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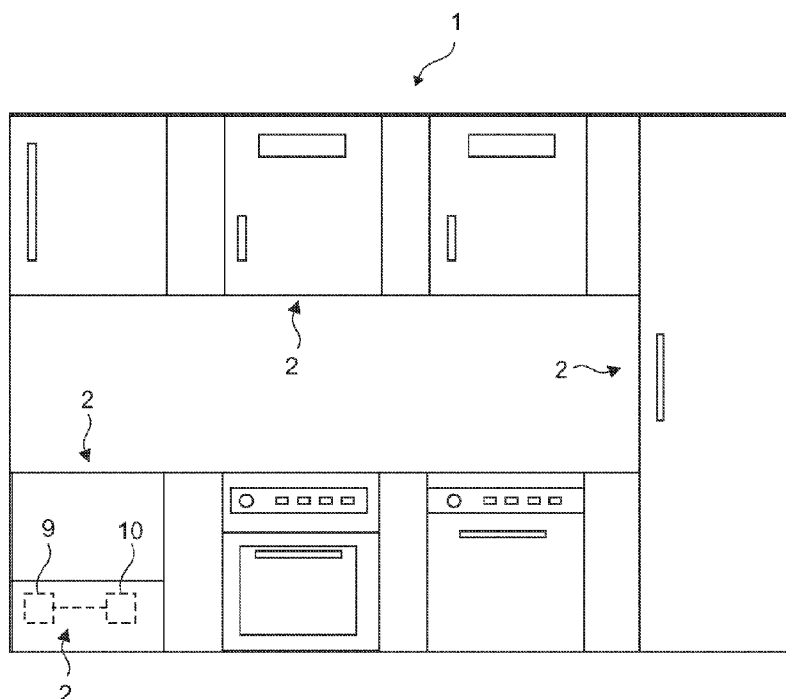
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(54) Title: MODULAR KITCHEN FURNITURE



(57) Abstract: This invention relates to modular kitchen furniture (1) wherein means are provided to utilize the kitchen cabinets (2) for various purposes regarding the user preferences.

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Description

MODULAR KITCHEN FURNITURE

- [1] This invention relates to modular kitchen furniture comprising several kitchen cabinets which are to be utilized for various purposes.
- [2] The cooling devices in the current state of the art are constituted of isolated units which are cooled by means of a central compressor unit with a compressor, and a condenser and evaporators connected to the mentioned central compressor unit, said evaporators being parallel to each other. A closed cycle is formed with the compressor, condenser, evaporator and a capillary pipe.
- [3] In the current state of the art, in Japanese Patent Application JP2000088426, a description is given of a preserving container which is cooled by means of an evaporator connected to a cooling device, a refrigerant fluid passing there through.
- [4] In the current state of the art, in United States Patent Application US2003074911, a description is given of a cooling system where additional cooling compartments may be attached to and which incorporates a fan and a channel whereby cold air can reach the kitchen cabinets. In the described embodiment, refrigeration of the cooling cabinets is achieved by enabling the cold air to reach the insulated unit via a fan and several channels, said cold air being generated by means of a cooling system comprising a compressor, a condenser and an evaporator separately positioned with respect to the mentioned insulated unit. In the mentioned embodiment, since cooling is realized by utilizing air, the length and insulation of the channels between the insulated unit and the cooling system denote significance, resulting in an ineffective cooling. Insulated units do not incorporate dedicated evaporators.
- [5] The aim of the present invention is the realization of modular kitchen furniture, wherein, means are provided to easily transform the kitchen cabinets either into a cooler or a dry storage compartment, as desired.
- [6] The modular kitchen furniture designed to fulfill the objectives of the present invention and described in the first claim and in the other claims related to said first claim, comprises supply and return lines between the compressor unit and the kitchen cabinet, whereby the kitchen cabinets located inside the kitchen are transformed either into compartments used for cooling purposes or dry storage compartments. In order to be able to utilize the kitchen cabinets as coolers, if necessary, supply and return lines are positioned onto the mentioned kitchen cabinets. When the insulated unit is placed into a kitchen cabinet, by easily attaching the evaporator inside the insulated unit to the supply and return lines and thus connecting each element of the refrigeration cycle to each other, the refrigeration cycle is completed.
- [7] As the insulated unit positioned into the kitchen cabinet, the evaporator can easily

be attached to or detached from the supply and return lines connected to the compress or unit, wherein it is accomplished that kitchen cabinets may be used for various purposes and thereby achieving a great deal of flexibility in kitchen design.

[8] Furthermore, it is also accomplished that insulated units are utilized in a most efficient manner regarding the kitchen design and user preferences. It is achieved that insulated units may easily be placed inside the kitchen cabinets located below or above the kitchen counter. In addition to that, it is further accomplished that kitchen cabinets with various shape and quantity may be utilized inside the kitchen with insulated units having various dimension and quantity, as joined in various combinations.

[9] While placing the insulated units into the kitchen cabinets, the connection between the evaporator and the supply and return lines may be established at the front side of the kitchen cabinet, which side is more accessible compared to the back side. Thereby, while placing the insulated units into the kitchen cabinets, connections between the insulated unit and other insulated units and / or the compressor unit may easily be established. Thus, it is achieved that attaching / detaching insulated units to / from the kitchen cabinets and the maintenance and repair of the mentioned insulated units are easier, wherein the service speed is also increased.

[10] The kitchen cabinet is manufactured with the supply and return lines attached to it. The insulated units purchased according to needs, can easily be placed into the kitchen cabinets located in the kitchen, said insulated units being easily attached to the supply and return lines with a plug – in type connection.

[11] The modular kitchen furniture designed to fulfill the objectives of the present invention is illustrated in the attached figures where:

[12] Fig.1 – is a schematic view representation of modular kitchen furniture.

[13] Fig.2 – is a schematic view of a cooling system.

[14] Fig.3 – is a schematic view of the modular kitchen furniture, where no insulated unit is placed there into.

[15] Fig.4 – is a schematic view of the modular kitchen furniture, where an insulated unit is placed there into.

[16] Fig.5 – is a schematic view of the modular kitchen furniture comprising several kitchen cabinets.

[17] Fig.6 – is a schematic view of the modular kitchen furniture comprising a chamber.

[18] Elements shown in figures are numbered as follows:

[19] 1. Modular kitchen furniture

[20] 2. Kitchen cabinet

[21] 3. Insulated unit

[22] 4. Compressor unit

[23] 5. Supply line

- [24] 6. Return line
- [25] 7. Control unit
- [26] 8. Connection passage hole
- [27] 9. Compressor
- [28] 10. Condenser
- [29] 11. Evaporator
- [30] 12. Aperture
- [31] 13. Distribution unit
- [32] 14. Collecting unit
- [33] 15. Valve
- [34] 16. Chamber

[35] The modular kitchen furniture (1) in accordance with the present invention comprises one or more than one kitchen cabinet (2) where various household appliances are placed into, a compressor (9) whereby the refrigerant fluid is moved, a condenser (10) used to condense the fluid, a compressor unit (4) positioned inside or outside of the kitchen cabinet (2) incorporating a fan whereby the heat transfer is increased by flowing air on the condenser (10) and / or the compressor (9) and, one or more than one insulated unit (3) positioned into the kitchen cabinet (2), as a separate piece from the mentioned compressor unit (4).

[36] The kitchen cabinet (2) comprises a supply and return line (5, 6) whereby the refrigerant fluid is transferred from the compressor unit (4) to the insulated unit (3) and from the insulated unit (3) back to the compressor unit (4), one of the ends of said line communicating either with the compressor unit (4) or another kitchen cabinet (2) and, the other end communicating either with the insulated unit (3) or another kitchen cabinet (2). When the insulated unit (3) is positioned into the kitchen cabinet (2), by establishing a connection with the compressor unit (4) by means of the supply and return line (5, 6), a closed refrigeration cycle is formed, wherein the cabinet (2) is utilized for cooling purposes, whereas it is utilized as a dry storage compartment when the insulated unit (3) is not positioned there into (Figure 1 and Figure 2).

[37] The insulated unit (3) comprises one or more than one evaporator (11) whereby the surroundings is cooled by absorbing heat from the environment.

[38] When an insulated unit (3) is positioned into the kitchen cabinet (2), by means of the supply line (5), the refrigerant fluid pumped by the compressor (9) reaches the evaporator (11) after it passes through the condenser (10). The refrigeration cycle is completed as the refrigerant fluid passed through the evaporator (11) reaches the compressor (9) by means of the return line (6) (Figure 4).

[39] The kitchen cabinet (2) further comprises an aperture (12) preferably positioned at the section where the door of the insulated unit (3) is positioned, said aperture (12)

enabling the insulated unit (3) to be easily positioned and, at least two connection passage holes (8) whereby connections are established as the ends of supply and return line (5 and 6) and the evaporator (11) passes there through (Figure 3).

[40] In case the insulated unit (3) is not placed into the kitchen cabinet (2), one of the ends of the supply and return lines (5 and 6) are free on the kitchen cabinet (2).

Whereas in case the insulated unit (3) is placed into the kitchen cabinet (2), the mentioned ends of the supply and return lines (5 and 6) are respectively connected to the inlet and outlet ends of the evaporator (11) inside the insulated unit (3).

[41] The modular kitchen furniture (1) comprises one or more than one valve (15) which is positioned on the supply and return lines (5 and 6) and whereby the flow of the refrigerant fluid is controlled and, a control unit (7) used to open and close the mentioned valves (15) and to control the operation of the compressor (9). The valves (15) may also be located on the kitchen cabinet (2). Solenoid valves may be utilized as the aforementioned valves (15).

[42] While locating the modular kitchen furniture (1) inside the kitchen, regarding user preferences, kitchen cabinets (2) are placed inside the kitchen in various combinations, whereas the compressor unit (4) may be positioned inside kitchen cabinet (2) or outside the kitchen. Supply and return lines (5 and 6) are positioned between the compressor unit (4) and the kitchen cabinets (2), which the user desires or foresees to use as a cooler. Supply and return lines (5 and 6) are placed onto the kitchen cabinet (2) which is to be utilized either as a cooler if an insulated unit (3) is positioned there inside or as a dry storage compartment if the insulated unit (3) is not placed, wherein one end of said supply and return lines (5 and 6) are standing free. In that case, the valves (15) on the supply line (5) and the return line (6) are kept closed by means of the control unit (7). Thereby, it is not allowed to have a refrigerant fluid flow inside the supply line (5) and return line (6). Therefore, inside the kitchen, the kitchen cabinet (2) is utilized as any dry storage compartment where various items are stored there inside, said kitchen cabinet (2) being ready to be utilized as a cooler if an insulated unit (3) would be mounted there into.

[43] When an insulated unit (3) is placed into the kitchen cabinet (2), the free ends of the supply and return lines (5 and 6) on the kitchen cabinet (2) are attached to the inlet and outlet ends of the evaporator (11) inside the insulated unit (3) such that no fluid leakage is allowed. As the compressor (9) is operated, the refrigerant fluid reaches the supply line (5). By opening the valves (15) on the supply line (5), the refrigerant fluid arrived at the supply line (5), is permitted to pass to the evaporator (11) and reaches the return line (6) after the cooling of the insulated unit (3) is achieved. From the return line (6) whereon the valves (15) are kept open, the refrigerant fluid enters back to the refrigeration cycle, closing the cycle. Accordingly, modular kitchen furniture is

obtained, incorporating kitchen cabinets (2) which may easily be transformed from one type of usage into another type of usage for various purposes regarding the user preferences.

- [44] In another embodiment of the present invention, the modular kitchen furniture (1) comprises a distribution unit (13) where one or more than one supply line (5) is attached and a collecting unit (14) where one or more than one return line (6) is attached. On the distribution unit (13), there are provided assembly holes, the amount of which is equal to the possible amount of insulated units (3) and where supply lines (5) are to be connected to, whereas on the collecting unit (14), there are also provided assembly holes, the amount of which is equal to the possible amount of insulated units (3), where return lines (6) are to be connected to. The valves (15) controlling the flow of the refrigerant fluid, may be positioned on the mentioned distribution and collecting unit (13 and 14) (Figure 5).
- [45] In another embodiment of the present invention, the connection between the supply and return lines (5 and 6) and the evaporator (11) inside the insulated unit (3) or the distribution unit (13) and the collecting unit (14) or the compressor unit (4), is preferably realized at the front side of the kitchen cabinet (2). To be able to do that, housings in shape of channels are formed at the bottom of the kitchen cabinet (2) and / or the insulated unit (3), the pipes constituting the supply and return lines (5 and 6) fitting into the mentioned housings. By realizing the connections at the front side of the kitchen cabinet (2), it is accomplished that attaching and detaching insulated units (3) is easily performed.
- [46] In another embodiment of the present invention, the kitchen cabinet (2) incorporates a chamber (16) at its front side, wherein a lid is provided to access the interior of the mentioned chamber (16) from the external medium. Connections, valves (15) and the control unit (7) is positioned inside the afore-mentioned chamber (16) (Figure 6).
- [47] By means of the present invention, it is achieved that kitchen cabinets (2) may be utilized for various purposes, regarding user preferences. Furthermore, according to the kitchen design, various cooling systems may easily be applied in the kitchen, wherein it is accomplished that cooling is performed in an effective and easily manageable manner.

Claims

- [1] Modular kitchen furniture (1) comprising,
- one or more than one kitchen cabinet (2) where various household appliances are placed into,
 - a compressor (9) whereby the refrigerant fluid is moved,
 - a condenser (10) used to condense the fluid,
 - a compressor unit (4) positioned inside or outside of the kitchen cabinet (2) incorporating a fan whereby the heat transfer is increased by flowing air on the condenser (10) and /or the compressor (9) and,
 - one or more than one insulated unit (3) positioned into the kitchen cabinet (2), as a separate piece from the mentioned compressor unit (4),
- and characterized by one or more than one kitchen cabinet (2) which incorporates a supply and return line (5, 6) whereby the refrigerant fluid is transferred from the compressor unit (4) to the insulated unit (3) and from the insulated unit (3) back to the compressor unit (4), one of the ends of said line communicating either with the compressor unit (4) or another kitchen cabinet (2) and, the other end communicating either with the insulated unit (3) or another kitchen cabinet (2) and, wherein a closed refrigeration cycle is formed, when the insulated unit (3) is positioned into the kitchen cabinet (2), by establishing a connection with the compressor unit (4) by means of the supply and return line (5, 6), the cabinet (2) being utilized for cooling purposes, whereas it is utilized as a dry storage compartment when the insulated unit (3) is not positioned there into.
- [2] Modular kitchen furniture (1) as described in Claim 1, characterized by a kitchen cabinet (2) which comprises at least two connection passage holes (8) whereby connections are established as the ends of supply and return line (5 and 6) and the evaporator (11) passes there through.
- [3] Modular kitchen furniture (1) as described in Claims 1 or 2, characterized by a kitchen cabinet (2) which comprises supply and return lines (5 and 6) one of the ends of which are free in case the insulated unit (3) is not placed into the kitchen cabinet (2), whereas in case the insulated unit (3) is placed into the kitchen cabinet (2), the mentioned ends of the supply and return lines (5 and 6) are respectively connected to the inlet and outlet ends of the evaporator (11) inside the insulated unit (3).
- [4] Modular kitchen furniture (1) as described in any of the above Claims, characterized by one or more than one valve (15) which is positioned on the supply and return lines (5 and 6) and whereby the flow of the refrigerant fluid is

controlled and, a control unit (7) used to open and close the mentioned valves (15) and to control the operation of the compressor (9).

- [5] Modular kitchen furniture (1) as described in any of the above Claims, characterized by a distribution unit (13) where one or more than one supply line (5) is attached to and, a collecting unit (14) where one or more than one return line (6) is attached to, said units (13, 14) being positioned between the compressor unit (4) and the kitchen cabinets (2).
- [6] Modular kitchen furniture (1) as described in any of the above Claims, characterized by a kitchen cabinet (2) wherein the connection between the supply and return lines (5 and 6) and the evaporator (11) inside the insulated unit (3) or the distribution unit (13) and the collecting unit (14) or the compressor unit (4), is preferably realized at the front side of the mentioned kitchen cabinet (2).
- [7] Modular kitchen furniture (1) as described in any of the above Claims, characterized by a housing in shape of a channel is formed at the bottom of the kitchen cabinet (2) and / or the insulated unit (3), the pipes that constitute the supply and return lines (5 and 6) fitting into the mentioned housing.
- [8] Modular kitchen furniture (1) as described in any of the above Claims, characterized by a kitchen cabinet (2) which comprises a chamber (16) at its front side, wherein a lid is provided to access the interior of the mentioned chamber (16) from the external medium and all of the connections, valves (15) and the control unit (7) is positioned inside the afore-mentioned chamber (16).

Figure 1

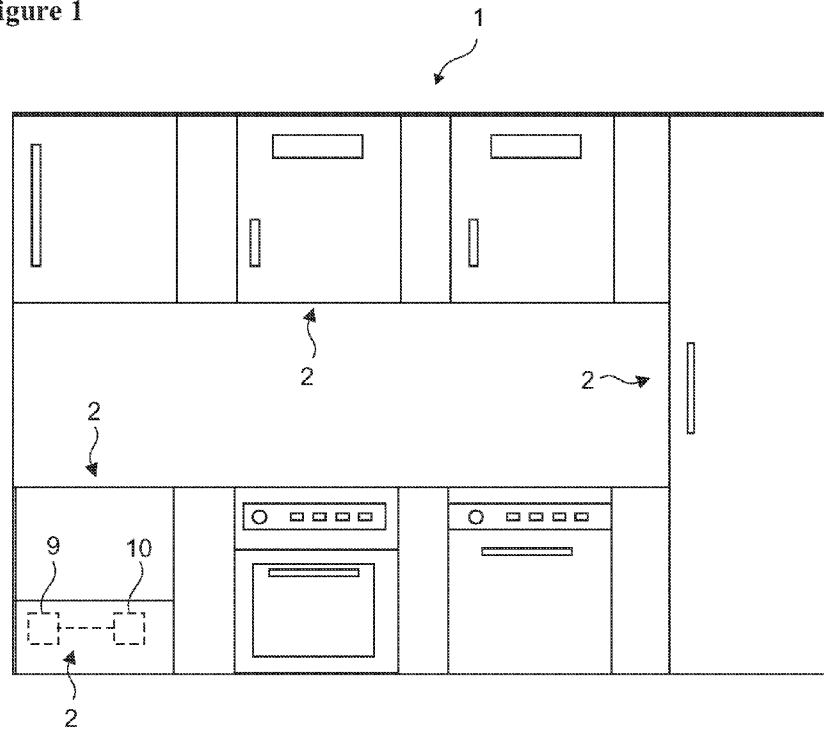


Figure 2

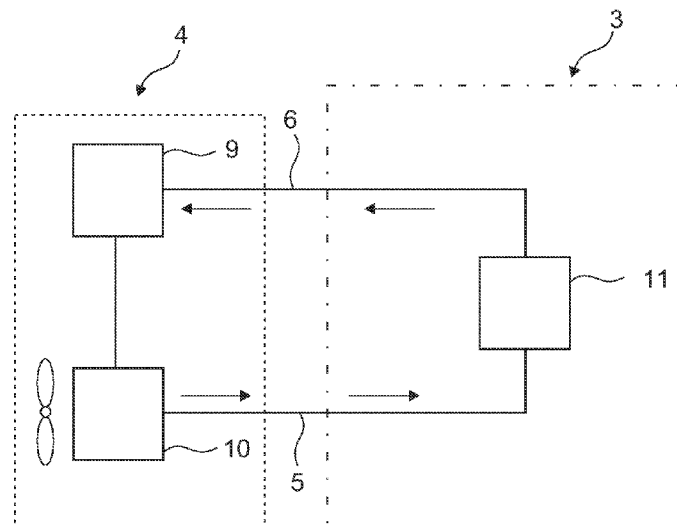


Figure 3

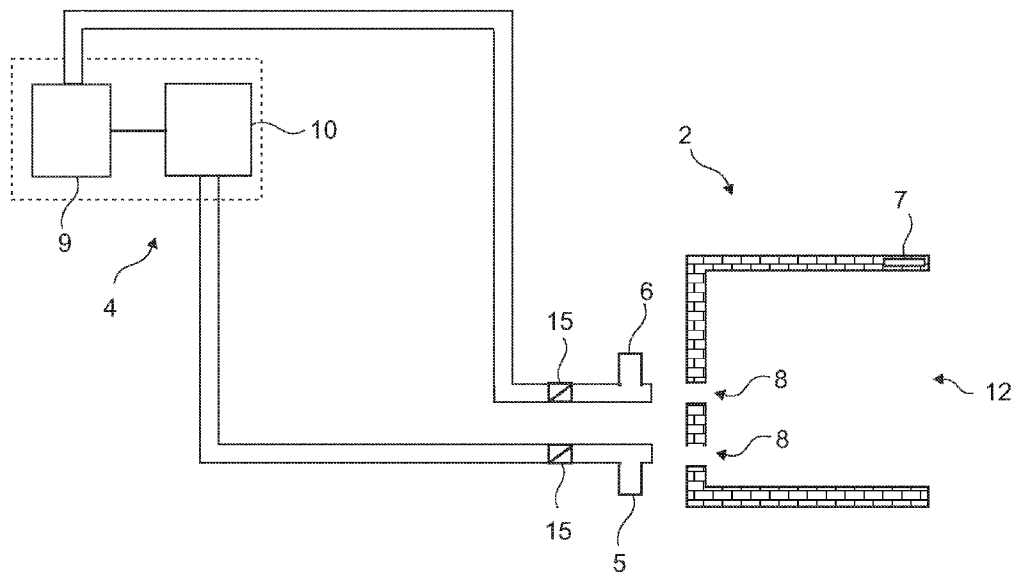


Figure 4

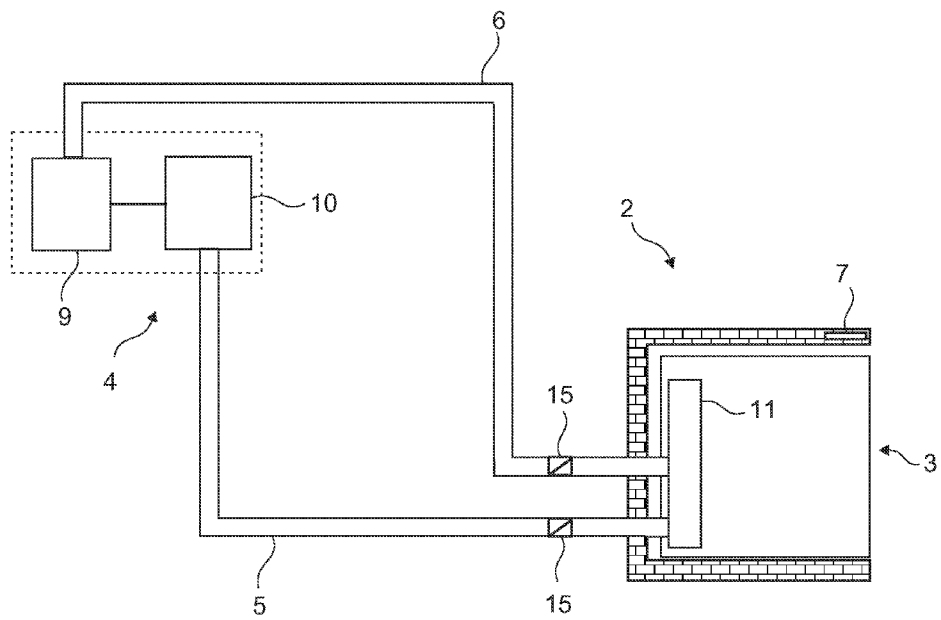


Figure 5

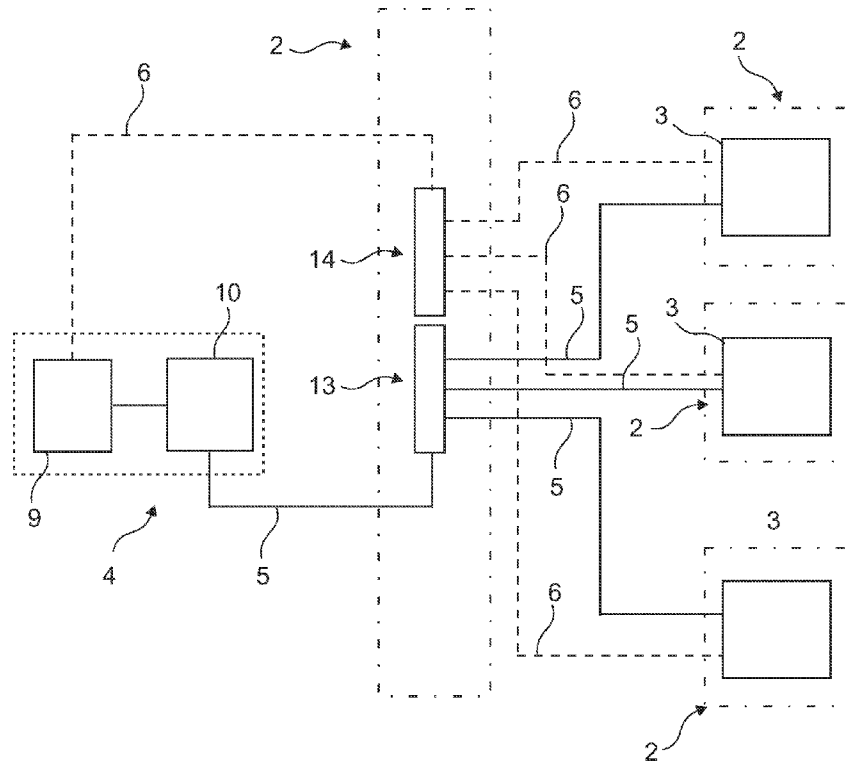
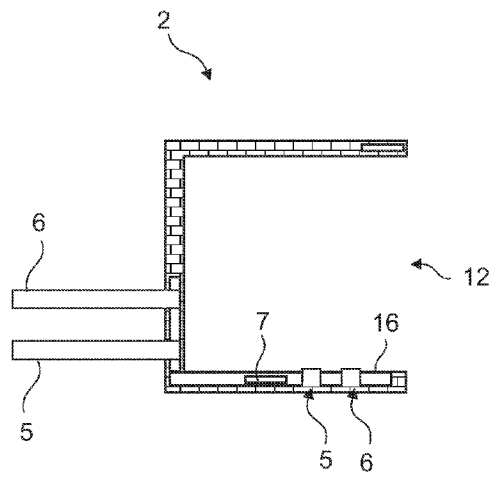


Figure 6



INTERNATIONAL SEARCH REPORT

International application No

PCT/IB2006/053111

A. CLASSIFICATION OF SUBJECT MATTER
INV. A47B77/08 F25D23/10

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A47B F25D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2005/017425 A (BSH BOSCH SIEMENS HAUSGERAETE [DE]; BAUER PETER [DE]; GOMOLL GUENTER []) 24 February 2005 (2005-02-24) page 3, line 35 - page 6, line 13; figure 1	1-8
X	EP 0 344 562 A (C & D REFRIGERATION SPA [IT]) 6 December 1989 (1989-12-06)	1-3
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A	abstract; figures 1-9	4-8

☐ Further documents are listed in the continuation of Box C.

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Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

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