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(54) **An appliance and a method for a built-in arrangement in a kitchen interior**

(57) The invention relates to an appliance (1), such as a refrigerator or a freezer, which is adapted for a built-in arrangement into a kitchen interior by positioning into an opening (6) in the kitchen interior. The appliance has a door (3, 3') being adapted to support a front door panel (10, 10') of the kitchen interior in alignment with other

cabinet doors (11) in the kitchen interior. The appliance has essentially the same width as a standard free-standing appliance and is adapted to be mounted in the opening without any separate cabinet. The invention also relates to a method for mounting of an appliance into a kitchen interior.

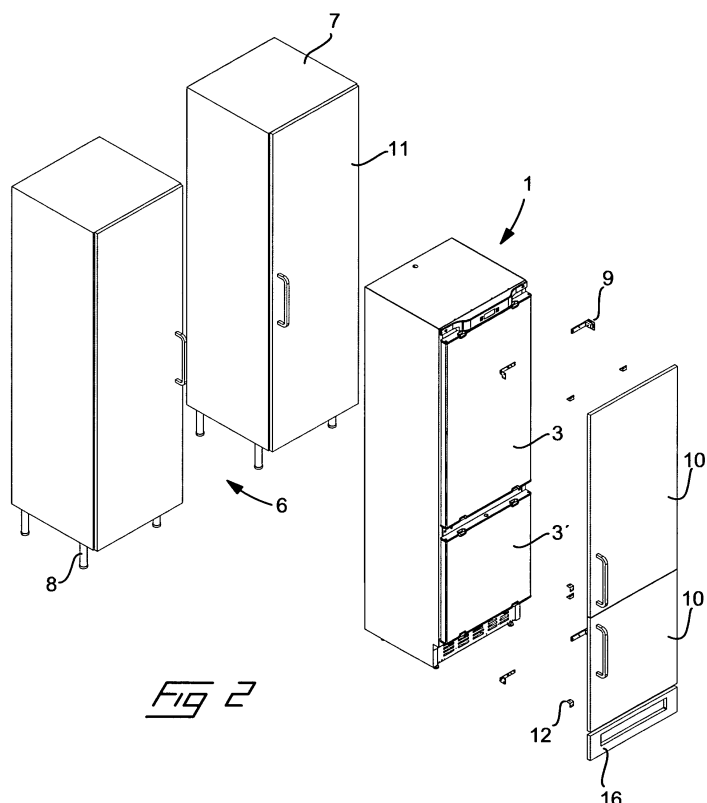


FIG 2

Description

[0001] The invention relates to an appliance, such as a refrigerator or a freezer, which is adapted for a built-in arrangement into a kitchen interior by positioning into an opening in the kitchen interior, the appliance having a door being adapted to support a front door panel in alignment with other cabinet doors of the kitchen interior.

[0002] The invention also relates to a method for mounting such an appliance in a built-in arrangement into a kitchen interior.

Background of the invention

[0003] The use of so called built-in appliances, such as refrigerators and freezers, have been more and more popular. Built-in appliances are arranged in kitchen furniture and has a special door adapted to support a front door panel which usually has the same appearance as and is aligned with the other cabinet doors of the kitchen interior. In that way built-in appliances blend with the rest of the kitchen interior and gives the kitchen a modern and uniform look. A built-in appliance is placed and mounted in a kitchen interior such that the body of the appliance is positioned into a separate kitchen cabinet and a front door panel is connected to the door of the appliance by means of suitable connecting elements.

[0004] However, there are several drawbacks with prior art built-in appliances. The major drawback is that the inner available space in built-in appliances is considerably smaller than for a corresponding free-standing appliance occupying essentially the same overall space in the kitchen interior, which gives less storage space for foods and other products inside the appliance. The reduced inner available space has several reasons. One reason is that for a free-standing appliance, the door of the appliance is normally located outside of the plane of the cabinet doors in the kitchen interior. In a built-in appliance, on the other hand, the door must be positioned within the plain of the cabinet doors of the kitchen interior and moreover there has to be sufficient space for mounting of the front door panel on the outside such that it will be in alignment with the other cabinet doors in the kitchen interior. This has to effect that the depth of the available interior space will be smaller for a built-in appliance than for a free-standing appliance. Another reason is that, in order to let the built-in appliance blend with the remaining kitchen interior, the built-in appliance is positioned into an opening in a separate kitchen cabinet. In this way the built-in appliance can be provided with a plinth panel in the lower end just above the floor to give a uniform appearance in relation to the rest of the kitchen interior. However, this also has to effect that the available height as well as width for the appliance will be smaller. The latter since the thickness of the cabinet walls will interfere with the available space for the appliance.

[0005] Moreover, since the inner space of a built-in appliance is smaller than a free-standing appliance, it is not

possible to use the same inner casings and interior fittings for these two types of appliances. This is a disadvantage since it is more expensive to manufacture two or more separate sets of inner casings and interior fittings for essentially the same purpose, and will therefore raise the total costs for the final products.

Summary of the invention

[0006] It is an object of the invention to overcome the drawbacks of prior art built-in appliances and provide an appliance, which presents a considerably larger inner, useful space in comparison to prior art built-in appliances occupying essentially the same space in the kitchen interior. At least this object is achieved by an appliance according to claim 1.

[0007] The invention also relates to a method for mounting an appliance into a kitchen interior having essentially the same object as above. At least this object is achieved by a method according to claim 9.

[0008] Accordingly, the basis of the invention is the insight that this object may be achieved by mounting the appliance into the kitchen interior without having a separate cabinet for the appliance. Instead, the appliance is positioned into an opening in the kitchen interior adjacent at least one adjoining kitchen cabinet and it is standing on its own base frame or feet directly on the floor. In this way the available opening space in the kitchen interior can be utilized to the maximum possible extent without any useful space being wasted for a separate kitchen cabinet.

[0009] Within this general inventive idea, the invention may be modified in many different ways. In one embodiment, the appliance is provided with a setback plinth portion such that the kitchen interior can be provided with an uniform plinth panel extending over the entire length of the kitchen interior, the appliance(s) included.

[0010] To utilize the depth of the appliance from the front door panel to a wall or the like on the rear side of the appliance, a condenser tube system, in an embodiment of the invention, is not positioned in the back of the appliance as is common for refrigerators and freezers. Instead, the appliance is provided with a rear panel, preferably of a metal sheet, which is positioned as far rearward as possible towards a wall or the like behind the kitchen interior. To permit electrical wiring to lighting inside the appliance, regulation and the like, the rear panel, in one embodiment, is formed with recessed cable ducts in an outer surface to accommodate external electric wiring in the outer surface. The recessed cable ducts comprises, in one embodiment, at least one cable duct along a vertical edge of the rear panel at the connection to a side panel, from which one or more additional cable ducts can be branched off to a central portion of the rear panel, if required for lighting and the like, from each of which a hole may be formed to the inside of the appliance. One advantage with locating at least the vertical cable duct (s) at the vertical edges or corners of the appliance, is

that here the thermal insulation is as largest, which has to effect that any increased heat leakage due to the recessed cable duct will be minimal.

[0011] Instead of positioning the cooling condenser tube system on the outside of the rear side of the appliance, it can optionally be positioned e.g. in the space above the appliance or, as in a hereinafter described and illustrated embodiment of the invention, in the setback plinth portion beneath the appliance. This necessitates a very compact condenser system and to provide the required air flow through the condenser, a fan is provided which draws air through air inlet openings in the plinth panel, which air passes by the condenser tube system provided in an inlet passage. After passing the fan, the air flow turns and exits through an outlet passage and air outlet openings in the plinth panel. The inlet passage and the outlet passage are separated by a partition wall.

[0012] An appliance according to the invention may optionally be positioned in an opening between two cabinets in the kitchen interior, such that the appliance can be attached, by means of suitable anchoring fittings, to the cabinets on each side. It is also possible to position two or more appliances side by side, being attached to each other, in a large opening in the kitchen interior. However, the appliance can also be positioned outermost in a row of cabinets such that the appliance is attached only in one side to an adjacent cabinet. On the other side of the appliance, it is in this case preferably provided with a covering panel attached to the appliance and having a similar appearance as the rest of the kitchen interior. This way of positioning the appliance is facilitated when the appliance is in itself sufficient stable. In one embodiment of the inventive appliance, it is therefore formed of an outer shell or casing of metal sheets, which are bent and welded together. The covering panel on the "free" side of the appliance may optionally be utilized to attach an adjoining kitchen worktop, a lower cabinet, an upper cabinet or the like.

[0013] A built-in appliance according to the invention, can be made such that the increased inner space, in comparison to prior art built-in appliances, can be utilized such that the same inner casings and interior fittings can be used as in a corresponding free-standing appliance.

Brief description of the drawings

[0014] An embodiment of the invention will hereinafter be described by way of example with reference to the drawings, in which:

- Fig 1 is a perspective view of an appliance in form of a refrigerator or freezer according to the invention;
 Fig 2 is an exploded perspective view of an appliance, which is to be inserted into an opening between two cabinets of a kitchen interior;
 Fig 3 is a perspective view illustrating the connections of the appliance to adjacent cabinets and

to a front door panel;

- Fig 4 is a view from above of an appliance positioned between two adjacent cabinets of a kitchen interior;
 Fig 5-7 are front views of examples of different installations of appliances according to the invention into a kitchen interior;
 Fig 8 is a partly cut perspective view from the rear side of the appliance;
 Fig 9 is a cross section in the longitudinal direction of the lower part of an appliance according to the invention; and
 Fig 10 is a perspective view of a cooling condenser system provided in a plinth portion of the appliance.

Detailed description of embodiments of the invention

[0015] Fig 1 is a perspective view of one embodiment of an appliance 1 according to the invention. The appliance can optionally be a refrigerator or a freezer and comprises an outer casing 2 and one or more doors. In this case two doors 3 and 3', which cover a refrigerator compartment and a freezer compartment, respectively. However, it is to be understood that the appliance also may comprise only one door covering e.g. a large refrigerator or a freezer compartment. The appliance is adapted to stand on the floor of a kitchen on its own feet, indicated at 4 in form of adjustable threaded bolts. To allow the appliance to blend in with the rest of the kitchen interior, the appliance is provided with a set back plinth portion 5.

[0016] In fig 2 is illustrated how the appliance is adapted to be mounted into an opening 6 between two cabinets 7 in a kitchen interior. The cabinets 7 are in this case of a type standing on adjustable tubular feet 8. It is to be understood, however, that the cabinets also could be of a type standing e.g. on a box formed setback plinth portion. As is illustrated, the appliance 1 is to be positioned into the opening 6 between the cabinets 7 without being positioned into a separate cabinet. Instead, the appliance has the same width as a standard cabinet and is adapted to be attached to the adjacent cabinets by means of anchoring fittings 9, such as angle bars and the like. Moreover, the appliance 1 is adapted to be covered by front door panels 10, 10', which normally has the same appearance as cabinet doors 11 of the rest of the kitchen interior. The front door panels 10, 10' are attached to the doors 3, 3' of the appliance 1 by means of attachment fittings 12, as is best seen from the perspective view in fig 3, such that the front door panels 10, 10' will be aligned with the cabinet doors 11 of the kitchen interior, as is illustrated in fig 4. Since the doors 3, 3' of the appliance will be positioned somewhat inside in relation to the outer surfaces of the cabinet doors 11, the appliance has to be provided with a special designed hinge 13, as is shown in fig 3, which besides effecting pivoting of the door, at the same time also effects displacement of the door out-

wards such that there is no risk of interference with the cabinets 7 and the cabinet doors 11 during opening of the doors 3, 3'. The hinge 13 also constitutes an anchoring fitting for attachment to the adjacent cabinet. However, the anchoring fittings 9, the attachment fittings 12 and the hinge 13 are well known in the prior art and will therefore not be described in detail herein.

[0017] In figs 5-7 are illustrated, in front views, a few different ways of positioning an appliance, according to the invention, in a kitchen interior. In fig 5 is illustrated the situation corresponding to fig 4, where the appliance 1 is positioned between two tall cabinets 7. To provide a uniform appearance, the cabinet doors 11 and the front door panels 10, 10' are similar, except for the size, provided with the same kind of handles 15 and aligned with each other. Also the set back plinth portions of the cabinets as well as the appliance, are provided with the same kind of plinth panels 16, the only difference being that the plinth panel of the appliance is provided with an air inlet opening 17 for reasons to be explained more in detail below.

[0018] In fig 6 is illustrated an arrangement where an appliance 1 are arranged in an end of a row of tall cabinets 7 in a kitchen interior. Preferably, the side of the appliance is covered by a panel board 18, or the like, having the same appearance as the cabinets.

[0019] Finally, in fig 7 is illustrated an arrangement where two appliances 1 are arranged in an end row of cabinets in a kitchen interior and for this reason the outermost appliance is provided with a panel board 18 on its side surface, as in the arrangement according to fig 6. However, here the cabinets of the kitchen interior, which are connected to the appliance on the other side, are comprised of lower cabinets 19 being provided with a work top 20. Also here, the side of the appliance is covered by a panel board 18, which is utilized for attachment of the lower cabinet and the work top. The arrangements according to figs 6 and 7, where the appliances are not positioned between two tall cabinets, which can support the appliance, but are positioned more free-standing, is facilitated if the appliance in itself is quite rigid and stable. In one embodiment of the invention, the appliance therefore is manufactured with an all-welded outer metal casing, which provides the required rigidity.

[0020] Reference is now made to fig 8, in which an appliance according to the invention is shown in a partly cut perspective view from behind. Since the available depth of the appliance, from the front surface of the doors 3, 3' to a rear wall or the like, is smaller for a built in appliance than for a free-standing appliance, as is mentioned before, the appliance according to the invention lacks any condenser tube system on the rear side, as is common practice for refrigerators and freezers. Instead the appliance is provided with an outer rear panel 22, which preferably is positioned as far back as the available depth permits. To accommodate electrical wiring, the rear panel 22 is provided with vertical recessed cable ducts 23 on each side portion where the rear panel is

connected to each side panel 24. The cable ducts 23 are provided simply by bending the edge portions of the rear panel inwards. From each of the vertical cable ducts 23, laterally extending cable ducts 25 is branching off to central positions of the rear panel 22 for allowing electrical wiring through holes 26 to the inside of the appliance for lighting, sensors or the like. The lateral cable ducts 25 are channel formed. In the upper insulation layer of the appliance, a cable tube 27 extends rearward from a control box 28 on the front side and opens through a hole 29 in the rear panel from which also lateral cable ducts 25 extend to the vertical cable ducts 23.

[0021] Since no condenser tube system is positioned in the back of the appliance, the available depth for the inner refrigerator or freezer compartment will be larger than for a traditional built-in appliance. In fact the available depth is so large that it is possible to use the same inner housings and interior fittings as for a free-standing appliance, despite that the space is limited on the front side since the front door panel has to be aligned with the rest of the cabinet doors in the kitchen interior. The tube system can, instead of being positioned on the rear side of the appliance, be positioned in the upper portion or, as in the illustrated embodiment, in the lower, setback plinth portion of the appliance. As is shown in detail in figs 8 to 10, a very compact and folded condenser tube system 30 is positioned in an inlet passage 31 of the setback plinth portion 5. A fan 32 is positioned in an opening in a partition plate 33 and draws, during operation, an air flow through the air inlet opening 17 in the plinth panel 16, through the condenser tube system 30 and through the hole in the partition plate 33. The air flow is then turned and flows through an outlet passage 34 on one side of the condenser tube system out of the setback plinth portion. The inlet and outlet passages 31 and 34 are separated by a partition wall 35. In the rear part of the setback plinth portion 5 also a compressor 36 is positioned.

Claims

1. An appliance, such as a refrigerator or a freezer, which is adapted for a built-in arrangement into a kitchen interior by positioning into an opening (6) in the kitchen interior, the appliance (1) having a door (3, 3') being adapted to support a front door panel (10, 10') in alignment with other cabinet doors (11) of the kitchen interior, **characterized in that** the appliance (1) has essentially the same width as a standard free-standing appliance and is adapted to be mounted in the opening (6) without any separate cabinet.
2. An appliance according to claim 1, **characterized in that** it has a width being generally equal to the width of the cabinets (7, 19) in the kitchen interior.

3. An appliance according to claim 1 or 2,
characterized in that it is formed with a setback
plinth portion (5) in its lower end to support a plinth
panel (16) in alignment with corresponding plinth
panels of the kitchen interior. 5
4. An appliance according to any of the preceding
claims, **characterized in that** it comprises recessed
cable ducts (23, 25) in an outer surface of a rear
panel (22) to accommodate cables, wires or the like
for electrical wiring. 10
5. An appliance according to claim 4, **characterized
in that** the cable ducts comprises at least one vertical
cable duct (23) along a vertical edge of the rear panel
(22) at the connection to a side panel (24) from which
one or more recessed cable ducts (25) are branching
off to a central portion of the rear panel. 15
6. An appliance according to any of the claims 3-5,
characterized in that a cooling condenser tube sys-
tem (30) is positioned in the setback plinth portion
(5) in the lower end. 20
7. An appliance according to any of the claims 3-6,
characterized in that a compressor (36) is posi-
tioned in the setback plinth portion (5) in the lower
end. 25
8. An appliance according to any of the preceding
claims, **characterized in that** the appliance (1) is
formed with an all-welded metal outer covering. 30
9. A method for mounting of an appliance, such as a
refrigerator or a freezer, in a built-in arrangement
into an opening (6) of a kitchen interior such that the
appliance (1) will be provided with a front door panel
(10, 10') in alignment with other cabinet doors (11)
of the kitchen interior, **characterized by** the steps of: 35

providing an appliance (1), having essentially
the same width as a standard free-standing ap-
pliance, and position the appliance in the open-
ing (6) without placing it into a separate cabinet. 40
10. A method according to claim 9, **characterized by**
the further step of;
providing an appliance (1) being formed with a set-
back plinth portion (5) in a lower end and mounting
a plinth panel (16) in alignment with plinth panels of
the rest of the kitchen interior. 45
11. A method according to claim 9 or 10, **characterized
by** the further step of;
positioning electrical wirings of the appliance (1) into
recessed cable ducts (23, 25) in an outer surface of
a rear panel (22) of the appliance. 50
12. A method according to claim 10 or 11,
characterized by the further step of; providing an
appliance (1) having a cooling condenser tube sys-
tem (30) positioned in the setback plinth portion (5). 55
13. A method according to any of the claims 10-12,
characterized by the further step of; providing an
appliance (1) having a compressor (36) positioned
in the setback plinth portion (5).
14. A method according to any of the claims 9-13,
characterized by the further step of; providing an
appliance (1) having an all-welded outer metal cov-
ering.
15. An appliance according to any of the claims 6-7,
characterized in that the cooling condenser tube
system is positioned in an inlet passage 31.
16. An appliance according to claim 15, **charac terized
in that** the set back plinth portion 5 comprises an
outlet passage 34.
17. An appliance according to any of the claims 1-5,
characterized in that the cooling condenser tube
system is positioned in the upper portion of the ap-
pliance.

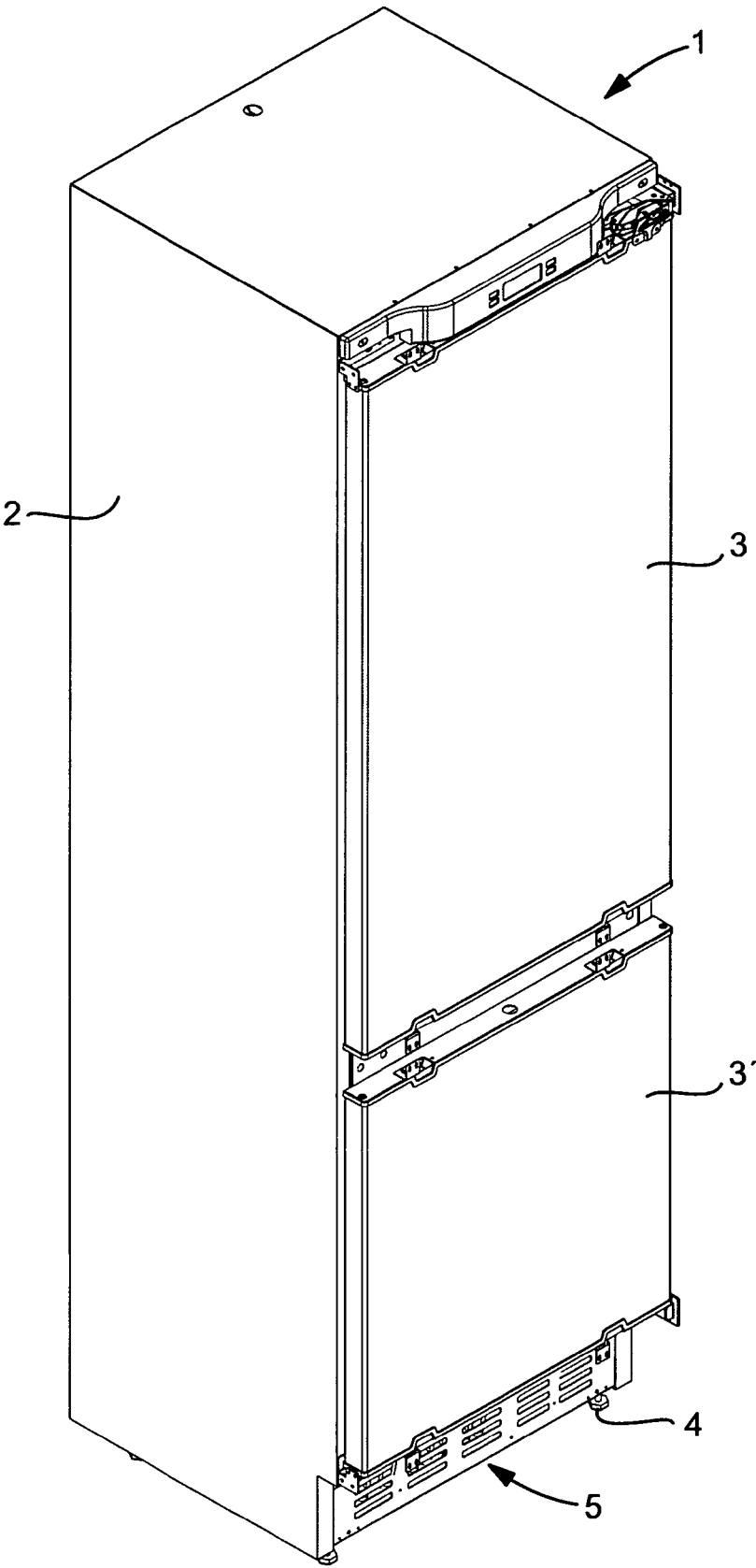
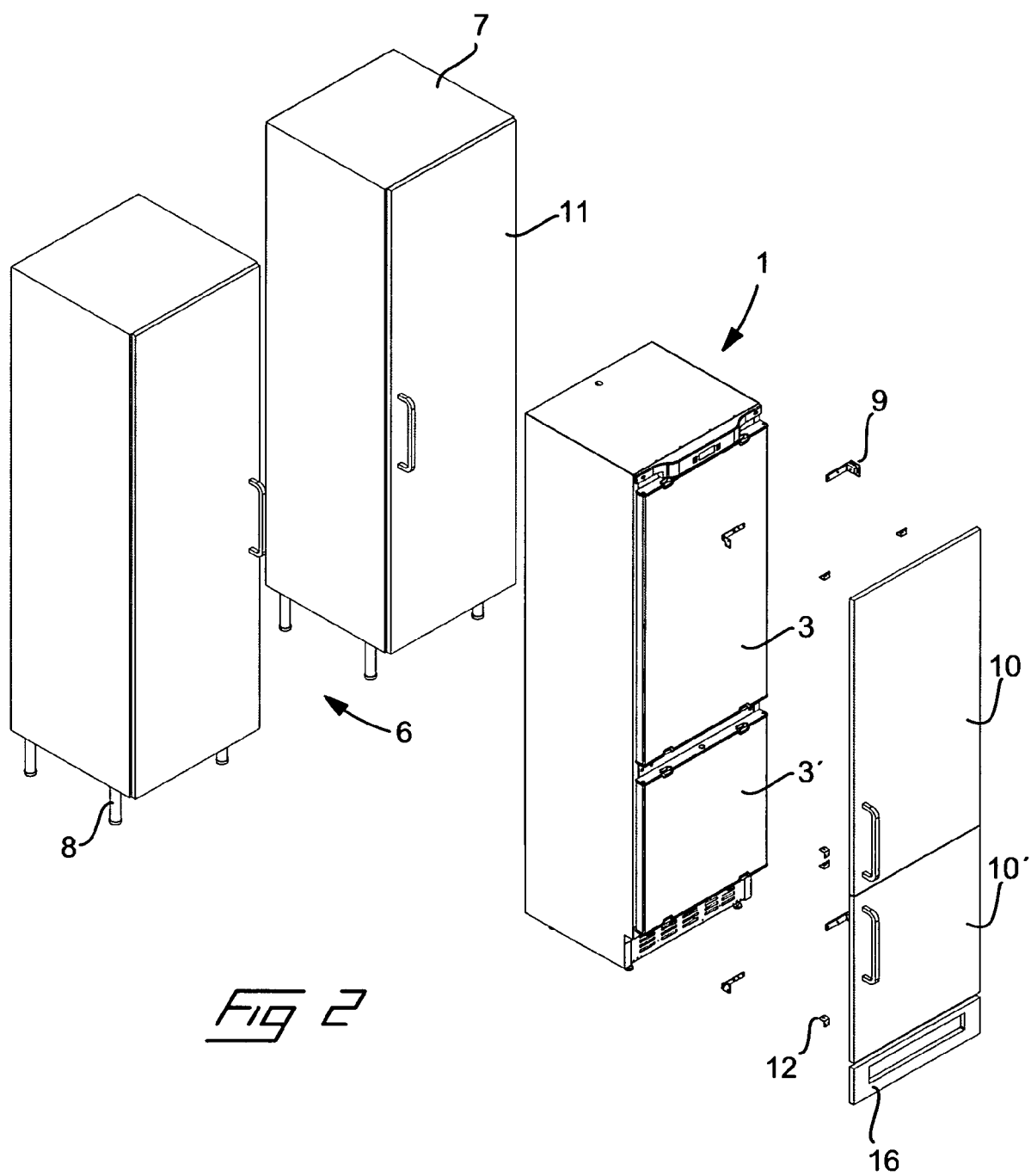


Fig 1



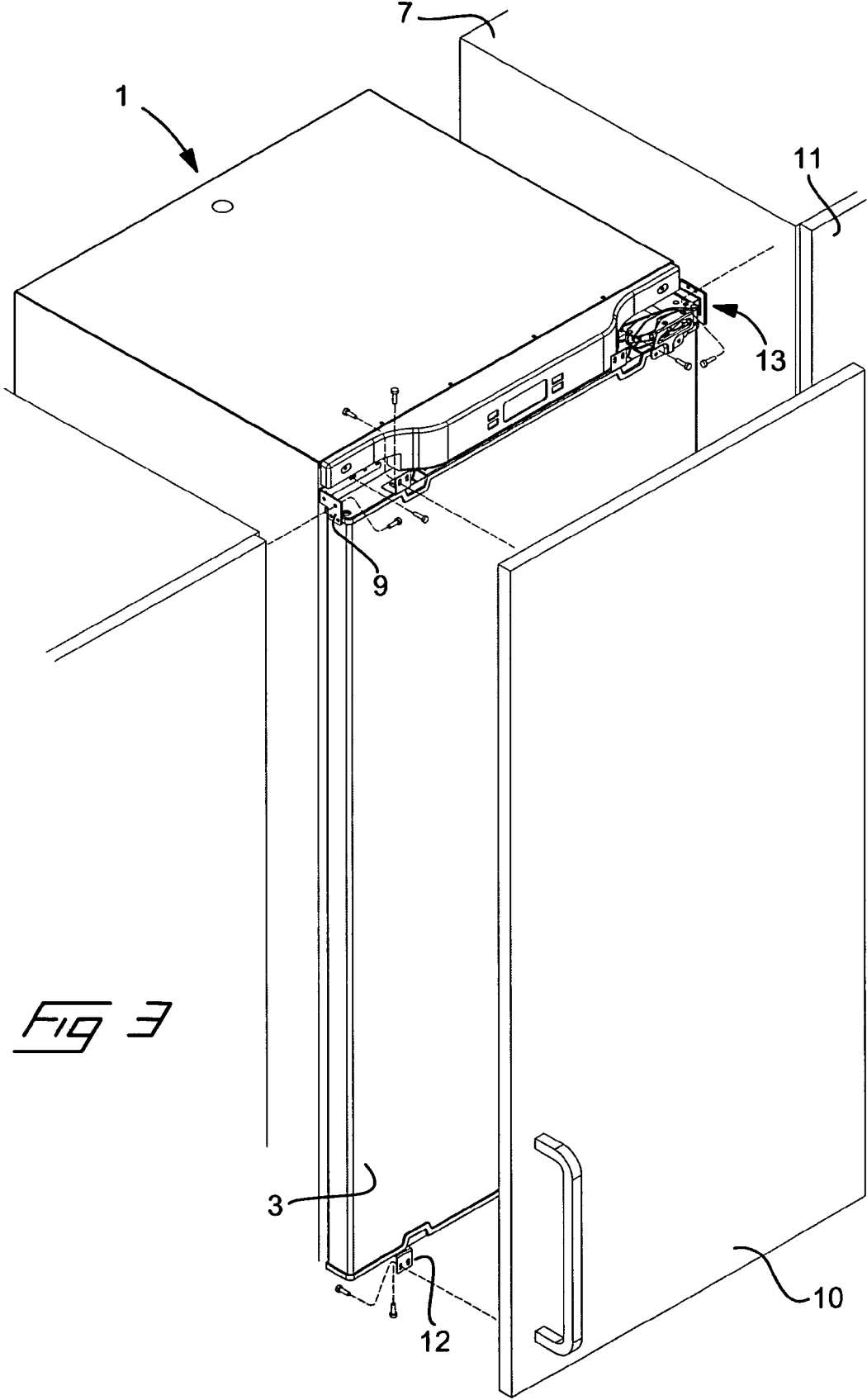


Fig 3

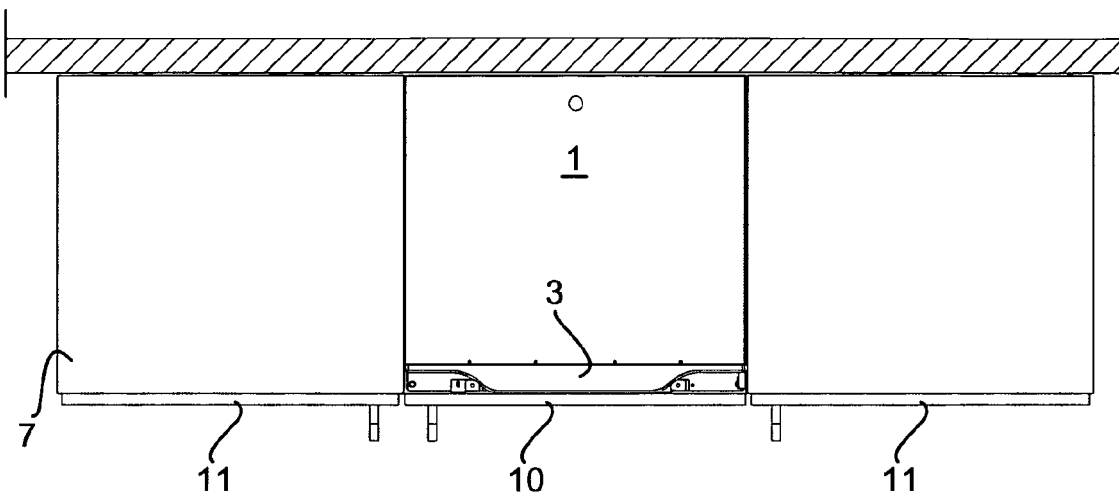


Fig 4

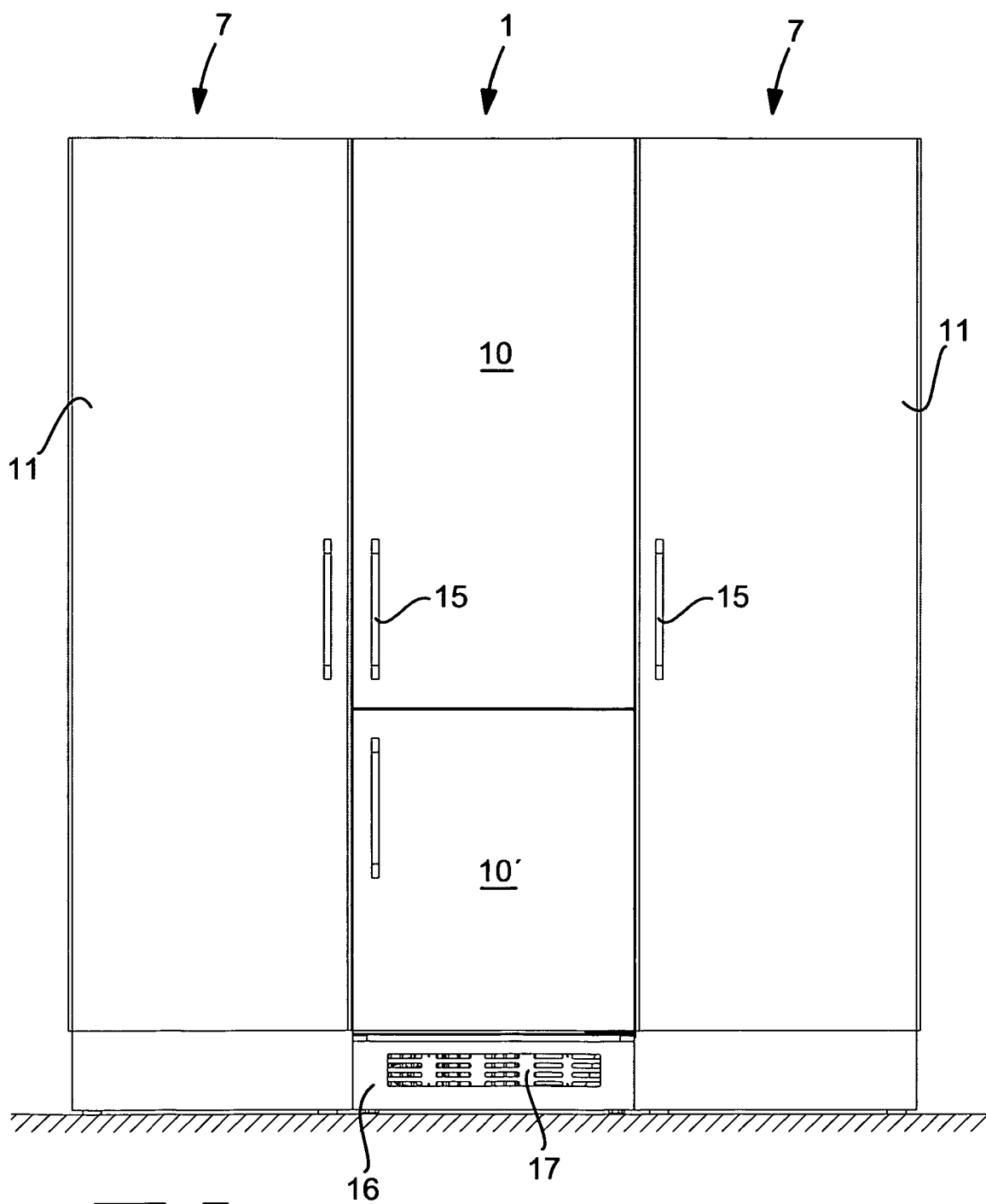


Fig 5

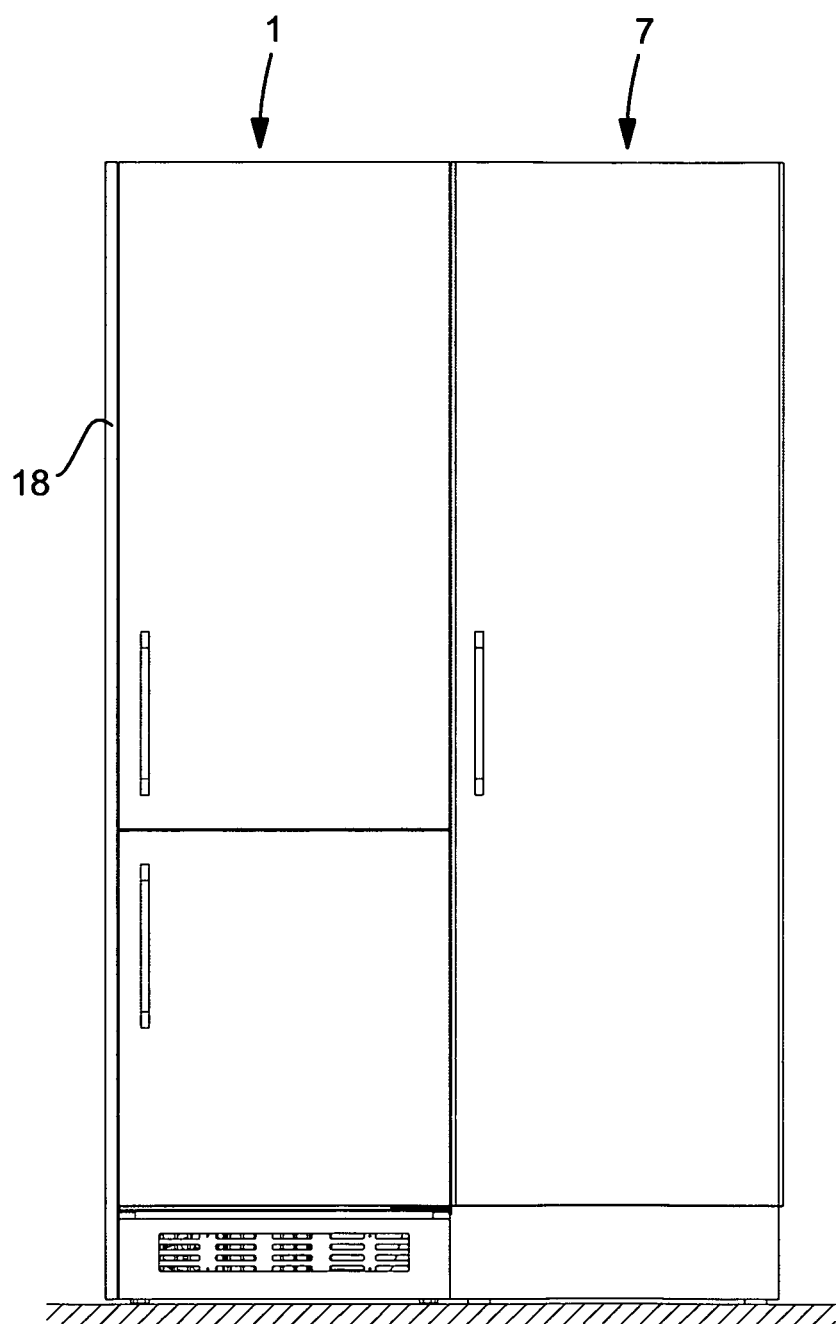


Fig 6

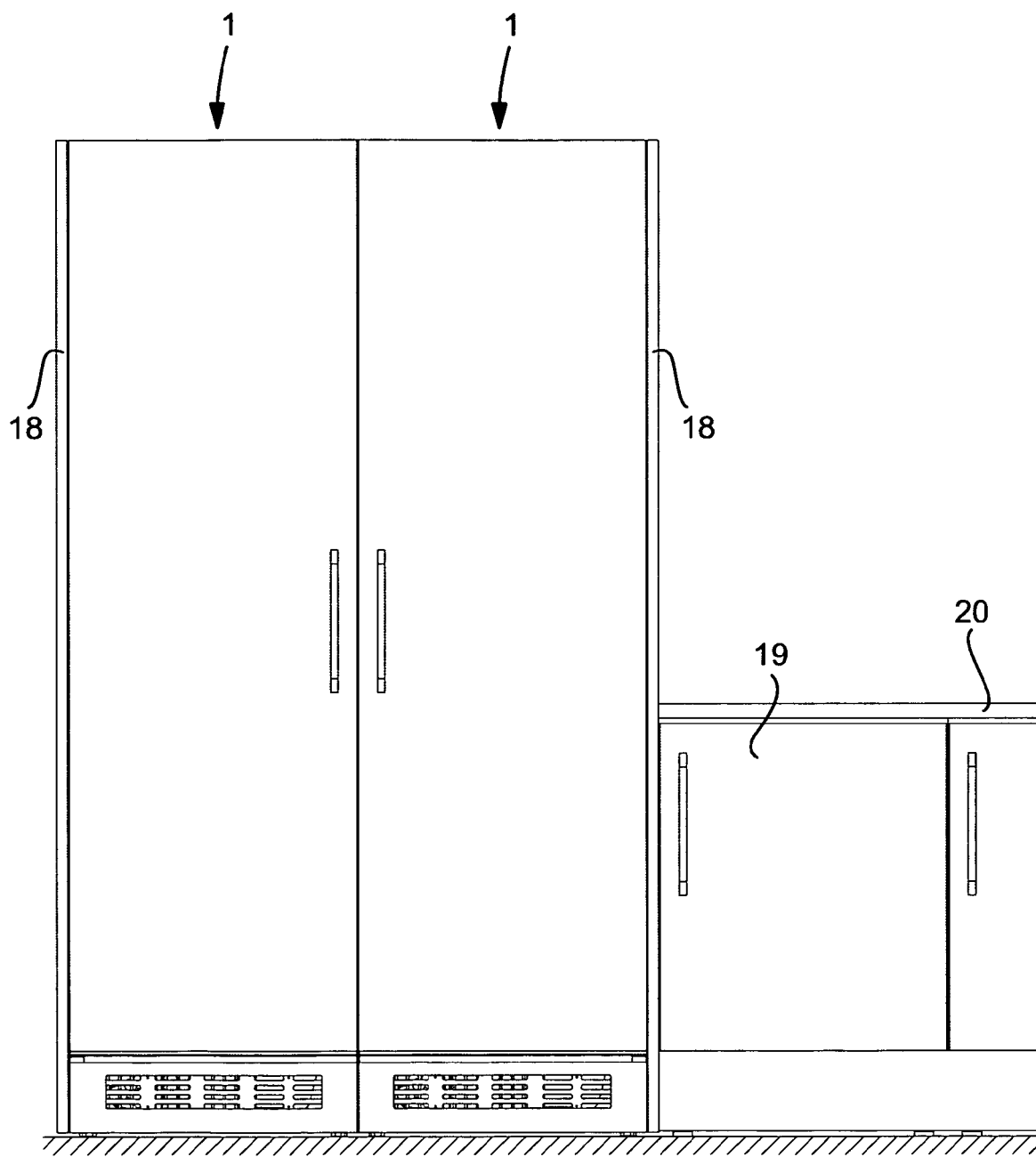
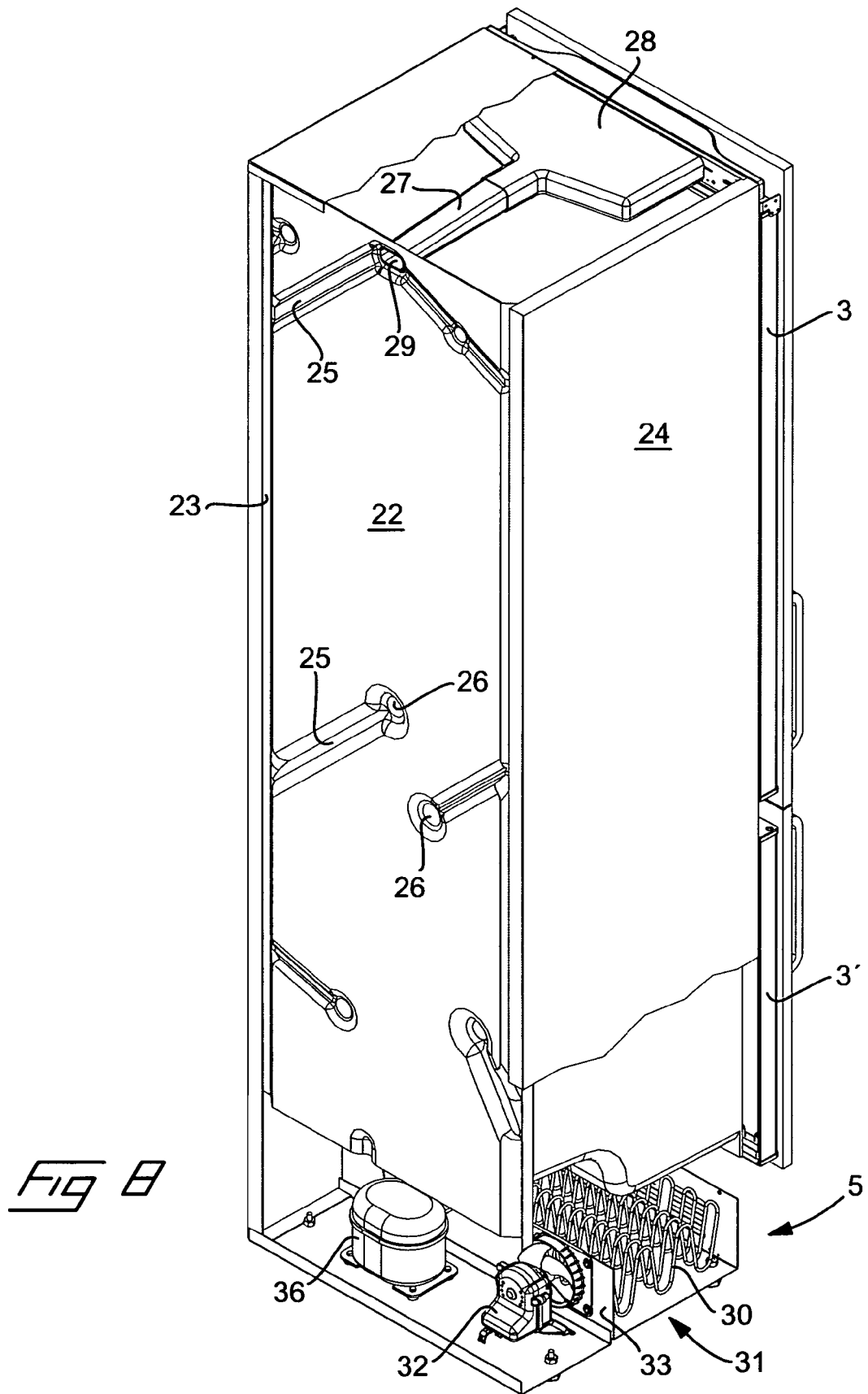
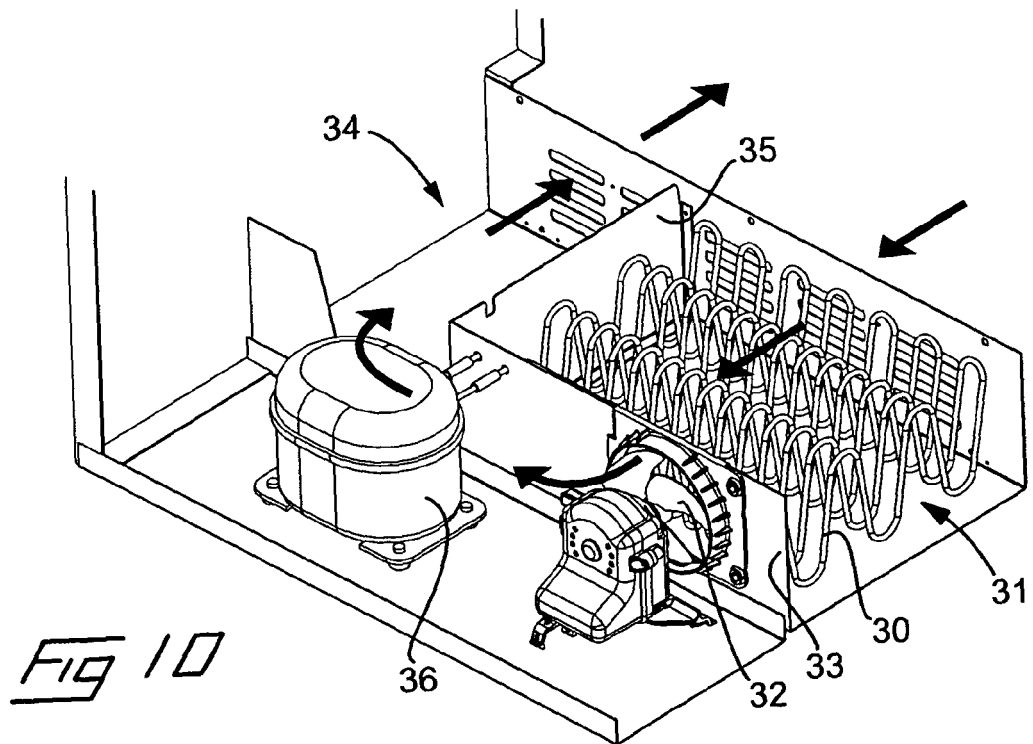
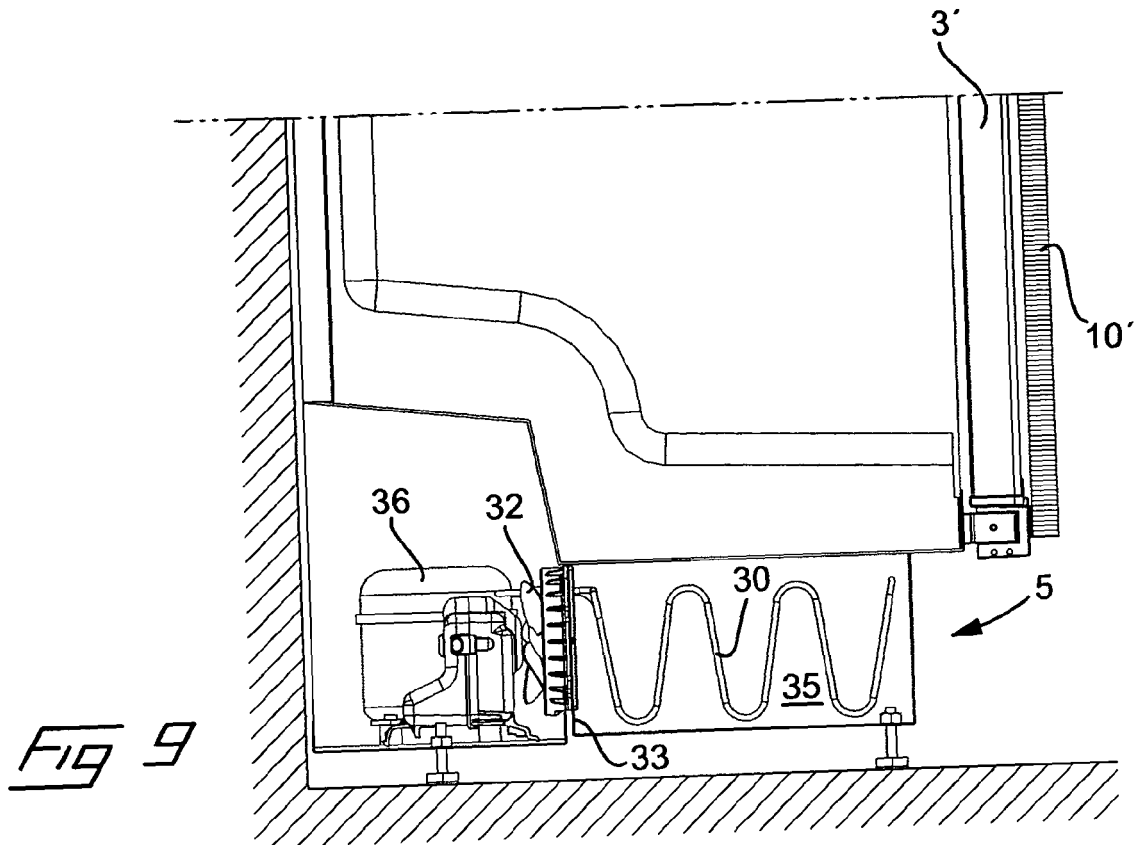


Fig 7







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Application Number
EP 08 00 3847

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 21 May 2008	Examiner Jacquemin, Martin
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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