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(54) Indoor unit for a combined room cooling and heating installation

Innenraumeinheit für die kombinierte Kühlung und Beheizung eines Raums

Unité intérieure pour refroidissement de salle et installation de chauffage combinés

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Description

Field of the invention

[0001] The present invention relates to an indoor unit for a combined room cooling and heating installation. In particular, the indoor unit of the present invention is adapted for use in an installation using a heat pump, particularly an air-source heat pump, that is capable of both heating and cooling a predetermined space (room).

Background of the invention

[0002] As the term already implies the indoor unit of the present invention is to be disposed inside. In addition, if the indoor unit is used in a room cooling installation or in the cooling mode of a combined room cooling and heating installation comprising the indoor unit, the fluid to be used for cooling, which passes the components in the indoor unit, leads to the formation of condensation water on outer surfaces of the various components.

[0003] In order to prevent the condensation water from dripping onto the floor, a main drain pan has been suggested at a lower portion of the indoor unit so as to collect and discharge the condensation water dripping down from the outer surfaces of the components.

[0004] However, with such a main drain pan the problem has been encountered that some outer surfaces on which condensation water drops may be formed which then drip down from said outer surfaces are positioned substantially higher than the main drain pan. Condensation water drops dripping from these outer surfaces from a high position into the main drain pan lead to the major disadvantages of spill water and dripping noises.

[0005] An indoor unit having the features defined in the preamble of claim 1 is known from EP 1 574 789, wherein the component on the outer surface of which condensation water drops are formed has a vertically oriented corrugated surface along which the drops run to a lowest position from which the drops directly drop into the main drain pan.

Summary of the invention

[0006] Hence, the object of the present invention is to provide an indoor unit as discussed in the introductory part being capable of collecting substantially the entire condensation water formed on outer surfaces of components contained in the indoor unit at the same time preventing dripping noises.

[0007] This object is solved by an indoor unit having the features of claim 1 or a combined room cooling and heating installation comprising such an indoor unit.

[0008] The basic idea underlying the present invention is to provide an indoor unit which guides condensation water drops which may be formed on an outer surface of a component within the indoor unit from the outer surface to a position closer to the main drain pan than the

outer surface in order to prevent the drops from the outer surface from dripping from a higher position relative to the main drain pan into the main drain pan.

[0009] The indoor unit of the present invention, which is adapted for a combined room cooling system and heating system and to be connected to a piping for circulating a fluid to be used for cooling, comprises at least one component to be flown through by the fluid. This component has an outer surface on which condensation water drops may be formed. That is, the component has an outer surface on which condensation water accumulates and forms a drop which may then drip down from the outer surface. This outer surface, i.e. the surface from which the condensation water drops drip down from the component, is located at a first position in the vertical direction. At a second position lower than said first position and, hence, below the first position, there is provided a main drain pan for receiving and discharging the condensation water. In order to prevent the condensation water drops formed on the outer surface of the at least one component from dripping down from the first position into the main drain pan at the second position, the present invention comprises at least one condensation water guide extending at least in the vertical direction between the first position and the second position. The condensation water guide is formed to guide condensation water from said outer surface of said component to said main drain pan. That is the condensation water drop may either drop on or be transferred otherwise to the condensation water guide, wherein the distance between the condensation water guide and the outer surface is less than the distance between the outer surface of the component and the main drain pan and then guides the condensation water drop to a position closer to the main drain pan. Particularly, if the indoor unit of the present invention is to be used for the combined room cooling and heating system comprising a heating device, such as a heat pump or air-source heat pump, for heating the fluid, the indoor unit further comprises an expansion vessel. The expansion vessel is a component which compensates volume changes in the system due to for example expansion of the fluid because of temperature increases while heating the fluid. In this embodiment the expansion vessel is oblong and with its longitudinal direction substantially vertically oriented. Therefore, the expansion vessel may be used as the condensation water guide, wherein the outer surface of the expansion vessel serves for the guiding purpose. In this case no additional component or part is to be implemented in the indoor unit but an existing and necessary part is adapted (configured) to provide for the purpose of guiding condensation water from the outer surface of the at least one component to the main drain pan. Therefore, the production efficiency and costs may be reduced.

[0010] Self-evident, the condensation water guide is particularly needed in case the space between the outer surface and the main drain pan is unobstructed so that the condensation water drop may without hitting any of

the other components drip into the main drain pan.

[0011] In order to prevent condensation water drops from dripping onto the condensation water guide thereby producing spilling water and possibly noises, the indoor unit of the present invention preferably comprises at least one sub-drain pan which is arranged between said component and said condensation water guide. This sub-drain pan collects the condensation water drop on said outer surface and guides and transfers the condensation water to the condensation water guide, which then guides the condensation water to a lower position for dripping into the main drain pan.

[0012] According to one particularly preferred embodiment, the indoor unit comprises only one condensation water guide but a plurality of components each having an outer surface from which condensation water drops drip down. Hence, only one additional component is required to guide the condensation water from the outer surfaces to a position closer to the main drain pan.

[0013] In this embodiment the expansion vessel preferably has a parallelepiped basic shape. This particularly leads to the advantage, that the sub-drain pans may easily approach the outer surface of the expansion vessel to deliver (transfer) the condensation water to the outer surfaces of the expansion vessel to be guided to the main drain pan.

[0014] Furthermore, there may exist the problem that a fluid inlet and a fluid outlet of the indoor unit which are to be connected to the piping of the room cooling installation or the combined room cooling and heating installation pass by the main drain pan. Although the inlet and the outlet are surrounded by an insulation the problem may occur that condensation water runs along the outer surface of the inlet and the outlet or the insulation, thereby passing by the main drain pan and then dripping on the floor. In order to prevent the condensation water from passing by the main drain pan, the present invention preferably implements an insulation which is at least partially located at a third position higher than the second position and, hence, above the main drain pan, wherein this portion comprises a drip down lip, which forces the condensation water to drip down from the lip (insulation) into the main drain pan.

[0015] Preferably and from the view point of producibility, the drip down lip is formed by an annular rim at the periphery of an outer edge of the insulation. As insulations are usually formed in a mold such a rim may easily be added to the existing insulations without the need of high investments.

[0016] In addition, there may exist the problem that components in the indoor unit located downstream of the heat exchanger which extracts the heat from the fluid to be used for cooling and which are located close to an outer cover of the indoor unit may lead to a decreasing temperature of the outer cover in this portion. This decrease in temperature of the outer cover may as well lead to the formation of condensation water on the outer cover, which is detrimental from the view point of the outer ap-

pearance and may also lead to condensation water dripping down onto the floor. In order to prevent this formation of condensation water on the outer cover, the present invention preferably comprises a main housing (outer cover) and accommodates the aforesaid components, e.g. in the proximity of an outlet of the fluid from the indoor unit, in an insulating sub-housing located inside the main housing. This sub-housing prevents the outer cover from adopting a low temperature and, therefore, eliminates the formation of condensation water in this portion of the main housing.

[0017] The indoor unit of the present invention may be implemented in a combined room cooling and heating system comprising a piping for circulating the fluid the indoor unit being connected to the piping.

[0018] Preferably, the combined room cooling and heating system comprises a heat pump, preferably an air-source heat pump, having an outer evaporator, a condenser, a conductor forming a heat exchanger and an expansion means connected by refrigerant piping in a cycle. The heat exchanger (condenser) is located in the indoor unit of the present invention as well as a portion of the refrigerant piping. In this context, it is to be mentioned that depending on the cooling or heating mode the outdoor evaporator functions as an evaporator (heating mode) or as a condenser (cooling mode) and the condenser in the indoor unit acts as a condenser (heating mode) or an evaporator (cooling mode).

Brief description of the drawings

[0019] Additional features and advantages of the present invention will become apparent from the following description of a preferred embodiment with reference to the accompanying drawings in which:

Fig. 1 is a perspective view of a room heating and cooling system in which the present invention may be implemented;

Fig. 2 is a system diagram for schematically explaining the components of the installation shown in Fig. 1;

Fig. 3 is a perspective view of an indoor unit according to an embodiment of the present invention the main housing being removed;

Fig. 3A is an enlarged view of the portion A of Fig. 3;

Fig. 3B is an enlarged view of the portion B of Fig. 3;

Fig. 4 is a perspective side view of the indoor unit shown in Fig. 3;

Fig. 5 is an enlarged view of the insulation surrounding the inlet and the outlet of the fluid to be used for cooling for explaining the drip down lip of the insulation;

Fig. 6 is a partial perspective of the indoor unit shown in Fig. 3 for explaining the sub-housing.

Preferred embodiment of the invention

[0020] The present application will be described in the following as being implemented in a system which is capable of heating and cooling a predetermined space (room) and heating water in a hot water tank, the water via piping 50 being used for sanitary purposes like the tabs 52, the shower 51, etc. Yet it is to be understood that the present invention may also be implemented in other systems than the one shown in Figs. 1 and 2, where appropriate.

[0021] The installation shown in Fig. 1 consists of three major components, an outdoor unit 10, an indoor unit 20 and a hot water tank 30. The outdoor unit 10 is connected to a piping 11, 12 which connects the outdoor unit 10 to the indoor unit 20. The outdoor unit 10 comprises an inlet/outlet 12 and an outlet/inlet 11 for a refrigerant piping. The indoor unit 20 comprises an inlet/outlet 24 and an outlet/inlet 23 for the refrigerant piping. In addition, the indoor unit has an outlet 21 and an inlet 22 for the fluid to be circulated in the fluid circuit (depending on the mode the fluid is heating or cooling fluid). The fluid may be water or a brine solution. The piping downstream of the outlet 21 is connected via a valve 32 to a piping 31 and a piping 35. The piping 31 passes through the interior of the hot water tank 30 in form of a coil (see Fig. 1) and leaves the hot water tank 30 via a piping 34 connected to a piping 36 leading to the inlet 22. The piping 35 downstream of the valve 32 leads to a heat emitter 41 and/or underfloor heating loops 40 and then is refed to the indoor unit via the piping 36 and the inlet 22.

[0022] As will be appreciated, the connections 11, 12 to the outdoor unit 10 and the connections 23, 24 to the indoor unit may respectively be reversed depending on the mode in which the system is operated, i.e. the heating mode or the cooling mode.

[0023] As shown in Fig. 2 the outdoor unit comprises an evaporator and/or condenser 14, a four-way valve 16, a compressor 15 and an expansion device 13, which may be an electric valve or a capillary. The indoor unit 20 inter alia comprises a condenser/evaporator 25. These components form a heat pump. Hence, the evaporator/condenser 14, the compressor 15, the condenser/evaporator 25 and the expansion means 13 are connected in this order in a cycle or loop by means of a refrigerant piping 17, 18. A refrigerant is circulated by means of the compressor 15 in the refrigerant piping 17, 18. In the heating mode the refrigerant circulates clockwise in Fig. 2. Hence, the refrigerant leaving the condenser 25 and having a first temperature T_1 upstream of the expansion means 13 passes the expansion means 13, the pressure being reduced. Afterwards, the refrigerant passes the evaporator 14 and is evaporated. After leaving the evaporator 14, the refrigerant passes through the compressor, the pressure being increased. The refrigerant is at a sec-

ond temperature T_2 at this point, which is greater than the first temperature T_1 . Finally, the refrigerant is again condensed to the first temperature T_1 in the condenser 25, wherein the heat from the refrigerant is transferred to the water or brine solution (fluid) in the piping connected to the indoor unit via the connections (inlet 22 and outlet 21).

[0024] In the cooling mode, this process is reversed, wherein the component 14 then serves as condenser and the component 25 as evaporator. The refrigerant then circulates counter-clockwise in Fig. 2.

[0025] The indoor unit 20 further comprises a pump 27 and a backup heater 26. The pump serves for circulating the fluid (heating or cooling fluid) in the fluid circuit (21, 31, 34, 35, 36, 22). The purpose of the backup heater 26 is to cope with situations in which the heat pump described above is not capable to satisfy the entire heating demand (at very low temperatures, e.g. below -10°C). This backup heater 26 in some cases may also be omitted.

[0026] In the heating mode the fluid (heating fluid) enters the indoor unit 20 through the inlet 22, passes the condenser 25, wherein heat is transferred from the refrigerant to the fluid, then flows through the backup heater 26 in which the fluid may be additionally heated if necessary and subsequently passes the pump 27 which circulates the fluid in the fluid circuit. Afterwards and by controlling the valve 32 the fluid is either supplied to the floor heating loops 40 and the heat emitter 41 (see Fig. 1) or alternatively to the hot water tank piping (31, 34). In the latter case, the fluid may enter the hot water tank 30 by means of the piping 31 passing the heating coil inside the hot water tank 30 thereby transferring the heat from the fluid to the water contained in the hot water tank 30 and subsequently being refed to the circuit by the pipings 34 and 36 finally being reintroduced into the indoor unit via the inlet 22. Similar, the fluid may also be supplied to the floor heating loops 40 as a heat emitter or the radiator 41 shown in Fig. 1 and subsequently be reintroduced in to the indoor unit via the inlet 22. In case the temperature of the fluid is not sufficient to heat the hot water in the hot water tank an additional (booster) heater 33 may be provided in the hot water tank.

[0027] As previously mentioned, the circulation of the fluid in the cooling mode is the same but the cycle of the heat pump (flow direction of the refrigerant) is reversed.

[0028] Referring now to Figs. 3 to 3B the various components of the indoor unit will be described.

[0029] Contrary to the installation diagram in Fig. 2 the flow through the indoor unit shown in Fig. 3 is different. In Fig. 2 the heat exchanger 25 (condenser/evaporator), the pump 27 and the back-up heater 26 are arranged in the circulation piping in this order. In the indoor unit in Fig. 3, in contrast, the heat exchanger 25 is located upstream of the back-up heater 26 and the back-up heater 26 is located upstream of the pump 27.

[0030] Hence, in the cooling mode, the fluid to be used for cooling enters with a first temperature T_{1F} the inlet 22, enters the heat exchanger 25, which in the cooling

mode acts as the evaporator of the heat pump, wherein heat is extracted or transferred from the fluid to the refrigerant in the refrigerant piping of the heat pump. The fluid then leaves the heat exchanger 25 at a temperature T_{2F} lower than T_{1F} passes the back-up heater 26 without any temperature change and leaves the indoor unit 20 via the pump 27 through the outlet 21. In the heating mode the fluid to be used for heating enters the indoor unit 20 via the inlet 22 having a first temperature T_{1F} enters the heat exchanger 25, wherein the fluid is heated to a temperature T_{2F} . In other words the heat exchanger 25 acts as a condenser of the heat pump in that heat is transferred from the refrigerant in the heat pump piping to the fluid, which in the heating mode is to be used for heating. This fluid enters the back-up heater 26 and, in case additional temperature increase of the fluid is required, is additionally heated to a temperature T_{3F} by the back-up heater 26. Afterwards, the heated fluid leaves the indoor unit via the pump 27 through the outlet 21.

[0031] The system further comprises an expansion vessel 104 which is connected to the back-up heater 26 in fluid communication so as to compensate for volume changes of the fluid to be used for cooling/heating in the installation. This expansion vessel 104 is parallelepiped having two opposing and substantially plane outer surfaces without recesses and protuberances and four smaller surface sides. In other words, the expansion vessel 104 is formed rectangular having an oblong shape. The longitudinal extension of the expansion vessel 104, i.e. the longest dimension, is oriented substantially vertical in the indoor unit 20. Furthermore, the expansion vessel 104 is located centrally, although not necessarily in the center.

[0032] At the bottom portion of the indoor unit 20, there is provided a main drain pan 100 which in regard of its dimension almost closes the bottom portion of the indoor unit with the exception of the inlet 23 and the outlet 21 passing by the main drain pan 100 (see particular Fig. 4). This main drain pan 100 comprises a drain pipe 101 which is connected to the waste-water system and used for discharging the condensation water collected in the main drain pan 100. The main drain pan 100, as previously mentioned, is located at the bottom portion of the indoor unit 20 which portion is referred to as the second position in the vertical direction of the indoor unit.

[0033] In the present embodiment, mainly two outer surfaces at which condensation water drops are formed at a relatively high position relative to the main drain pan 100, the space in between the outer surface and the main drain pan being substantially unobstructed, are formed. The first surface 106 is located at a lower portion in the vertical direction of the connection of the piping with the inlet of the back-up heater 26. At said outer surface, there is provided a sub-drain pan 103 which is formed by a metal sheet which is bent to form an open channel and which is inclined relative to the horizontal toward the opposing outer surfaces 105 of the expansion vessel 104. This sub-drain pan 103 with its guiding surface approach-

es the outer surface 105 of the expansion vessel 104 and the distance between the edge of the sub-drain pan 103 and the outer surface 105 of the expansion vessel 104 is configured so that no drops of condensation water may drop down from the edge of the sub-drain pan 103 but are transferred from the sub-drain pan 103, i.e. its guiding surface, to the outer surface 105 of the expansion vessel 104.

[0034] An additional outer surface 107 on which condensation water drops are formed is the lower portion of the pump as well as the lower portions of the connection of the piping to the pump. Therefore, an additional sub-drain pan 102 is disposed below the pump 27 surrounding the lower pipe connecting to the pump. This sub-drain pan 102 is formed similar to the sub-drain pan 103 but in this instance is formed from an insulating material, preferably expanded polystyrol (EPS). The sub-drain pan 103, hence, serves for additionally insulating cool components relative to the main housing (not shown) (see below for more details). Similar, also the main drain pipe 100 is formed from such a material. The surfaces 106 and 107 from which the condensation water drops drip down are the surfaces on which condensation water drops are formed and which are referred to as the first positions. The sub-drain pans 103 and 102 are located below these first positions and referred to as third positions.

[0035] The sub-drain pans 102, 103 as well as the positioning relative to the expansion vessels outer surfaces 105 are more closely shown in Fig. 3A and 3B.

[0036] The outer surfaces 105 of the expansion vessel 104, therefore, serve as condensation water guide to guide the condensation water formed on the surfaces 106, 107 from the high position (first position) to a position closer to the main drain pan 100 (second position). In other words, the condensation water drops down from the outer surfaces 106, 107 onto the guiding surfaces of the sub-drain pans 103 and 102. These guiding surfaces are inclined towards the corresponding outer surfaces 105 of the expansion vessel 105 as previously described. Therefore, the condensation water runs upon the guiding surface of the sub-main drain pans 102, 103 and is transferred from these guiding surfaces to the outer surfaces 105 of the expansion vessel 104. The condensation water then is guided by (flows along) the outer surfaces 105 as condensation water guides from the sub-drain pans 102, 103 to the lower portion of the expansion vessel 104 and drops from this lower position (fourth position) into the main drain pan 100. The distance between the lower surface of the expansion vessel 104 (fourth position) and the main drain pan 100 (second position), however, is much less than the distance between the second position and the first position so that spilling water and dripping noises are prevented.

[0037] Furthermore and as shown in the bottom portion of Figs. 3 and 4 both the inlet 22 and the outlet 21 are surrounded by an insulating 108 in the portion reaching from above the main drain pan 100 to the portion passing

by the main drain pan 100 (see particular Fig. 4). This insulation 108 at its edge, which is located above the main drain pan 100 (fourth position higher than second position), is provided with an annular rim 109, which on the side facing the piping located above the main drain pipe 100, i.e. right side in Fig. 5, has a sharp edge. Accordingly, this annular rim 109 serves as a drip down lip which forces the condensation water 110 running along the outer surface of the piping to drip down from the sharp edge (drip down lip) into the main drain pan 100.

[0038] In addition, the components (the piping) leading from the pump 27 to the outlet 21 are arranged close to the main housing (outer cover) which is not shown for clarity reasons. These components in the cooling mode are under the coolest components being located immediately (within the indoor unit) downstream of the heat exchanger 25. Therefore, in order to prevent the temperature of the main housing from decreasing resulting in the formation of condensation water on the outside of the main housing, there is provided an additional sub-housing 111 made from an insulating material, e.g. EPS, surrounding these components and insulating these components relative to the main housing. This sub-housing 111 is shown in Fig. 6.

[0039] Although the present invention has been described with respect to a particular embodiment and particularly with respect to the implementation in a combined cooling and heating system, the skilled person will appreciate that the basic concept of the present invention may also be implemented in systems only capable of cooling. Similarly, it is not necessary to alter the shape of the expansion vessel 104 to form the condensation water guide but a separate condensation water guide may be provided in the indoor unit instead of or in addition to the expansion vessel 104.

Claims

1. Indoor unit (20) for a combined room cooling and heating system comprising a heating device (13-16) for heating the fluid and to be connected to a piping for circulating a fluid to be used for cooling, the indoor unit comprising:

at least one component to be flown through by the fluid, said component having an outer surface (106, 107) on which condensation water drops may be formed and from which they drip down and which is located at a first position in the vertical direction;

a main drain pan (100) located at a second position lower than said first position in the vertical direction for receiving and discharging the condensation water; and

at least one condensation water guide (105) extending at least in the vertical direction between the first position and the second position and

being formed so that the condensation water drops are transferred from the outer surface of said component to the condensation water guide and that the condensation water drops are guided from the outer surface (106, 107) of said component to said main drain pan (100), **characterized by** an expansion vessel (104) being oblong and with its longitudinal direction oriented substantially vertically, said condensation water guide (105) being formed by an outer surface of the expansion vessel.

2. Indoor unit as set forth in claim 1, wherein the space between the outer surface and the main drain pan (100) is unobstructed.
3. Indoor unit as set forth in claim 1 or 2, wherein a sub drain pan (102, 103) is arranged between said component and said condensation water guide (105) to guide condensation water, which may be formed on the outer surface (106, 107) of said component, to said condensation water guide.
4. Indoor unit as set forth in any one of the preceding claims, wherein a plurality of components, each having an outer surface (105, 106), and only one condensation water guide (105) are provided.
5. Indoor unit as set forth in any one of the preceding claims, wherein the expansion vessel (104) has a parallelepiped basic shape.
6. Indoor unit as set forth in any one of the preceding claims, wherein the piping is to be connected to a fluid inlet (22) and a fluid outlet (21) of the indoor unit, the inlet (22) and the outlet (21) passing by the main drain pan (100) and being surrounded by an insulation (108), wherein the insulation is at least partly located at third position, higher than the second position and above the main drain pan (100) and comprises a drip down lip.
7. Indoor unit as set forth in claim 6, wherein the drip down lip is formed by an annular rim (109) at the periphery of an outer edge of the insulation (108).
8. Indoor unit as set forth in any one of the preceding claims, further comprising a main housing, wherein components downstream of a heat exchanger (25) of the installation and located in the proximity of the main housing, preferably of an outlet (21) of the fluid are housed in an insulating sub-housing (111) located inside the main housing.
9. Combined room cooling and heating system comprising a piping for circulation the fluid and an indoor unit (20) according to any one of claims 1 to 8 and connected to said piping.

10. Combined room cooling and heating system as set forth in claim 9, further comprising a heat pump having an outdoor evaporator (14), a compressor (5), a condenser (25) forming a heat exchanger and an expansion means (13) connected by refrigerant piping in a cycle, the indoor unit (20) comprising the heat exchanger (25) and a portion of the piping.

Patentansprüche

1. Innenraumeinheit (20) für ein kombiniertes Raumkühl- und Erwärmungssystem mit einer Erwärmungseinrichtung (13-16), mit der das Fluid erwärmt wird, und die mit einer Leitung zum Zirkulieren eines zum Kühlen verwendeten Fluids verbunden ist, wobei die Innenraumeinheit aufweist:

zumindest eine Komponente, die durch das Fluid durchströmt wird, wobei die Komponente eine Außenfläche (106, 107) aufweist, an der Kondensationswassertropfen ausgebildet werden können und von der sie nach unten tropfen, und die an einer ersten Position in der vertikalen Richtung gelegen ist,

eine Haupttropfwanne (100), die an einer zweiten Position, die in der vertikalen Richtung niedriger ist als die erste Position, gelegen ist, zum Empfangen und Ausstoßen des Kondensationswassers, und

zumindest eine Kondensationswasserführung (105), die sich zumindest in der vertikalen Richtung zwischen der ersten Position und der zweiten Position erstreckt, und die derart ausgebildet ist, dass die Kondensationswassertropfen von der Außenfläche der Komponente zur Kondensationswasserführung übertragen werden, und dass die Kondensationswassertropfen von der Außenfläche (106, 107) der Komponente zur Haupttropfwanne (100) geführt werden, **dadurch gekennzeichnet, dass** ein Expansionsbehälter (104) länglich ist und mit seiner Längsrichtung im Wesentlichen vertikal orientiert ist, wobei die Kondensationswasserführung (105) durch eine Außenfläche des Expansionsbehälters ausgebildet wird.

2. Innenraumeinheit gemäß Anspruch 1, bei der der Bereich zwischen der Außenfläche und der Haupttropfwanne (100) unversperrt ist.
3. Innenraumeinheit gemäß Anspruch 1 oder 2, bei der eine Untertropfwanne (102, 103) zwischen der Komponente und der Kondensationswasserführung (105) angeordnet ist, um Kondensationswasser, das an der Außenfläche (106, 107) der Komponente ausgebildet sein kann, zur Kondensationswasserführung zu führen.

4. Innenraumeinheit gemäß einem der vorangegangenen Ansprüche, bei der eine Vielzahl von Komponenten, von denen jede eine Außenfläche (105, 106) aufweist, und lediglich eine Kondensationswasserführung (105) vorgesehen sind.

5. Innenraumeinheit gemäß einem der vorangegangenen Ansprüche, bei der der Expansionsbehälter (104) eine Parallelepiped-Basisgestalt aufweist.

6. Innenraumeinheit gemäß einem der vorangegangenen Ansprüche, bei der die Leitung mit einem Fluideinlass (22) und einem Fluidauslass (21) der Innenraumeinheit zu verbinden ist, wobei der Einlass (22) und der Auslass (21) neben der Haupttropfwanne (100) verlaufen und durch eine Isolation (108) umgeben sind, wobei die Isolation zumindest teilweise an einer dritten Position gelegen ist, die höher ist als die zweite Position und oberhalb der Haupttropfwanne (100), und eine Herabtropfflippe aufweist.

7. Innenraumeinheit gemäß Anspruch 6, bei der die Herabtropfflippe durch einen ringförmigen Grat (109) am Umfang der Außenkante der Isolation (108) ausgebildet ist.

8. Innenraumeinheit gemäß einem der vorangegangenen Ansprüche, ferner aufweisend: ein Hauptgehäuse, bei dem Komponenten, die stromabwärts eines Wärmetauschers (25) der Installation befindlich sind und in der Nähe des Hauptgehäuses, bevorzugt eines Auslasses (21) des Fluids, gelegen sind, in einem innerhalb des Hauptgehäuses gelegenen, isolierenden Untergehäuse (11) aufgenommen sind.

9. Kombiniertes Raumkühl- und Erwärmungssystem mit einer Leitung zum Zirkulieren des Fluids und einer Innenraumeinheit (20) gemäß einem der Ansprüche 1 bis 8, und mit der Leitung verbunden.

10. Kombiniertes Raumkühl- und Erwärmungssystem gemäß Anspruch 9, ferner aufweisend: eine Wärmepumpe mit einem Außenverdampfer (14), einem Verdichter (5), einem Kondensator (25), die einen Wärmetauscher ausbilden, und einem Expansionsmittel (13), die durch eine Kühlmittelleitung in einem Zyklus verbunden sind, wobei die Innenraumeinheit (20) den Wärmetauscher (25) und einen Abschnitt der Leitung aufweist.

Revendications

1. Unité intérieure (20) pour un système combiné de chauffage et de refroidissement d'une salle comprenant un dispositif de chauffage (13-16) pour le chauffage du fluide et à raccorder à une canalisation pour la circulation d'un fluide à utiliser pour le refroidisse-

ment, l'unité intérieure comprenant :

- au moins un composant qui est parcouru par le fluide, ledit composant ayant une surface extérieure (106, 107) sur laquelle des gouttes d'eau de condensation peuvent se former et depuis laquelle elles tombent et qui est localisée au niveau d'une première position dans la direction verticale ;
- un bac de récupération principal (100) localisé au niveau d'une deuxième position inférieure à ladite première position dans la direction verticale pour recevoir et évacuer l'eau de condensation ; et
- au moins un guide d'eau de condensation (105) s'étendant au moins dans la direction verticale entre la première position et la deuxième position et étant formé de sorte que les gouttes d'eau de condensation soient transférées de la surface extérieure dudit composant au guide d'eau de condensation et que les gouttes d'eau de condensation soient guidées de la surface extérieure (106, 107) dudit composant audit bac de récupération principal (100), **caractérisé par** un vase d'expansion (104) allongé et dont la direction longitudinale est orientée sensiblement verticalement, ledit guide d'eau de condensation (105) étant formé par une surface extérieure du vase d'expansion.
2. Unité intérieure telle que revendiquée dans la revendication 1, dans laquelle l'espace entre la surface extérieure et le bac de récupération principal (100) est dégagé.
 3. Unité intérieure telle que revendiquée dans la revendication 1 ou 2, dans laquelle un bac de récupération auxiliaire (102, 103) est agencé entre ledit composant et ledit guide d'eau de condensation (105) pour guider l'eau de condensation, qui peut se former sur la surface extérieure (106, 107) dudit composant, audit guide d'eau de condensation.
 4. Unité intérieure telle que revendiquée dans l'une quelconque des revendications précédentes, dans laquelle une pluralité de composants, chacun ayant une surface extérieure (105, 106), et un seul guide d'eau de condensation (105) sont prévus.
 5. Unité intérieure telle que revendiquée dans l'une quelconque des revendications précédentes, dans laquelle le vase d'expansion (104) a une forme de base parallélogrammique.
 6. Unité intérieure telle que revendiquée dans l'une quelconque des revendications précédentes, dans laquelle la canalisation doit être raccordée à une entrée de fluide (22) et une sortie de fluide (21) de l'unité

intérieure, l'entrée (22) et la sortie (21) passant par le bac de récupération principal (100) et étant entourées par une isolation (108), où l'isolation est au moins localisée en partie au niveau d'une troisième position, plus élevée que la deuxième position et au dessus du bac de récupération principal (100) et comprend un rebord d'égouttage.

7. Unité intérieure telle que revendiquée dans la revendication 6, dans laquelle le rebord d'égouttage est formé par un bord annulaire (109) à la périphérie d'une bordure extérieure de l'isolation (108).
8. Unité intérieure telle que revendiquée dans l'une quelconque des revendications précédentes, comprenant en outre un boîtier principal, où des composants en aval d'un échangeur de chaleur (25) de l'installation et situés à proximité du boîtier principal, de préférence d'une sortie (21) du fluide sont logés dans un boîtier d'isolation auxiliaire (11) situé dans le boîtier principal.
9. Système combiné de chauffage et de refroidissement de salle comprenant une canalisation pour la circulation du fluide et une unité intérieure (20) selon l'une quelconque des revendications 1 à 8 et raccordée à ladite canalisation.
10. Système combiné de chauffage et de refroidissement de salle tel que revendiqué dans la revendication 9, comprenant en outre une pompe à chaleur ayant un évaporateur extérieur (14), un compresseur (5), un condenseur (25) formant un échangeur de chaleur et un moyen de détente (13) raccordé par une canalisation de fluide frigorigène dans un cycle, l'unité intérieure (20) comprenant l'échangeur de chaleur (25) et une partie de la canalisation.

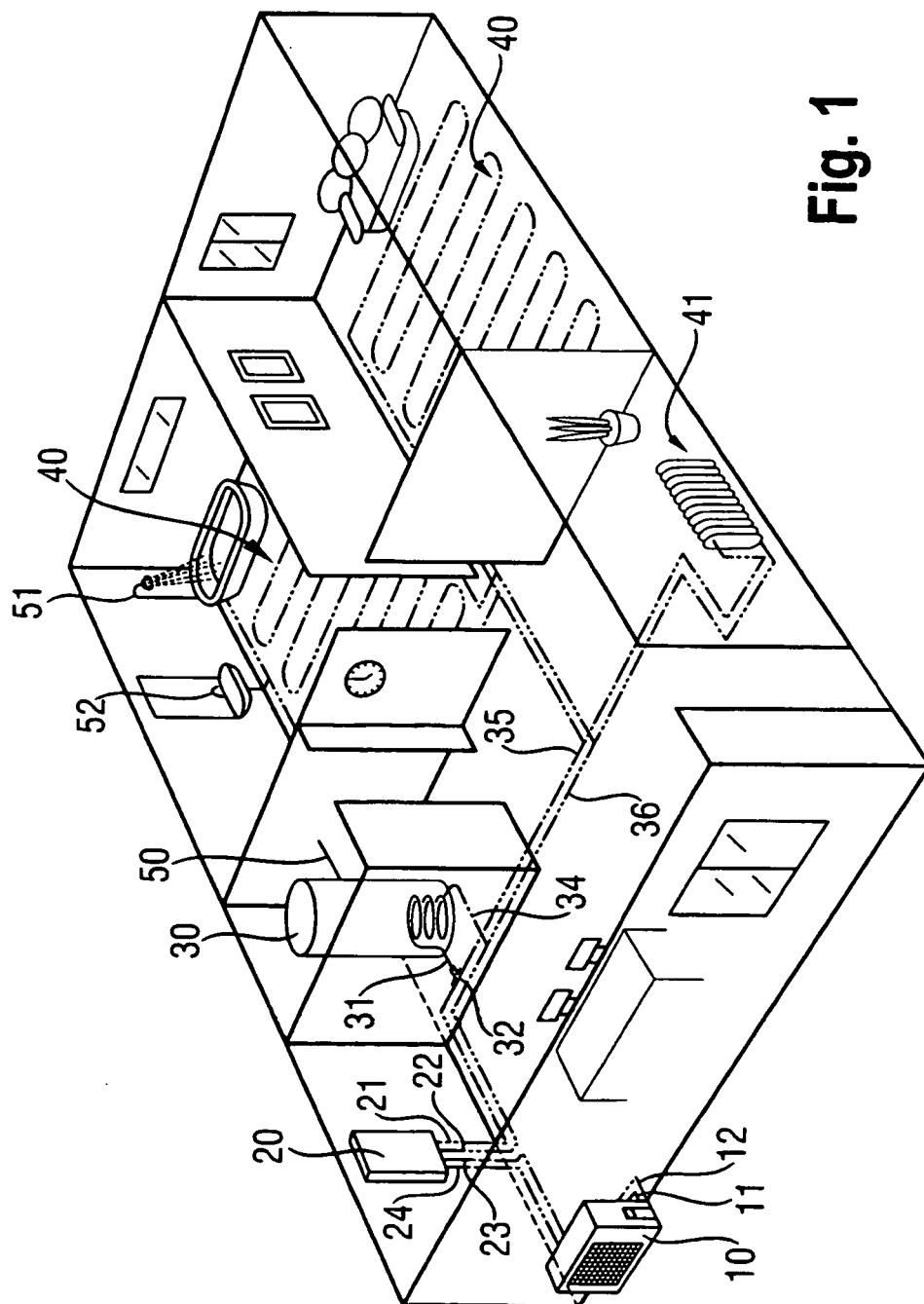


Fig. 1

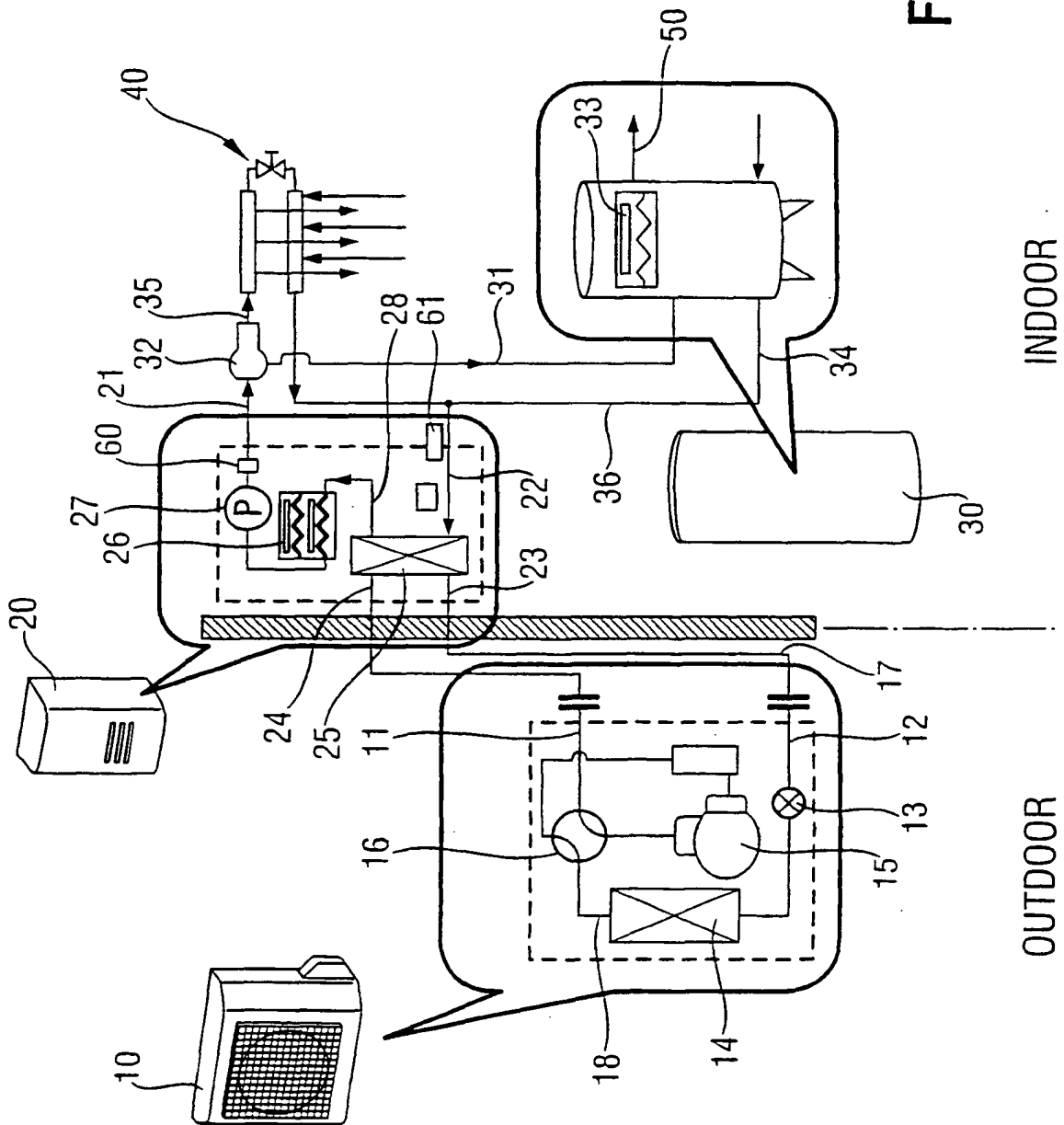
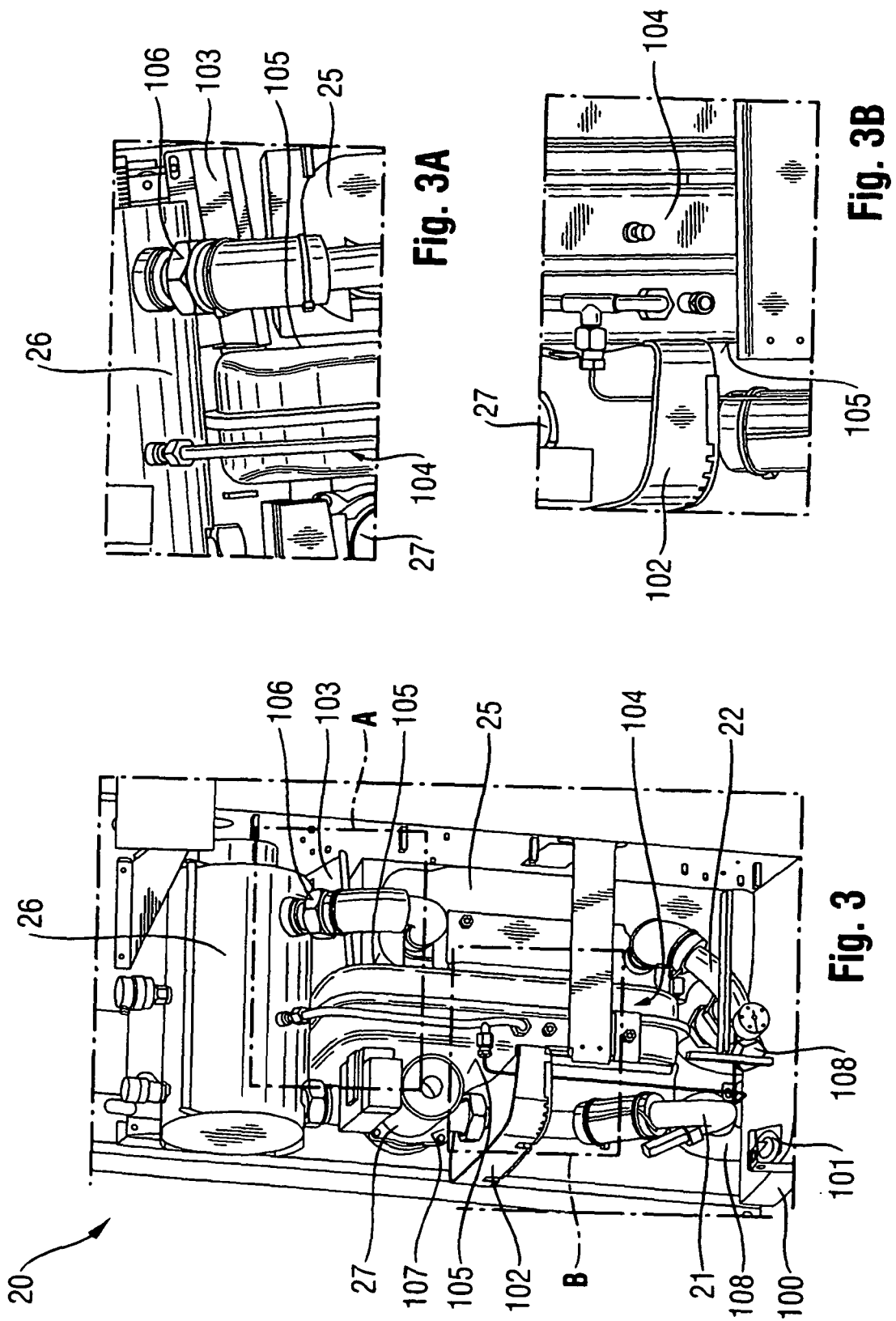
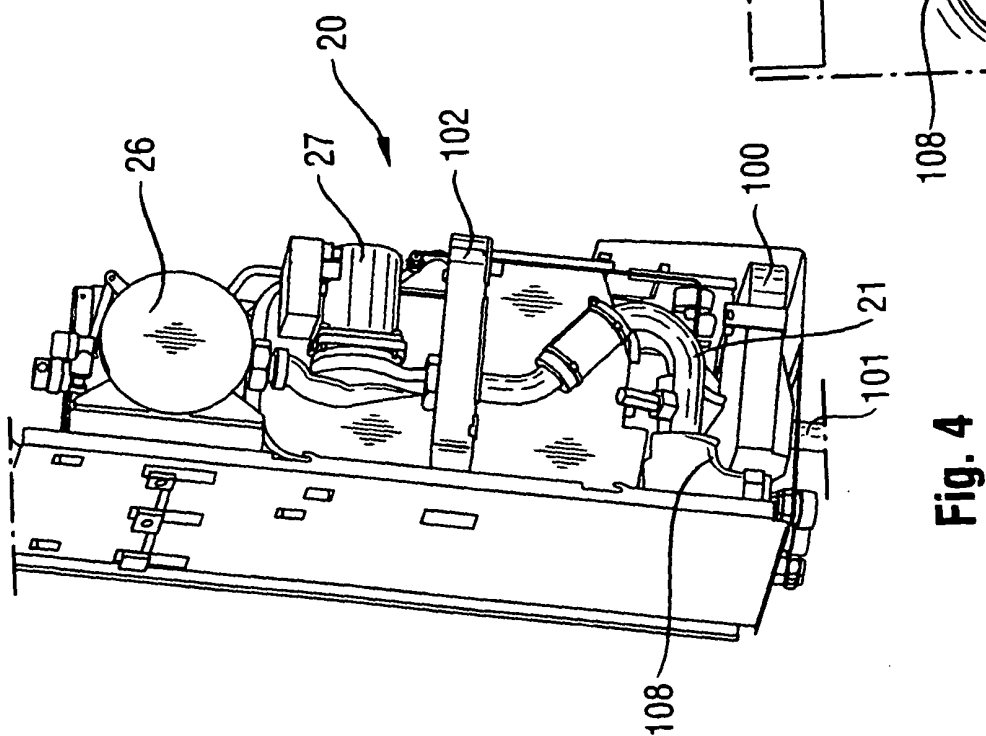
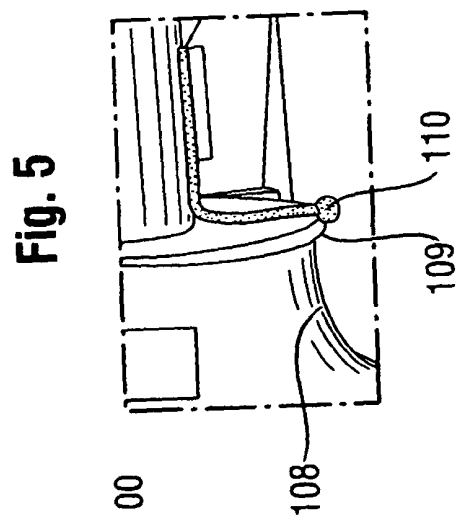
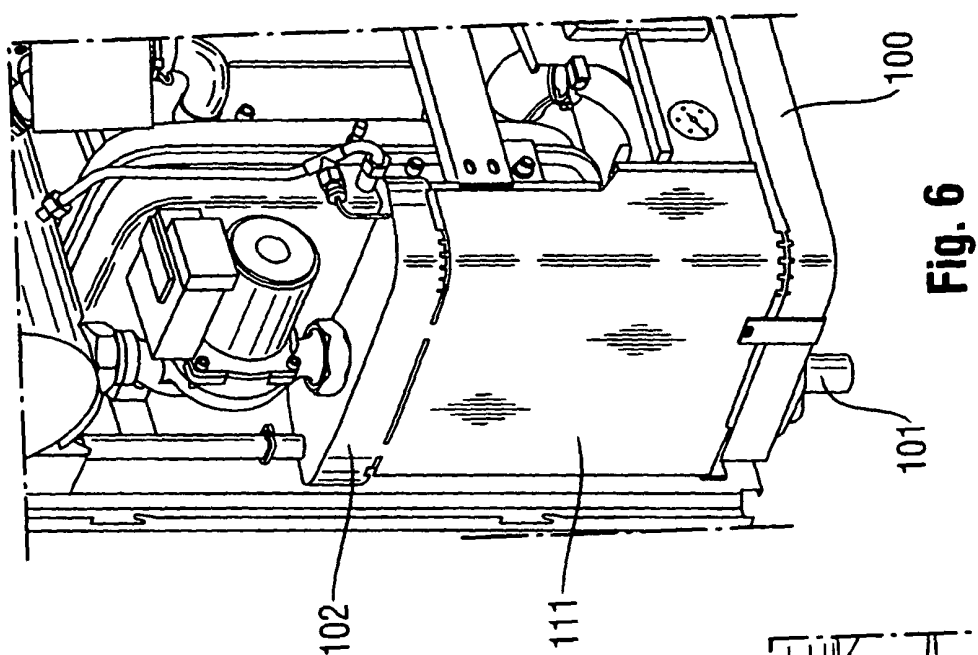


Fig. 2





REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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