichtereinlass (13) der Innentür (3) angeordnet ist, und die den Durchlass zum Zwischenfach (29) öffnet und schließt.
11. Kühlschrank (1) nach Anspruch 10, **gekennzeichnet durch** ein erweitertes Türregal (28), das einen Vorsprung aufweist, der das Öffnen und Schließen der Trichterabdeckung (17) **durch** gemeinsames Verschieben und Bewegen ermöglicht, wenn die Außentür (2) geschlossen wird.
12. Kühlschrank (1) nach einem der der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** eine Außentür (2) und/oder eine Innentür (3) teilweise oder ganz aus einem transparenten Material wie z.B. Glas hergestellt sind, damit der Benutzer Lebensmittel und Getränke hinter der Tür erkennen kann, ohne die Tür zu öffnen.

Revendications

1. Un réfrigérateur (1) comprenant un corps (5) ayant au moins un compartiment dans lequel les aliments et les boissons sont placés, une ou plusieurs portes intérieures (3) fermant le compartiment et/ou le corps (5), une ou plusieurs portes extérieures (2) fermant la porte intérieure (3) et un ou plusieurs inter-compartiments (29) entre la porte intérieure (3) et la porte extérieure (2), une ou plusieurs entrées d'entonnoir (13) de préférence sur la porte intérieure (3) pour faciliter les transferts de l'air frais à l'inter-compartiment (29), un ou plusieurs sorties d'entonnoir (14) de préférence sur la porte intérieure pour absorber et retransférer l'air déjà transféré entre les portes intérieures (3) et/ou au corps (5) et avec un ou plusieurs étagères de porte (20), qui peuvent être attachées à des logements et/ou des projections sur la porte extérieure (2) où les aliments et les boissons sont placés, **caractérisé en ce que** l'une ou plusieurs étagères de porte (20) ont un ou plusieurs ouvertures d'auto-ventilation (30) pour fournir la circulation d'air.
2. Un réfrigérateur (1) selon la revendication 1, **caractérisé par** un canal d'entonnoir (21) de préférence sur la porte intérieure (3) pour engager l'entrée d'entonnoir (13) avec la sortie d'entonnoir (14) et pour diriger la circulation de l'air frais.
3. Un réfrigérateur (1) selon la revendication 2, **caractérisé par** un ou plusieurs ouvertures de souffle d'entonnoir (22) sur le canal de l'entonnoir (21) fournissant le transfert de l'air frais dans le canal d'entonnoir (21) vers l'inter-compartiment (29).
4. Un réfrigérateur (1) selon l'une quelconque des revendications précédentes **caractérisé par** un ou plusieurs canaux de distribution d'air (7) pour faciliter le transfert de l'air frais nécessaire au corps (5).
5. Un réfrigérateur (1) selon la revendication 4, **caractérisé par** un évaporateur (6), un ou plusieurs canaux de collecte (23), pour collecter et diriger le flux d'air vers l'évaporateur (6) et un canal de refroidissement de porte (24) dirigeant l'air frais à l'inter-compartiment, relié au canal de distribution d'air (7) qui distribue l'air refroidi au corps (5), après le refroidissement de l'air absorbé par le canal de collecte (23) sur l'évaporateur (6) et l'entrée d'entonnoir (13).
6. Un réfrigérateur selon la revendication 4, **caractérisé par** un ou plusieurs couvercles fournissant le contrôle et le passage de l'air refroidi de préférence dans le canal de distribution d'air (7).
7. Un réfrigérateur (1) selon la revendication 1, **caractérisé par** un inter-compartiment supplémentaire

- (27) qui isole les côtés de la porte intérieure (3) et la porte extérieure (2) par un mur engageant le canal d'entonnoir (21) avec le côté de la porte intérieure et/ou extérieure (2, 3) de l'inter-compartiment (29), assurant le stockage des marchandises destinées à être conservées dans un endroit frais comme des vêtements, médicaments, etc. ainsi que les aliments et les boissons, et l'utilisation par les enfants sans affecter le cycle de réfrigération, y compris le cycle de réfrigération au moyen des ouvertures de soufflage d'entonnoir (22) sur le canal d'entonnoir (21) à la demande de l'utilisateur. 5
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8. Un réfrigérateur (1) selon la revendication 7, **caractérisé par** une porte de compartiment supplémentaire (16) isolant et fermant l'inter-compartiment supplémentaire (27) de préférence au moyen du joint (11). 15
9. Un réfrigérateur (1) selon l'une quelconque des revendications précédentes **caractérisé par** un ventilateur d'entonnoir (19) placé de préférence dans l'entrée d'entonnoir (13) de la porte intérieure pour absorber et souffler l'air frais dirigé vers l'inter-compartiment (29). 20
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10. Un réfrigérateur (1) selon l'une quelconque des revendications **caractérisé par** un couvercle d'entonnoir (17) de préférence dans l'entrée d'entonnoir (13) de la porte intérieure (3) qui sert à ouvrir et fermer le passage à l'inter-compartiment (29). 30
11. Un réfrigérateur (1) selon la revendication 10, **caractérisé par** une étendue étagère de porte (28) ayant une projection et assurant l'ouverture et la fermeture du couvercle d'entonnoir (17) en poussant et en se déplaçant le long de lui-même lorsque la porte extérieure (2) est fermée. 35
12. Un réfrigérateur (1) selon l'une quelconque des revendications **caractérisé par** une porte extérieure (2) et/ou intérieure (3) partiellement ou entièrement en matériau transparent comme le verre, ce qui permettrait à l'utilisateur de voir les aliments et les boissons derrière les portes sans ouvrir la porte. 40
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Figure 1a

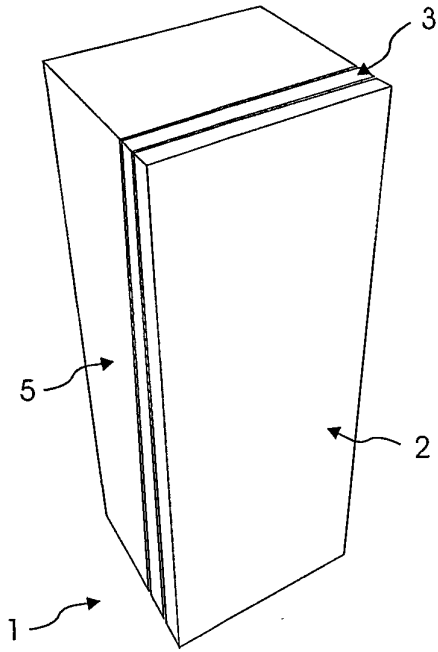


Figure 1b

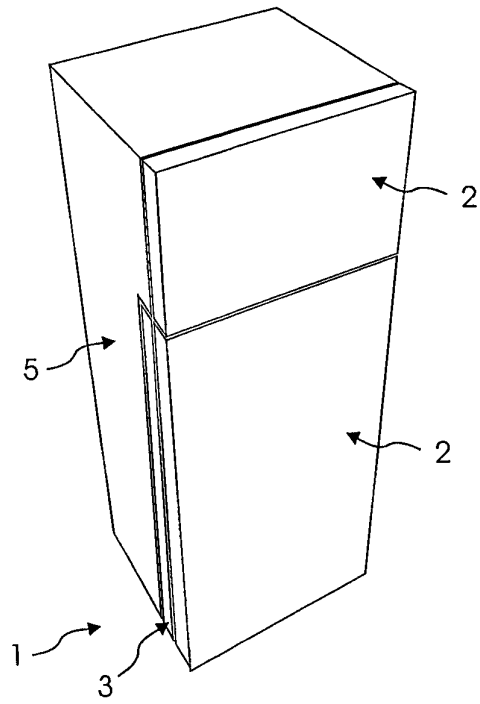


Figure 1c

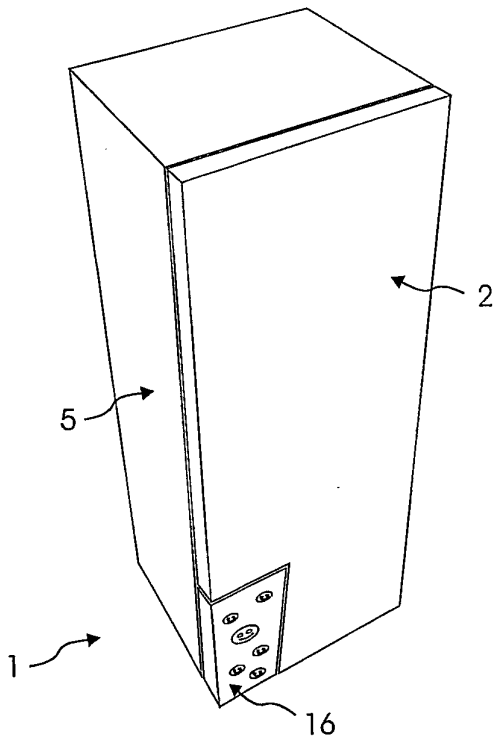


Figure 1d

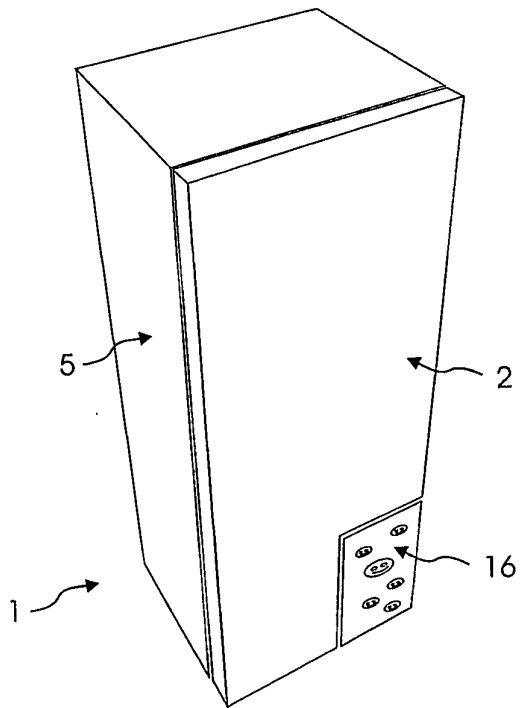


Figure 1e

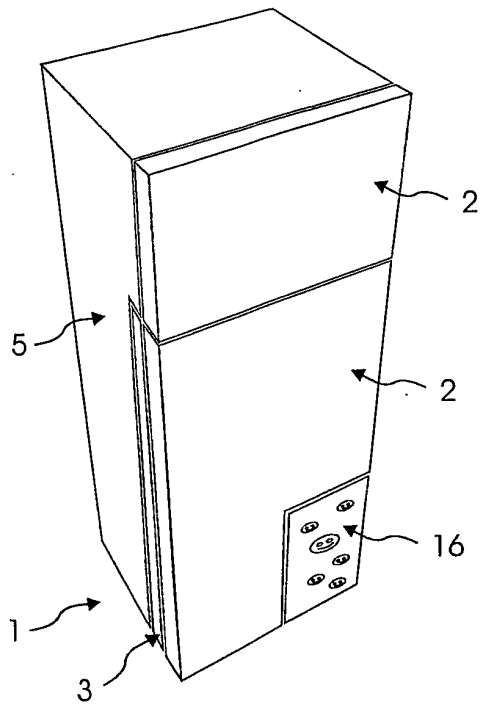


Figure 1f

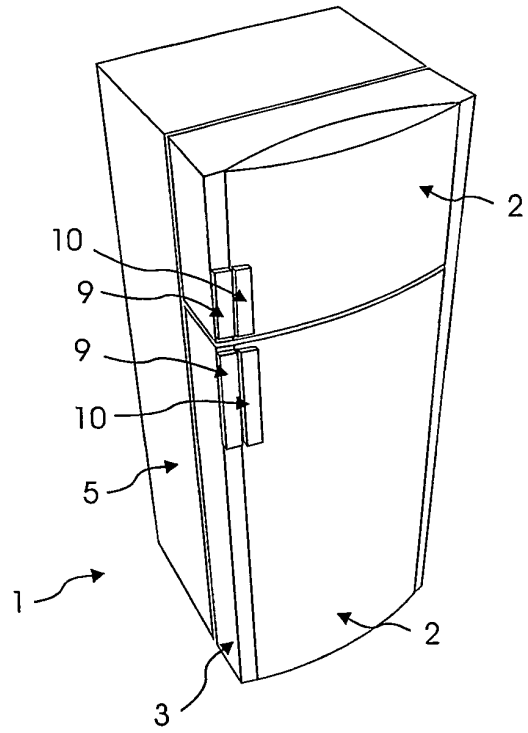


Figure 2a

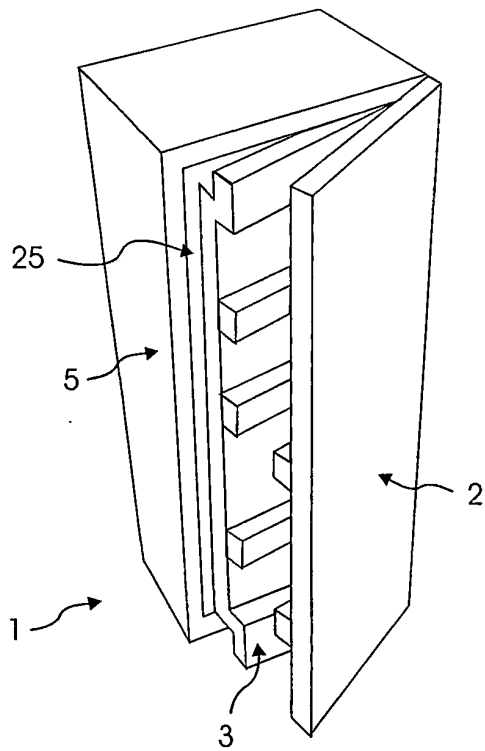
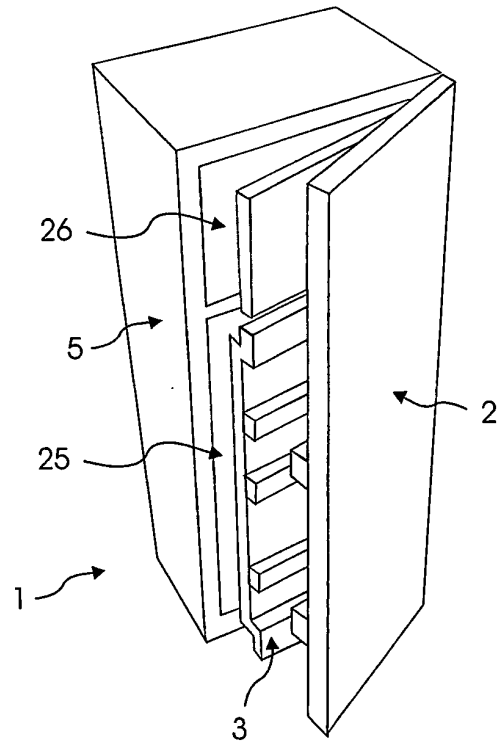
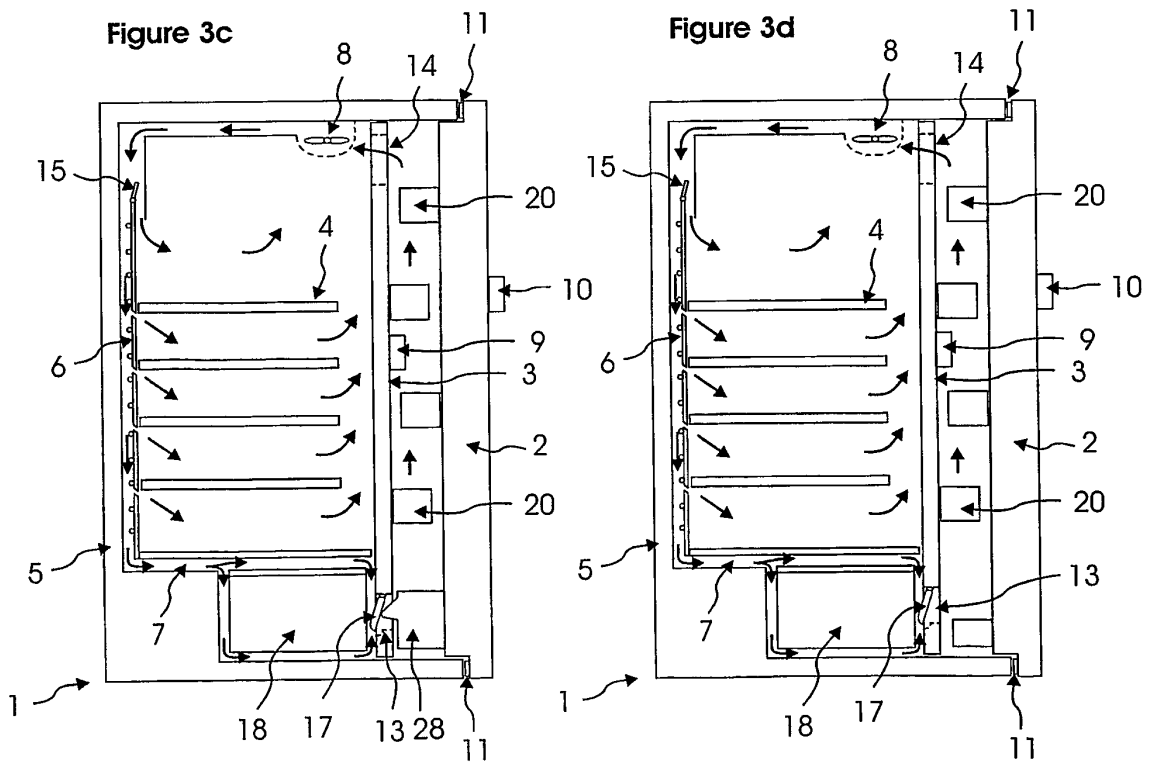
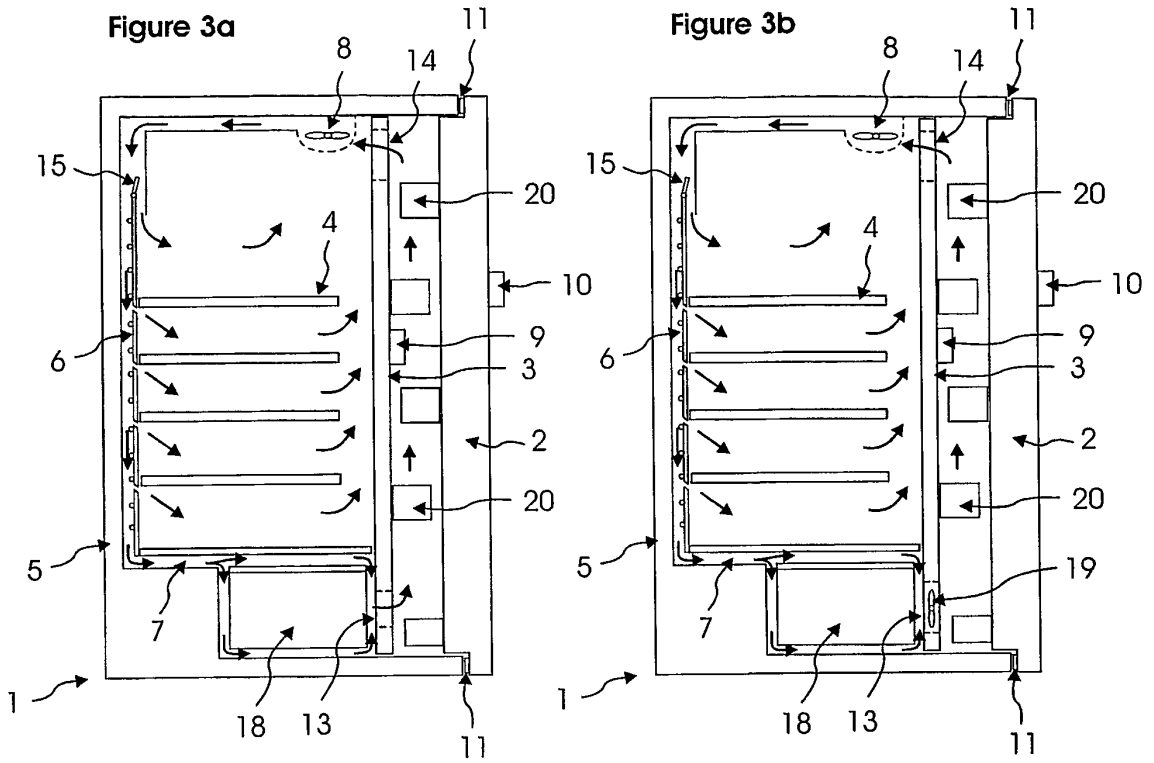


Figure 2b





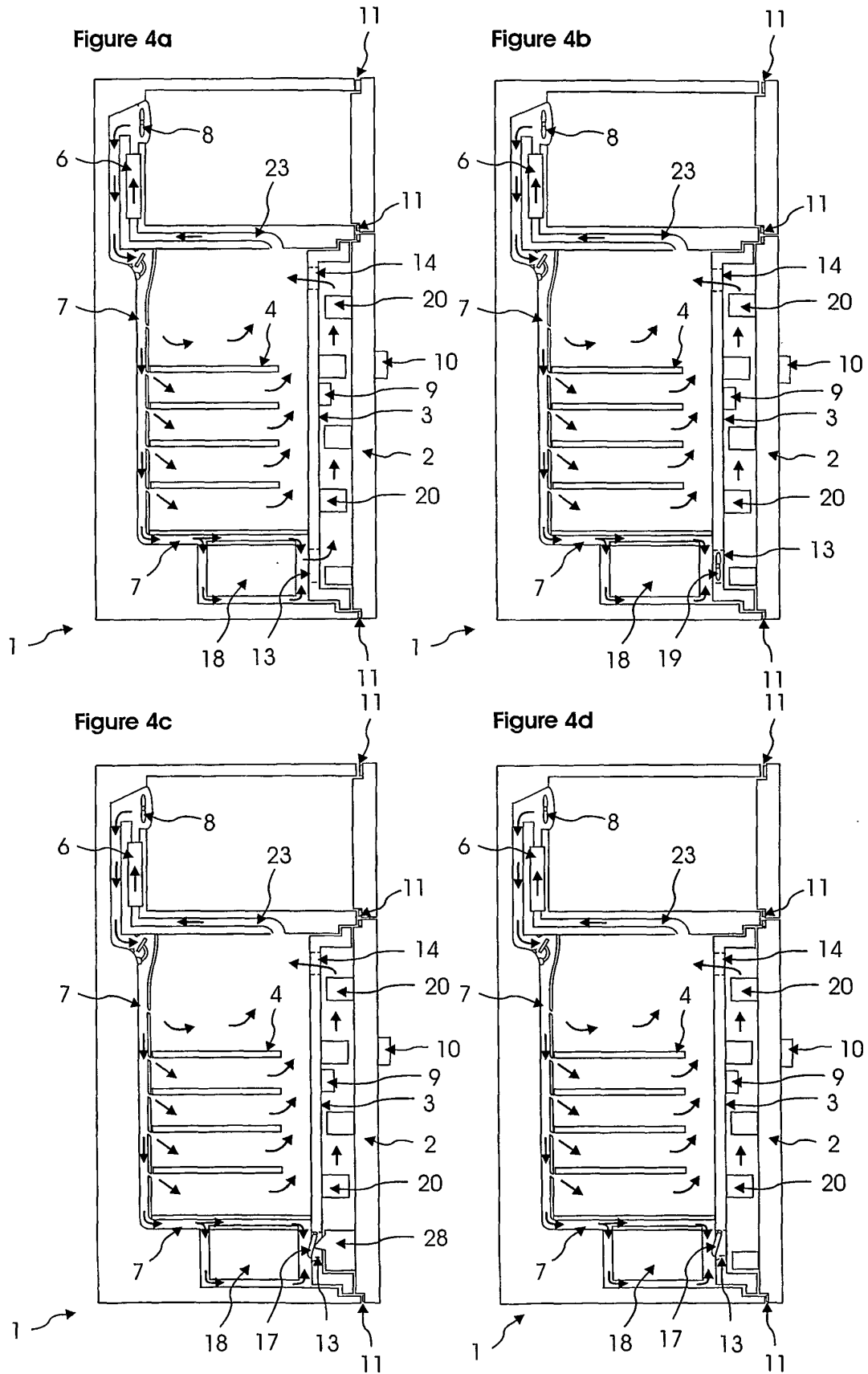


Figure 4e

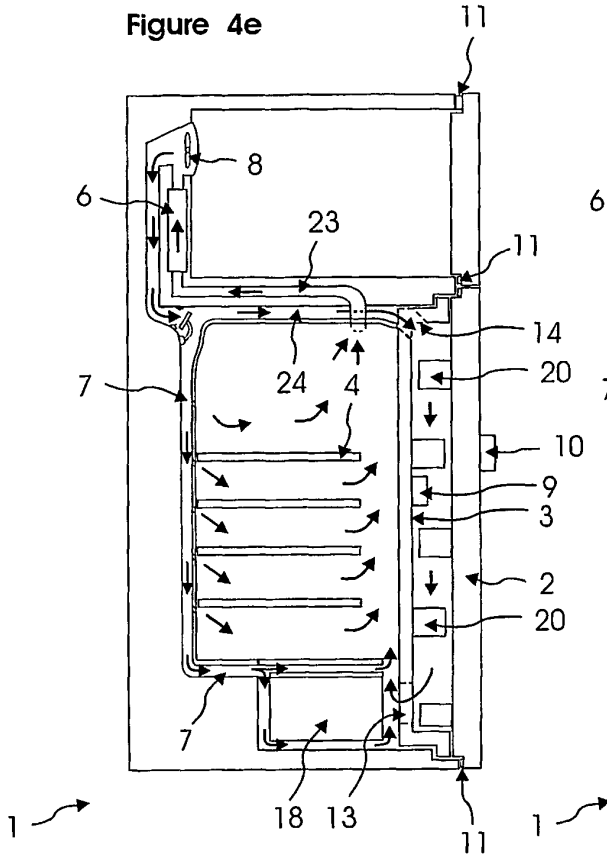


Figure 4f

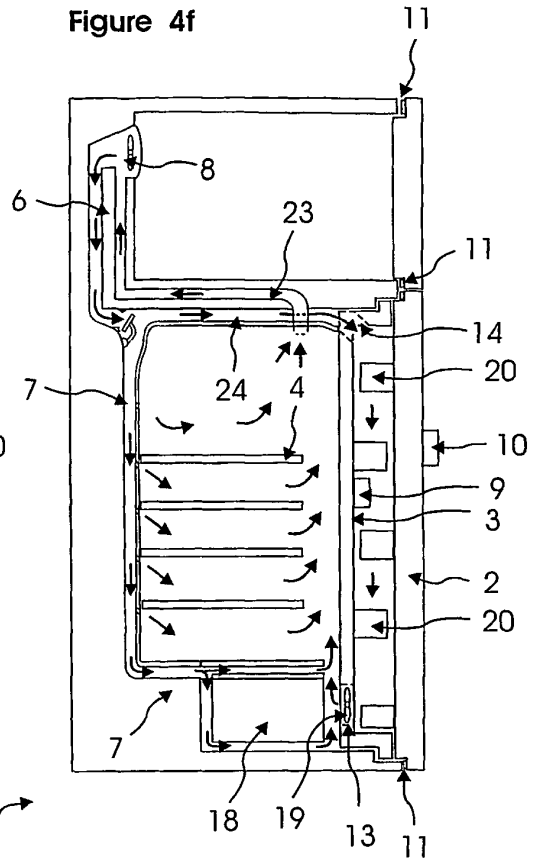


Figure 4g

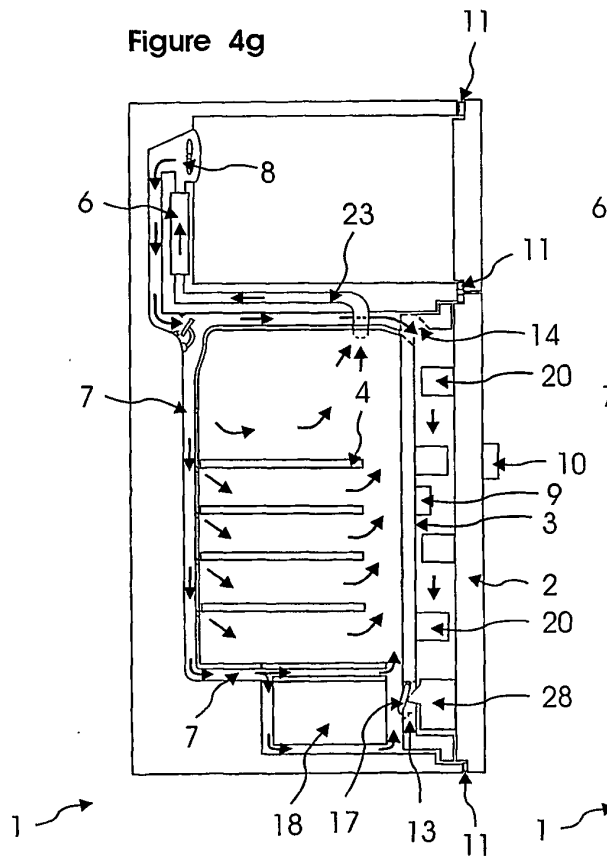
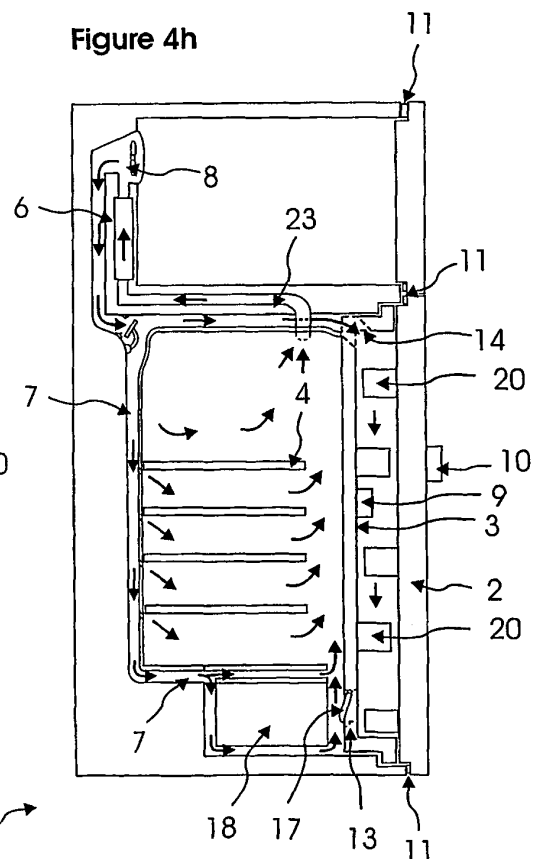


Figure 4h



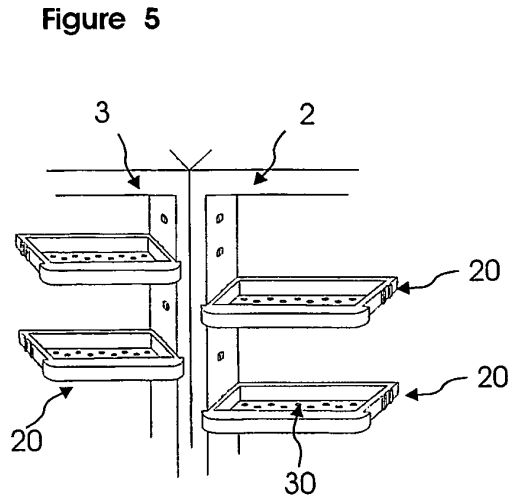
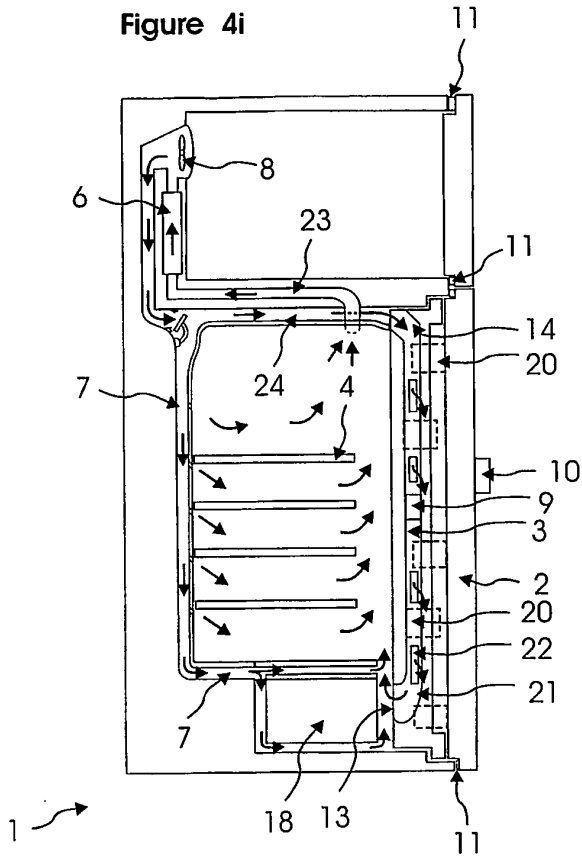


Figure 6a

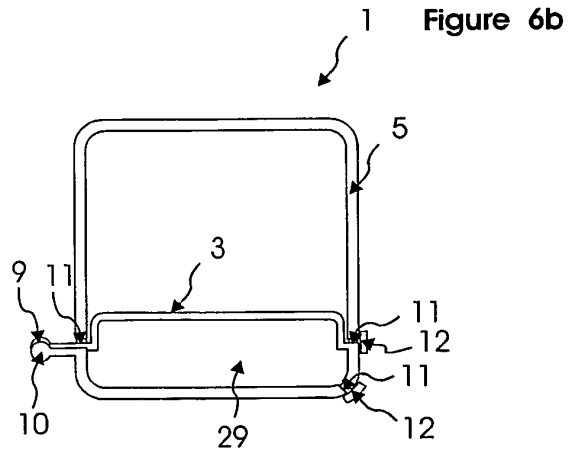
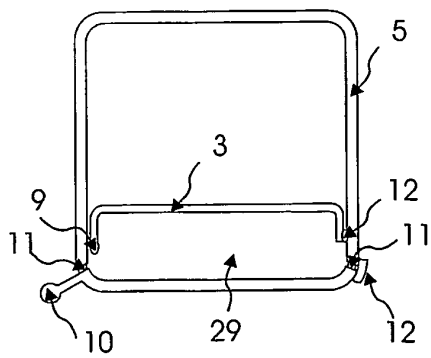


Figure 6c

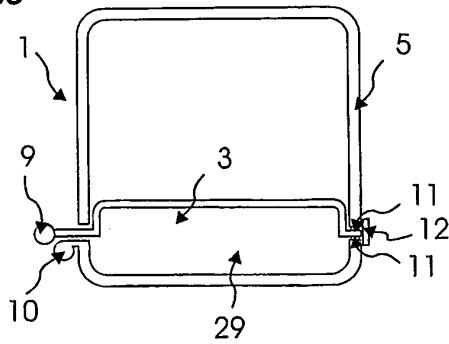
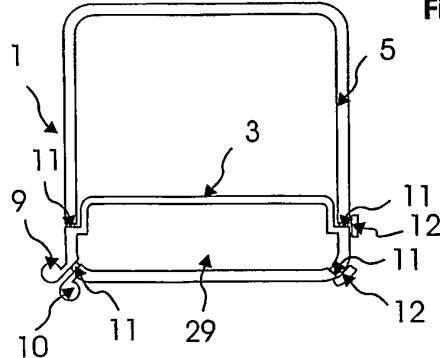


Figure 6d



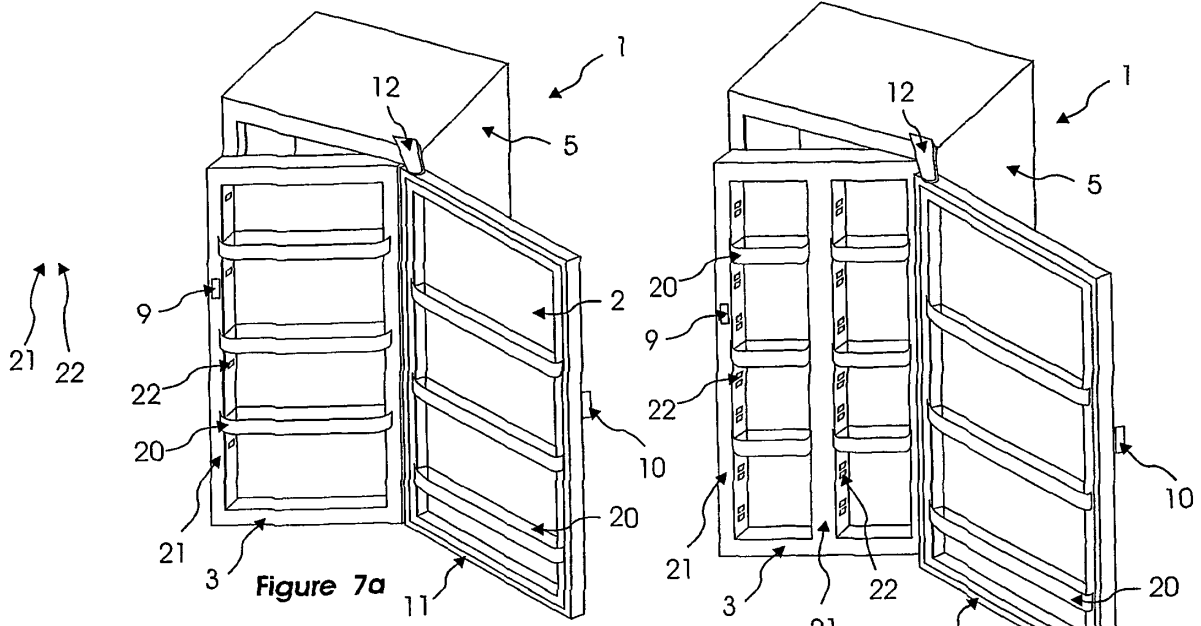


Figure 7a

Figure 7b

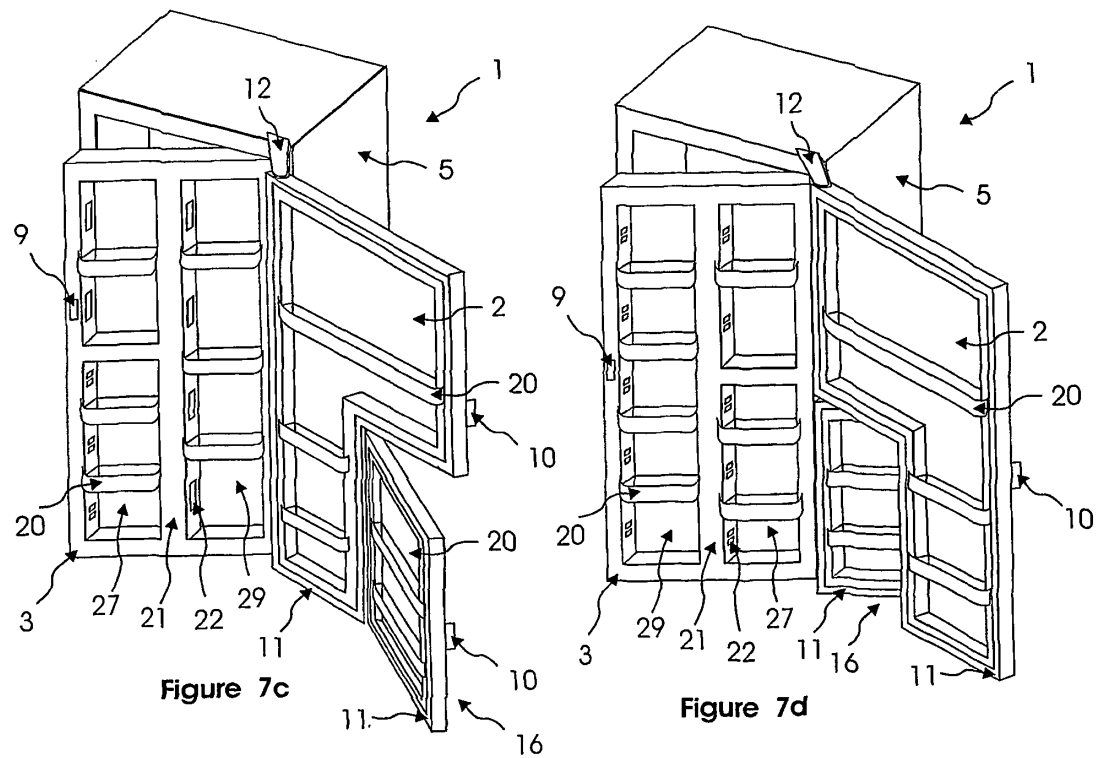


Figure 7c

Figure 7d

REFERENCES CITED IN THE DESCRIPTION

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