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- (73) Patenthaver: **Societe Industrielle de Chauffage (SIC), Rue des Fondateurs, 59660 Merville, Frankrig**
- (72) Opfinder: **BRAVO, Hector, 78 rue Hippolyte Kahn, 69100 VILLEURBANNE, Frankrig**
CLEMENT, Jean-Francis, 38 rue Guyonnet, 85000 LA ROCHE-SUR-YON, Frankrig
FONTBONNE, Erwan, 10 avenue Roberto Rossellini, 69100 VILLEURBANNE, Frankrig
SAISSET, Luc, 16, Rue de la Reynière, 38460 Villemoirieu, Frankrig
- (74) Fuldmægtig i Danmark: **RWS Group, Europa House, Chiltern Park, Chiltern Hill, Chalfont St Peter, Bucks SL9 9FG, Storbritannien**
- (54) Benævnelse: **SYSTEM TIL KØLING, LUFTKONDITIONERING ELLER OPVARMNING MED SÆRSKILTE ENHEDER OG BOKS, DER INDEHOLDER EN AF ENHEDERNE**
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DESCRIPTION

The invention concerns a system for cooling, air conditioning or heating a building based on the principle of the heat pump and using outside air as the outside source. The system is of the type with separate heat exchange units in which, on the one hand, the compressor, the expansion member and the first exchanger in which the outside air circulates, and on the other hand, the second exchanger are distributed in two separate heat exchange units remote from one another.

When such a system is installed with the aim of cooling, air conditioning or heating a building (a home, etc.), one of the heat exchange units, referred to as the outside unit, is placed outside the building whereas the other unit is positioned inside the building.

Generally, this type of outside unit comprises an air inlet on a first face and an air outlet on a second face opposite the first.

The implantation of the outside unit must satisfy certain installation constraints and, in particular, be separated from the wall by at least 100 mm in order to facilitate the intake of air through the first face of same opposite the wall. The opposing second face is turned away from the wall.

Such an implantation can be greatly detrimental to the aesthetic appearance of the building, which is especially important when the building is a home. Moreover, when the outside unit contains a compressor and a fan, the noise generated by these components is a nuisance for people located nearby and for neighbouring homes.

International application WO 2004/094918 describes an air-conditioning system comprising a unit referred to as the "outside" unit placed inside a building. Patent application EP 2 314 937 describes an air-conditioning system comprising an

inside unit and an outside unit.

The present invention therefore aims to overcome at least some of the abovementioned disadvantages by proposing a system as
5 defined in independent claim 1.

By installing the heat unit in a casing that is intended to be placed inside the building, the aesthetic appearance of the building is compromised.
10

The noise nuisance outside is also greatly reduced as a result.

One side of the casing is generally completely open, and this open side is generally intended to be turned towards an opening
15 of a building.

The longitudinal axis is considered to be the axis that extends between the discharge air outlet of the heat exchange unit and the open side of the casing, perpendicularly, on the one hand,
20 to the face of the heat exchange unit in which the air outlet is provided and, on the other hand, to the open side of the casing.

The (longitudinally extending) air separating means have a telescopic configuration, allowing their longitudinal extension to be varied (this arrangement allows the system to be installed on building walls of varying thicknesses) and/or the (longitudinally extending) air separating means comprise a discharge sheath that is arranged opposite the outlet of the
25 heat exchange unit.
30

According to other possible features taken alone or in combination with each other:

35 - the longitudinally extending air separating means are capable of channelling (guiding) the discharge air from the outlet of the heat exchange unit to the open side of the casing;

- the air separating means are separate from the heat exchange unit and are placed in front of the outlet of said unit;

5 - the air separating means further comprise at least one air deflector that is designed to prevent the air discharged through the outlet of the heat exchange unit from being sucked through the outside intake air inlet of said heat exchange unit; therefore, the air separating means comprise a longitudinally
10 extending part and at least one air deflector associated with this part;

- the system comprises an outer frame arranged across and at a distance from the open side of the casing, said at least one
15 deflector being fastened to said outer frame;

- the discharge sheath is arranged between the outlet of the heat exchange unit and said at least one air deflector;

20 - the discharge sheath comprises an emerging end and said at least one deflector extends at least partially around said emerging end of the discharge sheath;

- the discharge sheath is mounted on a frame referred to as
25 the inner frame separate from the heat exchange unit and placed in front of the outlet of said unit;

- the casing is fastened to the inner frame;

30 - the discharge sheath includes two parts that are fitted in one another;

- a first part of the sheath is mounted on the inner frame and a second part of the sheath is mounted on said at least one
35 air deflector;

- the first part is fitted in the second part;

- said at least one air deflector is in the form of a plate of which the inner peripheral edge is fastened to the second part of the discharge sheath and that extends transversely around said second part in such a way as to obstruct a part of the open side of the casing;
5
- the plate comprises an outer peripheral edge, the profile of which is designed to allow the plate to be fastened to the outer frame, while leaving one or more zones inside the outer frame clear so as to allow the intake of outside air;
10
- the outer frame is closed by a grate allowing the two-way passage of air and behind which the air separating means are arranged;
15
- the casing comprises a framework structure onto which, after installing the heat exchange unit in the casing, side walls, a back wall opposite the open side of said casing, and a ceiling wall are attached, at least one of said walls being removable in order to allow access to the heat exchange unit;
20
- the two side walls of the casing, viewed from above, are each adjacent, on the one hand, to the open side of the casing and, on the other hand, to the back wall of the casing, said at least one heat exchanger of the heat exchange unit being arranged along two adjacent walls of said unit, the unit being arranged inside the casing in such a way that the two adjacent walls of said unit are respectively arranged across from and at a distance from a first of the two side walls of the casing and from the back wall of the casing, the unit being offset laterally so as to be closer to the second of the two side walls of the casing than to the first side wall;
25
30
- the system comprises one or a plurality of elements for fastening and/or supporting the casing intended to fasten the casing to another component of the system and/or to the building and/or to support the casing;
35

- the system comprises a casing support on which said casing is capable of being placed and which comprises means for adjusting the height of said support; the casing support is, for example, mounted on feet that each comprise two parts that are
5 movable with respect to each other so as to increase or decrease the height of said foot in the direction of movement of the two parts with respect to each other;

- the heat exchange unit is able to rest on a plate (for
10 example opposite the abovementioned ceiling wall of the casing) that comprises guide elements intended to guide said unit in a translational movement between one of the peripheral edges of the plate and a zone of the plate that corresponds to the implantation zone of the unit in the casing;

15 - the guide elements are guide rails;

- the heat exchange unit is able to rest on the plate via anti-vibration fastening members;

20 - the system comprises a tank for recovering the liquid condensates originating from said at least one heat exchanger and that comprises at least one opening through which the liquid condensates are discharged;

25 - the system comprises:

at least one thermostat that is capable of measuring the air temperature of the environment in which the tank is placed and
30 of comparing it with a setpoint value that is representative of a risk of the liquid condensates freezing,

at least one heating element that is capable of heating at least one zone of said tank if said at least one heat exchanger is de-
35 iced and when the air temperature measured in the environment in which the tank is placed is lower than the setpoint value;

- the system comprises at least one additional air inlet in

the casing that is capable of providing said casing with foul air that is mixed in said casing with the incoming outside air;

- said at least one air inlet is capable of providing said casing with foul air recovered in the building by a controlled mechanical ventilation facility;

- the system comprises, in addition to the heat exchange unit referred to as the first heat exchange unit, a second heat exchange unit separate and remote from the first unit, the second unit including a heat exchanger that is complementary to the heat exchanger of the first unit, namely a condenser if the exchanger of the first unit is an evaporator or vice versa.

According to another separate aspect, the invention concerns a system for cooling, air conditioning or heating a building based on the principle of the heat pump and which is of the type with separate heat exchange units in which, on the one hand, the condenser and on the other hand, the compressor, the evaporator and the expansion member are distributed in two separate heat exchange units remote from one another, characterised in that the system comprises:

- a heat exchange unit that provides a heat exchange with the air outside said unit and that comprises at least one heat exchanger, i.e. an evaporator or a condenser, in which a state change heat transfer fluid circulates, the unit comprising an inlet for the outside intake air, an outlet for the discharge air and suction means for the inlet air so that it passes through said at least one exchanger and is discharged at the outlet,

- a casing in which the heat exchange unit is housed and which is open on one of its sides facing the discharge air outlet of the heat exchange unit,

the heat exchange unit being able to rest on a plate that comprises guide elements intended to guide said unit in a translational movement between one of the peripheral edges of

the plate and a zone of the plate that corresponds to the implantation zone of the unit in the casing;

5 Such a system has the advantage of allowing the heat exchange unit to be easily installed inside the casing.

10 According to one possible feature, the casing comprises two opposing peripheral edges, one of which, referred to as the front edge, is situated on the open side of the casing and the other of which, referred to as the rear edge, is situated on the opposite side of the casing, and the guide elements allow the heat exchange unit to be moved by a translational movement between the rear edge of the casing and the implantation zone of the unit in the casing.

15 Such a system has the advantage of being able to guide the heat exchange unit in order to install it in the casing. If required, it also allows the heat exchange unit to be easily moved from its implantation zone (towards the rear edge of the casing or another edge if the unit was introduced into the casing from this other edge), without disconnecting the refrigerating links/connections between the refrigerating circuit and the heat exchange unit.

25 During tests or maintenance operations, for example, it may be necessary for the system to be functioning. Since the guide elements allow the heat exchange unit to be moved by a simple translational movement, the refrigerating links can remain connected and therefore be moved simultaneously with the heat exchange unit according to a given range of movement inside the casing. The operations can thus be carried out without interrupting the functioning of the system.

35 According to other possible features taken alone or in combination with each other:

- the plate is arranged inside the casing, for example on top of one of the faces of the casing forming the bottom of the

latter;

- the guide elements are guide rails;

5 - the heat exchange unit is able to rest on the plate via anti-vibration fastening members;

- the ceiling of the casing (the face of the casing opposite the bottom) comprises an opening that, on the one hand, allows
10 the refrigerating links connected to the heat exchange unit to pass through and, on the other hand, allows said links to move in translation through the opening simultaneously with the translational movement of the heat exchange unit; during this movement of limited range (the range depends on the dimensions
15 of the opening), the refrigerating links can remain connected. Such an opening can also be used to install the refrigerating links when the heat exchange unit has been introduced into the casing but is not yet installed in its definitive position (implantation zone);

20

- the heat exchange unit is positioned on the guide elements via fastening feet; the heat exchange unit is, for example, placed in a chamber that is positioned on guide elements;

25 - the system comprises separating means between the discharge air and the outside air that enters the casing by the open side and that is intended for the outside intake air inlet of the heat exchange unit; the guide elements of the plate allow the heat exchange unit to be brought against the air separating
30 means;

- the air separating means extend longitudinally from the outlet of the heat exchange unit and away from same.

35 The system can, moreover, comprise one or a plurality of the features described above in relation with the system according to the first aspect of the invention and, in particular, the features relative to the air separating means. All the

advantages described above in relation with the system according to the first aspect of the invention also apply here.

The invention also concerns a structure for receiving a heat exchange unit, for example a system as briefly disclosed above, said structure being intended to receive such a heat exchange unit and comprising, to this end:

- a casing intended to house said heat exchange unit and that is completely open on one side,
- air separating means that are arranged on the open side of the casing and are intended to separate said open side into at least two air passage zones for the air entering and exiting through said open side.

Such a structure can be provided and installed separately from the heat exchange unit and comprises means capable of cooperating with said unit.

The air separating means are more particularly intended to separate, on the one hand, the air entering the casing by the open side in order to supply the air inlet of said unit and, on the other hand, the air exiting by the open side and that originates from the outlet of the unit (discharge air).

According to other possible features taken alone or in combination:

- the air separating means are arranged opposite only part of the open side of the casing and extend longitudinally from said part and moving away from it; the air separating means therefore leave the remaining part of the open side of the casing clear;
- the air separating means are capable of longitudinally channelling the air situated opposite said part of the open side of the casing but not the air situated opposite the remaining

part of said open side of the casing. The air situated opposite the remaining part of the open side of the casing (this is generally air entering the casing) is therefore not channelled to the periphery of same, either by the air separating means or
5 by the casing.

It should be noted that all or some of the features disclosed above of the system can also be applied to the receiving structure presented above insofar as these targeted features
10 concern the structure (e.g.: deflector, sheath, outer frame, inner frame, casing, casing support, plate supporting the unit, tank for recovering the condensates, recovering foul air, etc.) and not only the heat exchange unit.

15 The invention also concerns a building, characterised in that a system as briefly disclosed above is installed in said building, the building comprising a wall delimiting the inside of the building from the outside and in which an opening is arranged bringing the inside and the outside of said building in
20 communication, the casing being partially embedded in said opening or arranged against the wall such that the open side of the casing is across from the opening.

The partial embedding of the casing in the opening allows the
25 space requirement of the casing in the room of the building where it is installed to be reduced. This embedding also performs a mechanical support function for the casing. When the air separating means of the system comprise two discharge sheath parts fitted in one another, this fitting allows them to be
30 adapted to walls of different thicknesses by inserting one part to a greater or lesser extent into the other.

Alternatively, when the casing is arranged against the wall, the system as disclosed above (in relation with the two sheath parts
35 fitted in one another and the inner and outer frames) is, for example, fastened to the wall in such a way that the outer frame is arranged against the outer face of the wall and the inner frame is arranged against the inner face of the wall. The fitting

of the two parts of the discharge sheath in one another therefore allows said system to be installed on walls of different thicknesses.

5 Other features and advantages will become clearer on reading the description that follows, provided purely as a non-limiting example in reference to the appended drawings, in which:

10 - figure 1 is a general view showing the implantation of a system according to one embodiment of the invention inside a building;

15 - figure 2 is a top view showing the implantation of the first heat exchange unit in the casing of figure 1;

- figure 3 is a perspective view of the front face of the first heat exchange unit;

20 - figure 4 is an enlarged top view showing the front wall of the first heat exchange unit and the first discharge sheath part opposite;

25 - figure 5 is a rear schematic perspective view of the casing of figure 1 (with some walls removed) incorporating the first heat exchange unit and partially embedded in the opening in the building wall;

30 - figure 6 is a perspective view of the open front face of the casing and the first discharge sheath part opposite;

- figure 7 is a schematic view in longitudinal cross section of the casing of figure 5;

35 - figure 8 is a schematic view in longitudinal cross section of the male and female sheath parts fitted in one another;

- figure 9 is an enlarged rear perspective view of the tank for recovering the condensates of the casing of figure 5 without

the first heat exchange unit;

- figure 10 is a rear perspective view of the discharge sheath part fastened to the deflector and to the outer frame inside the wall opening;

- figure 11 shows, mounted inside the wall opening of figure 10, the inner frame and the discharge sheath part fastened to it;

- figure 12 is a view of the front face of the deflector fastened to the discharge sheath part inside the wall opening;

- figure 13 is an exploded perspective view of all of the components of the system according to one embodiment of the invention;

- figures 14a and 14b are perspective views showing the adaptability of the system to building walls of different thicknesses;

- figure 15 shows a rear schematic perspective view of the casing of figure 1 resting on a support according to one embodiment of the invention;

- figure 16 is a partial cross section view of an assembly formed by the first heat exchange unit and by the plate for recovering the condensates situated below;

- figure 17 is an enlarged cross section view of the plate of figure 16;

- figure 18 is a front perspective view of the plate of figures 16 and 17 without the first heat exchange unit;

- figure 19 is a rear perspective view of the plate of figure 18 with the first heat exchange unit partially shown;

- figure 20 is a schematic layout view of a system for managing the recovery and discharge of the condensates;

5 - figure 21 is a rear schematic perspective view of the casing showing the ability of the heat exchange unit to move on a plate of the casing according to one embodiment.

As shown in figure 1 and denoted by the general reference 10, a building such as a home comprises a plurality of rooms or
10 premises, only two of which, references 12, 14, are shown.

A heating system 20 according to one embodiment of the invention is installed in the building. This system is based on the principle of the heat pump and is of the type with separate heat
15 exchange units (also known technically as a "split" system).

The system 20 therefore comprises a first heat exchange unit 22 (shown in figure 2) that is installed in the unheated premises 12 and that comprises a compressor, an evaporator, and an
20 expansion member.

This first unit is enclosed inside a casing 24 that is only shown in figure 1.

25 The system also comprises a second heat exchange unit 26 installed in the premises 14 that is heated, for example, by means of underfloor heating 28. The second unit 26 comprises, for example, a condenser (not shown) and a regulating device with members dedicated to controlling the heating system and
30 managing the climatic comfort of the home. The condenser can be used to heat the water circulating in the pipes 30 that supply the pipes of the underfloor heating 28.

According to one variant that is not shown, one or a plurality
35 of other "second" heat exchange units 26 can be installed in other premises or rooms of the building ("multi-split" technology).

As shown in figure 1, the first heat exchange unit 22 is connected to the second 26 by refrigerating links 32 that convey the state change heat transfer fluid that is used in the refrigerating circuit.

5

A schematic top view of the first heat exchange unit 22 is shown in figure 2 and comprises, inside a chamber 23, the main components of this unit, namely:

- 10 - an evaporator heat exchanger 32 which, when viewed from above, can be generally L-shaped (figure 2) or have a straight shape, and in which the abovementioned heat transfer fluid circulates,
- 15 - a fan 34, the function of which is to suck inlet air into the chamber 23 of the unit 22 in order to make it pass through the exchanger 32 and discharge it at the outlet of the chamber 23,
- 20 - an expansion member 36 arranged upstream from the evaporator 32 and that allows the heat transfer fluid to enter the evaporator at low pressure and low temperature,
- a compressor 38 arranged at the outlet of the evaporator
- 25 32 that increases the pressure and the temperature of the fluid in the gaseous state. The member 36 and the compressor 38 are not shown separately but as a single unit.

As shown in figure 2, the chamber 23 comprises, when viewed from

30 above, four walls 23a-d and a wall forming a baseplate 23e. The chamber also comprises a top wall 23f that is not shown in this figure but is shown in figure 3.

The two adjacent walls 23a, 23b (forming one corner of the

35 chamber) are perforated (provided with grates) in such a way as to allow air to enter the chamber 23 from the side and below, as shown respectively by the arrows A1 and A2. Air enters under the effect of the suction means 34 in order for this air to pass

through the evaporator 32 and perform heat exchange with the latter (evaporation of the heat transfer fluid inside the evaporator and cooling of the sucked air).

5 The two other adjacent walls 23c, 23d form an opposing corner of the chamber. The wall 23d, referred to as the front wall, is opposite the rear wall 23b of the air inlet and is perforated with a through-opening 40 shown in figure 3 and facing which the fan 34 is positioned. The air that has passed through the
10 evaporator 32 is then discharged through this opening 40 that constitutes a discharge air outlet for the heat exchange unit 22.

The peripheral area or ferrule 40a bordering this opening has a
15 generally frustoconical shape that widens towards the outside of the chamber, in the direction of the discharged air A3 (figure 4).

This type of heat exchange unit is conventionally installed on
20 the outside of buildings and, to this end, the opening 40 is normally closed by a grate.

In the context of the present invention, this grate has been removed and the heat exchange unit 22 is placed in the building,
25 inside the casing 24.

This type of heat exchange unit is, for example, the type found in the heat pumps marketed by the company Atlantic with the sales reference "Alfea Extensa + 6".
30

Figure 5 shows (rear view of the casing) the first heat exchange unit 22 housed inside the casing 24, some of the walls of which have been removed for the purpose of visibility.

35 In figure 2, the two opposing side walls 24a, 24b of the casing, and the back wall 24c, are shown with dotted outlines.

As shown in figures 2, 5 and 6, the front face of the casing 24

(delimited laterally by the opposing walls 24a and 24b) is completely open, on the side of the casing opposite the back wall 24c. The first unit 22 is arranged opposite the opening 24e of the front face of the casing, the discharged air A3 outlet opening 40 facing the front opening 24e of the casing.

The unit 22 is offset laterally inside the casing so as to leave more space between the side wall 23a of the unit and the side wall 24a of the casing than between the side wall 23c of the unit and the opposing side wall 24b of the casing.

Therefore, the unit 22 is offset with respect to the opening 24e in such a way as to be tangential with the side wall 24b, thus leaving clear a lateral passage behind the opening 24e, between the side wall 24a and the wall 23a of the chamber 23.

This arrangement promotes the intake of air outside the building (symbolised by the arrow A0 in figure 2) into the casing, on the side where the unit has an air inlet.

Similarly, the unit 22 is spaced apart from the back wall 24c of the casing and is close to the opening 24e in order to leave sufficient space for the inflow of air entering the unit 22 through the rear wall 23b.

As shown in figures 5 and 7 (a very schematic figure), the wall 11 of the building is perforated by a through-opening referred to as the wall through-opening 13 that brings the inside and the outside of the building into communication. The opening 13 extends along a longitudinal dimension referred to as depth, being delimited at the periphery of same by longitudinal wall portions 13a-d shown in figure 10 (this figure shows part of the system according to the invention installed in the opening 13).

The casing 24 has transverse dimensions that correspond to those of the wall opening 13 and is thus partially embedded in this opening 13 (over part of depth of the opening 13) such that the opening 24e of the casing faces said opening 13 and communicates

with it. This makes it possible to take full advantage of the inflow of air outside the building into the casing.

5 The casing 24 comprises a framework structure consisting of a plurality of vertical and horizontal struts (crossmembers and sidemembers) assembled together, forming the edges of the casing (figure 5).

10 The walls 24a-c and a ceiling wall 24f (figures 1 and 5) are added and fastened to these struts in order to close the casing over the entirety of these faces.

15 It should be noted that, in this example, at least two walls, the walls 24b and 24c, are mounted removably in order to be able to install the heat exchange unit 22 in the casing and also in order to be able to access the inside of the casing if necessary (e.g. for maintenance purposes). The walls or panels closing the casing are thermally insulated in order to limit heat loss.

20 The casing 24 also comprises a lower wall or base 41, for example made from metal, on which a plate 42 is positioned, which will be described below (figure 9). The unit 22 rests on guide elements 44, 46, of which there may be two, for example (figures 5, 18 and 19). For example, they may consist of two parallel
25 rails that are mounted respectively inside two recesses formed in the thickness of the plate, from an edge that is arranged at the back wall side of the casing to the opposing edge arranged at the open side of the casing.

30 Each rail 44, 46 is itself mounted (figure 18) on anti-vibration fastening members 43 of the anti-vibration pad type (also known as "silent blocks"), of which there may be four, for example, which are fastened to the base 41.

35 The arrangement of these parallel rails allows the feet of the unit 22 to be positioned on same and slid in a translational movement until said unit reaches its implantation zone adjacent to the opening 24e and shown in figures 2 and 8. Because the

chamber 23 of the unit 22 is mounted in a shock-absorbing manner on the rails 44, 46 that are fastened to the members 43, the transmission of vibrations from the chamber to the base is greatly reduced (reduction in the noise level).

5

The system 20 also comprises air separating means between the discharge air A3 (figure 2) and the air A0 originating from outside the building and that enters the casing in order to supply the air inlet of the unit 22.

10

The air separating means 70 (shown schematically in figure 7) extend longitudinally from the outlet 40 of the unit 22 and moving away from it. The longitudinal axis is considered to be the axis that extends between the discharge air outlet of the heat exchange unit and the open side of the casing, perpendicularly, on the one hand, to the face of the heat exchange unit in which the air outlet is provided and, on the other hand, to the open side of the casing. As shown schematically in an assembled manner in figure 8, the means 70

comprise two separate parts that can be fitted in one another along a fitting or penetration length that may be longer or shorter so as to vary the total length (extending along the longitudinal axis X) of the two inserted parts.

25

These means 70 may, for example, be in the form of a discharge sheath comprising a male sheath part 72 (the first part) and a female sheath part 90 (the second part) that are shown separately in figures 6 and 10 respectively.

30

As shown in figure 6, the male sheath part 72 is mounted on a base 74 (that extends transversely) that is fastened between two vertical struts 76, 78, by means of axial returns 75a, 75b. The struts 76, 78 are both attached to the top and bottom horizontal struts 80 and 82 of a frame referred to as the inner frame 79 that delimits the outer periphery of the opening 24e of the casing. The frame 79 comprises a framework formed from four struts including two horizontal struts 80, 82 linked to two vertical struts 83, 84 and each extending axially (along the

35

longitudinal axis of extension of the air separating means 70). The frame 79 also comprises a peripheral rim 85 that extends transversely around the framework at one of the two longitudinal ends of same. As shown in figures 5, 11 and 13, the framework is intended to be engaged inside the opening 13 and to fit up against the longitudinal wall portions 13a-d delimiting it. The rim 85 comes to bear against the inner face of the wall 11 which faces into the room and, more particularly, against a peripheral zone of this face that borders the opening 13. Fastening members such as screws allow the frame 79 to be fastened to the inner face of the wall 11. The casing 24 is partially embedded inside the framework, as shown in figures 5 and 6. The male sheath part 72 may, for example, be generally cylindrical and have a circular flow cross section. The male sheath part has a first end 72a connected to the base 74 and a second opposing free end 72b that is intended to cooperate with the female sheath part 90 shown in figure 10.

As shown in figure 6, the unit 22 is positioned inside the casing, against the base 74, in such a way that the air discharge outlet opening 40 of the unit is opposite the internal flow cross section of the male sheath part 72. However, the unit 22 remains separate and independent from the base and the male sheath part 72.

A seal 84 is interposed between the base 74 and the zone of the wall 23d of the unit 22 that surrounds the opening 40 (figure 13).

As shown in figure 10, the female sheath part 90 may, for example, be generally cylindrical and have a circular flow cross section. The female sheath part 90 has a first free end 90a that can be flared, depending on the configuration, in such a way as to facilitate the insertion of the second free end 72b (figure 6) into it.

The female sheath part 90 has a second opposing emerging end 90b around which an air deflector 92 is connected via the inner

peripheral edge 92a of same.

5 The deflector 92 seen from its front face side in figure 12 is in the form of a plate that surrounds the second end 90b. The plate extends transversely with respect to the longitudinal extension direction of the female sheath part 90 in such a way as to meet an outer frame 94 to which said plate is fastened by its outer peripheral edge 92b. The plate forming the deflector 92 is in the general shape of a flange that is widened on two
10 opposing lateral sides so as to be fastened laterally by returns (figure 10) to two vertical struts 94a, 94b of the outer frame 94. The plate 92 is also fastened by its lower edge to the lower horizontal strut 94c of the frame (figures 10 and 12).

15 The outer peripheral edge 92b of the plate is therefore profiled in such a way as to allow it to be fastened to the frame, while leaving several zones clear for outside air to pass through the wall opening 13 and enter the casing through the open side of same.

20 More particularly, the plate 92 is cut out in such a way to clear two lower air inlet passage zones Z1 and Z2 and one large upper air inlet zone Z3 (figures 10 and 12).

25 The plate 92 therefore separates, on the one hand, the air A3 discharged by the outlet 40 of the heat exchange unit 22 and channelled by the discharge sheath, the two parts of which 72 and 90 are fitted in one another (as in figure 8), to the emerging end 90b of same and, on the other hand, the outside air
30 entering through the wall opening 13. Therefore, as a result of the plate 92, discharged air is prevented from being sucked back in with the incoming outside air.

35 It should be noted, in reference to figure 4 (in this figure, the position of the male sheath part 72 in front of the outlet opening 40 of the heat exchange unit 22 is shown with a dotted outline), that the first end 72a of the male sheath part is, for example, positioned in correspondence with the inner peripheral

edge 40a1 of reduced diameter of the opening 40 (the inner diameter of the ferrule 40a) and not with the outer peripheral edge of wider diameter (the outer diameter of the ferrule 40a).

5 Therefore, preventing the flow cross section from increasing means that the discharge air A3 maintains a high speed in the discharge sheath and at its emerging end. This outlet speed of the discharge air also helps prevent the discharged air from being sucked back in at the inlet of the system.

10

As already mentioned, the second end 72b of the male sheath part 72 is fitted in the first end 90a of the female sheath part 90 (figure 8).

15 This arrangement helps prevent drops of condensates that could be sprayed by the fan 34 from leaking through the gap between the two sheath parts fitted in one another.

Moreover, this arrangement reduces head losses and is more
20 aesthetically pleasing than the reverse arrangement (sheath part 90 fitted in sheath part 72).

However, the reverse arrangement can absolutely be envisaged as a variant.

25

As shown in figures 10 and 12, the outer frame 94 to which the deflector 92 and the sheath part 90 are fastened is mounted in the opening 13 and fastened to the wall 11 (from inside the building, for security reasons).

30

As shown in figures 5, 7 and 10, the outer frame 94 is closed by a grate 100 that extends in a transverse plane. The main function of this grate 100 is to allow air to pass through it in two directions. This grate also acts as an aesthetically
35 pleasing cover for the wall opening 13, prevents people and animals from passing through, and offers protection against rainwater. The outer frame 94 and the grate 100 can be mounted flush with the outer face of the wall 11 or withdrawn into the

wall opening 13 (figures 10 and 12).

In figure 11, the framework of the outer frame 79 has been inserted into the opening 13 and fastened to the wall 11 by means of the rim 85 of same and associated fastening means.

The two sheath parts 72 and 90 have been fitted in one another (as in figure 8) in such a way that the length of the discharge sheath formed in this way, extending through the opening 13, adapts to the thickness of the wall 11.

The inner frame 79 carries two parallel horizontal arms 95, 96 (figure 11) that extend longitudinally away from the rim 85 to which they are fastened (towards the inside of the room of the building). These arms 95, 96 form main support elements for the casing 24, part of which is intended to rest on them in the installed position (figure 5), another part of the casing resting on the framework due to the fact that it is embedded therein. The casing is, moreover, fastened to the upper horizontal strut of the inner frame 79 (figure 5) by means of two tilted fastening arms B1, B2 that also help support the casing.

Figure 13 is an exploded perspective view of the various components of the system in this embodiment and the order in which they are assembled to each other: le deflector 92 and the female sheath part 90 fastened to the outer frame, the male sheath part 72 fastened to the inner frame 79 and the casing 24 that encloses the heat exchange unit 22.

Figures 14a and 14b show the adaptation of the system according to the embodiment of the invention, by means of the telescopic discharge sheath described above, to walls 11a, 11b of varying thicknesses. The extension length is therefore greater for a wall with a small thickness 11a (e.g. 150 mm) than for a wall with a large thickness 11b (e.g. 360 mm). In figure 14a, the frame 94 is mounted flush with the wall 11a and the horizontal rim 97a secured to the frame and that rests on the lower

horizontal wall of the opening 13 is short. In figure 14b, the frame 94 is mounted in a withdrawn position in the opening 13 and the horizontal rim 97b of the outer frame is longer. The horizontal rims 97a and 97b are dripstones that allow rainwater to be discharged (as well as the liquid condensates following a blockage in the condensate tank of figure 9 which will be described below) without running down the walls.

It should be noted that the telescopic air separating means that have just been described can also be applied in other types of system for cooling, air conditioning or heating a building such as "monoblock" systems in which all of the components of the refrigerating circuit (evaporator, compressor, condenser and expansion member) are housed in the same casing or box. This allows them to be adapted to different wall thicknesses and allows the casing or box to be positioned as close as possible to the wall (reduced space requirement in the premises where the casing or box is installed).

Figure 15 shows an embodiment in which the casing 24 rests on a casing support 50 and is arranged against the wall 11 with the open face 24e of the casing opposite the opening 13. The casing is no longer partially embedded in the opening, in this case. In this embodiment, the elements of the abovementioned embodiment remain unchanged and keep the same references. The support 50 comprises an upper frame 52 mounted on four feet 54, 56, 58, 60 that are arranged two by two and are reinforced by transverse bars at the bottom and half way up.

Each foot comprises two elongate portions, for example the portions 56a, 56b of the foot 56, which can be moved with respect to each other by sliding along the length direction of same. Each portion has a plurality of ports arranged one above the other, ports of the two respective portions being aligned in pairs at the desired height.

Immobilising members are inserted through two aligned ports of the two respective portions in order to immobilise the two

portions in translation at the desired height.

The two movable portions of each foot of the support 50 form means for adjusting the height of the casing which allow this height to be adjusted to that of the lower part of the wall opening 13.

The upper frame 52 comprises, on its two opposing lateral sides, two parallel elongate guide elements (only one of which is shown, with the reference 52a) which each form a rim.

These guide elements guide the casing 24 on the upper frame 52 until it reaches its final installed position.

It should be noted that other means for fastening and/or supporting the casing can be envisaged according to other variants not shown here.

There now follows a description of the management of the recovery and discharge of the condensates from the evaporator 32, with reference to figures 2, 9 and 16 to 20.

The plate 42 on which the first heat exchange unit 22 is implanted forms a tank for recovering the liquid condensates generated by said heat exchanger 32.

A gutter 110 is formed in the thickness of the plate and extends longitudinally in a shape that substantially matches the general shape of the exchanger 32 projected onto the plate (when viewed from above). In this embodiment, the gutter is generally L-shaped when viewed from above. However, this shape can be adapted to that of the exchanger 32.

The bottom of this gutter 110 is inclined (in the longitudinal direction of extension of the gutter) so as to convey, by force of gravity, the liquid condensates collected by the gutter towards a through-opening 112 for discharging the condensates that is formed in the bottom of the gutter, at one end of same

(see the vertical axial cross section in figure 16; in this figure, only the main elements of the system are shown, the other elements having been omitted for the sake of clarity). A discharge tube 113 can be inserted into the through-opening 112 in order to guide the flow of the liquid condensates downwards, below the plate 42.

The plate 42 has a top face 42a that is also arranged in such a way as to slope towards the gutter 110 (in a direction transverse to the longitudinal direction of extension of the gutter) in order to assist the flow of condensates (see the vertical transverse cross section in figure 17). The gutter 110 thus forms a recess in the thickness of the plate 42, the recess comprising a central groove 114 in the bottom of same. This groove 114 is formed in the bottom of the gutter 110 in such a way as to form the lowest point of same.

The gutter 110 is delimited by two lateral faces 110a, 110b that extend in an inclined manner from the top face 42a towards the bottom. As shown in figure 17, the two faces 110a, 110b are inclined, each forming a double slope, i.e. a first slope formed by a first inclined panel P1 and a second slope, gentler than the first, formed by a second inclined panel P2, meeting the central groove 114. Alternatively, the two lateral faces 110a, 110b curve to meet the central groove 114 (without an angle break between two consecutive inclined panels).

The gutter 110 comprises a first part 110c corresponding to the longer of the two branches of the L that extends from the opening 112 situated at a first edge 42b of the plate to the end of the second branch 110d (second gutter part) of the L.

The second gutter part 110d or second branch forms an elbow from the end of the first part 110c and extends to a second edge 42c of the plate adjacent to the first edge 42b.

A heating element 120 is arranged inside the central groove 114 of the gutter (figures 16 and 17) and extends along virtually

the entire length of the gutter.

This elongate heating element 120 is, for example, a heating wire.

5

As shown in figure 17, a strip of heat sink material 122 such as a metal strip, for example made from aluminium, is placed at the bottom of the gutter, over the groove 114 housing the heating element 120 (the strip 122 is not shown in figures 9, 16, 18 and 10 19 for the sake of clarity), over all or part of the width of the gutter. This strip 122, which is highly thermally conductive, helps quickly dissipate the heat produced by the heating element that it covers, when the latter is activated and generating heat.

15

It should be noted that placing the heating element 120 at the bottom of the groove 114 that is arranged at a height lower than that of the bottom of the gutter, and covering the top opening of the groove with the strip 122, ensures that the liquid 20 condensates cannot stagnate around the heating element. Stagnation could occur if the heating element was arranged directly on the flat or inclined bottom of the gutter, in the most enclosed part of same.

25 For example, the heating wire dissipates 50 W/m and the strip has a width of 50 mm and a thickness of less than 2 mm and, preferably, less than 1 mm, and, for example, equal to 0.3 mm. The smallest thickness as possible is chosen in order to minimise the heat capacity of the strip.

30

The plate 42 is made from a material with low thermal conductivity, which promotes the discharge of the heat generated by the heating element on the heat sink strip 122 side.

35 The material constituting the plate is, for example, polystyrene, and, more particularly, coated polystyrene, or indeed another sealed cellular plastic material, with low thermal effusivity ($< 100 \text{ J.m}^{-2}.\text{K}^{-1}.\text{s}^{-1/2}$) and suitable for this

use.

For example, the metal strip is made from a material having a coefficient of thermal conductivity greater than or equal to 10 W/m.°C, whereas the material of the plate has a coefficient of thermal conductivity less than 0.1 W/m.°C.

It should be noted that the break in slope between the two inclined panels P1 and P2 acts as a reference for positioning the strip 122 at the bottom of the gutter 110.

The width at which the strip of heat sink material 122 extends can vary depending on the thickness of same. Since the aim is to minimise the heat capacity of the strip and therefore its volume, a very thin strip (thinner than 0.5 mm) can easily cover the entire width of the gutter (more than 100 mm wide) without having an excessive impact on energy consumption.

As shown schematically in figures 2 and 16, the chamber 23 containing the heat exchange unit 22 comprises a baseplate 23e that is perforated with a plurality of through-holes 124 arranged vertically perpendicular to the first gutter part 110c and beneath the exchanger 32.

These holes 124 allow the condensates that are formed in solid form (ice) on the exchanger 32 and that are then collected by force of gravity in liquid form in the gutter 110, after de-icing the exchanger, to be discharged out of the chamber 23 of the heat exchange unit.

Alternatively, the baseplate 23e may have only a single hole vertically perpendicular to the gutter or fewer holes than that shown in the figures.

As shown in figure 9, two recesses 42d, 42e, parallel to each other and perpendicularly intersecting the part 110c of the gutter, are formed in the thickness of the plate 42. These recesses receive the respective guide rails 44, 46 of the unit

22 (figure 19). Two housings or cavities that extend vertically, respectively numbered 42d1, 42d2 and 42e1, 42e2, are formed at the two opposing ends of each recess 42d and 42e.

5 Figure 18 shows a perspective view of the plate 42 from the edge 42c side. The two rails 44, 46 extend inside the two respective recesses 42e and 42d and each have two curved free ends so as to engage in the respective opposing cavities of each recess. One of the abovementioned anti-vibration members 43 is arranged
10 at the bottom of each cavity and the corresponding curved free end of the rail is mounted on this member. In figure 18, only two members 43 are shown respectively at the bottom of the cavities 42d2 and 42e2, and the curved ends 44a and 46a of the rails 44 and 46 are fastened respectively to the corresponding
15 members.

Figure 19 shows the chamber 23 of the unit 22 positioned on the rails 44 and 46 by means of fastening feet, only two of which, 126 and 128, are shown. The chamber of figure 4 is in the
20 implantation position of the chamber of figure 19. The chamber has been installed by sliding the feet on the top part of the rails and along them until reaching the abutment position.

It should be noted that an overflow device 130 (figures 8 and
25 18) is provided on the plate 42 and communicates with the gutter 110 so as to be able to discharge an excess of liquid condensates from the gutter (in the event that the opening 112 is no longer sufficient for the purpose of discharging). Such a device comprises a channel 132 that extends transverse to the gutter
30 from the zone of the gutter that is close to the opening 112 and towards an edge of the plate, for example, the edge 42c. The channel is formed from the top face 42a of the plate. This device 130 discharges excess liquid through the opening 13 and therefore out of the building.

35

The figure 20 shows the principle of a system for managing the recovery and discharge of the condensates of an exchanger such as the evaporator 32.

The system comprises the heating wire 120 that has an electrical resistor and forms an electric circuit (connected to a phase and to the neutral) that is open in two places in the circuit: a first place where a thermostat 140 is located inside the casing 24 (in the premises 12) and a second place where a contactor 142 is located in the second heat exchange unit 26 (in the premises 14). It should be noted that the thermostat 140 is installed in the part 110d of the gutter, adjacent to the edge 42c of the plate.

As shown in figure 20, the heating wire forms a loop inside the heating element enclosure at the thermostat 140. The heating wire 120 is supplied with electricity by the same power source as that used for the unit 22.

The thermostat 140 and the contactor 142 are mounted in series in the circuit, which means that the electric current can only flow through the electrical resistor of the heating wire if these two elements are both closed.

The contactor 142 is linked to an electronic board 144 that controls the control part of the heat pump system. The electronic board 144 relays information concerning the de-icing carried out in a known and, for example, automatic manner, by reversing the cycle of the evaporator 32 of the first unit 22.

Thus, when the de-icing of the evaporator is about to take place (or is underway), a corresponding piece of de-icing information is sent by the board 144 to the contactor 142, causing the circuit to close at the contactor.

Moreover, the thermostat 140 measures the air temperature of the environment in which the tank 42 is located (in particular at the place where air is in contact with the tank) and compares it with a setpoint value that is set in such a way that the thermostat switch closes when the measured air temperature is low enough for there to be a risk of the condensates freezing

in the tank. Generally, the setpoint temperature is chosen so as to be close to the solidification temperature of the condensates. Such a setpoint temperature can, for example, be lower than 5°C.

5

Therefore, when the de-icing of the evaporator is commanded (automatically or not) and the temperature of the air in contact with the tank is sufficiently low, the electric circuit of figure 20 is closed. This allows an electric current to be established in the heating wire 120 and therefore allows heat to be generated in the central groove 114 and in the bottom of the gutter by means of the heat sink strip 122. The condensates that fall in liquid form into the gutter (following the de-icing of the exchanger) and are in contact with the strip 122 dissipating the heat released by the heating element 120 are therefore kept at a temperature high enough to rule out any risk of the condensates freezing. The temperature needs to be high enough for the condensates to remain in liquid form in order that they can be discharged by draining them out (economically) but it should not be so high as to result in unnecessary energy consumption. The liquid condensates collected in the gutter are discharged by force of gravity, flowing along it to the opening 112 passing through the plate 42.

25 Therefore, the functioning of the heating element is slaved, on the one hand, to the de-icing of the exchanger 32 and, on the other hand, to the temperature of the air surrounding the heating element.

30 Such a design helps reduce electrical energy consumption because heating only takes place when there is a risk of the condensates in the tank freezing. Moreover, the heating is adapted so as to keep the condensates just in the liquid state (energy consumption of the system minimised).

35

Moreover, the heated zone is a relatively small area compared with the entire surface area of the plate 42. This localised heating (due in particular to the use of a heating wire) also

helps reduce electrical energy consumption compared to a situation in which virtually all of the surface area of the plate 42 for recovering the condensates is heated.

5 It should be noted that the abovementioned system for managing the recovery and discharge of the condensates is designed in a particularly simple manner because, apart from the electronics required in order to de-ice the exchanger, no other electronics are needed, and only one thermostat is used. No processing of
10 signals originating from different sensors is necessary in order to implement the system.

As a variant, the transverse profile of the gutter, its width, the shape in which it extends longitudinally, and the shape of
15 the central groove can vary depending on the needs and the application, in particular depending on the arrangement and the shape of the exchanger or exchangers from which the liquid condensates are to be recovered and discharged.

20 Depending on the application, the number of gutters that are likely to be heated can also vary as can, for example, the number of heating elements (one per gutter).

The system can comprise more than one through-opening 112,
25 depending on the requirements and/or the configuration of the exchanger or exchangers and the tank.

As a variant, some of the elements of the abovementioned circuit (such as the contactor 142) can be arranged elsewhere than in
30 the second heat exchange unit 26 or close to the latter and, for example, in the first heat exchange unit 22 or close to the latter.

As a variant, some of the elements of the abovementioned circuit (such as the contactor 142) can be arranged elsewhere than in
35 the second heat exchange unit 26 or close to the latter and, for example, in the first heat exchange unit 22 or close to the latter.

It should be noted that the innovative aspect that has just been described is not limited to the embodiment that has been described with reference to figures 1 to 15 (with the first heat
5 exchange unit 22 in a casing 24).

Indeed, this aspect can be applied to any cooling, air conditioning or heating system provided with a device (e.g. a tank) for recovering condensates and element(s) for heating the
10 device.

Figure 21 shows an embodiment of the system of figures 5, 6, 13 and 15 in which the heat exchange unit 22 rests on the plate 42 comprising guide elements 44 and 46. These guide elements allow
15 the heat exchange unit 22 to be moved by a translational movement between the rear edge 150 of the casing and the implantation zone of the unit in the casing.

An opening 152 extends parallel to the guide elements and therefore to the direction of translational movement (sliding)
20 of the unit 22. The opening is wider than the opening of the preceding figures and has a generally elongate shape, being rectangular, for example. As in the embodiment of the preceding figures, once the unit 22 is positioned in its implantation zone
25 (final working position), a plate or cover 156 closes the opening in order for the casing to be sealed off from the inside of the building.

Such a system has the advantage of being able to guide the heat
30 exchange unit in order to install it in the casing. This system also allows the heat exchange unit to be easily moved from its implantation zone towards the edge of the casing via which the unit was introduced into the casing, without disconnecting the refrigerating links 154 connected to the heat exchange unit 22.
35 The opening 152 provided in the ceiling of the casing 24f allows the refrigerating links 154 to pass through and allows them to move in translation through the opening simultaneously with the translational movement of the heat exchange unit, regardless of

the direction of this movement. Therefore, it is possible, for example, to carry out tests or maintenance operations on the heat exchange unit without disconnecting the refrigerating links 154 and, therefore, without interrupting the functioning of the system. The opening 152 can also be used to install the refrigerating links of the refrigerating circuit (to which the heat exchange unit 26 is connected) and connect them to the heat exchange unit 22 once the latter has been introduced into the casing 24 but is not yet installed in the definitive position of same (implantation zone).

Although the guiding of the heat exchange unit relative to the plate has been described consistently above in a system comprising air separating means, it should be noted that, according to a separate aspect of the invention, the air separating means can be omitted.

Patentkrav

1. System (20) til køling, luftkonditionering eller opvarmning af en bygning (10), hvilket system er baseret på princippet om varmepumpe, der anvender luft som ekstern kilde, og som er af typen med særskilte varmevekslingsenheder, i hvilke dels kompressoren, ekspansionsanordningen og den veksler, hvori den ydre luft cirkulerer, og dels den anden veksler er fordelt i to særskilte varmevekslingsenheder (22, 26), der er i afstand fra hinanden, idet systemet omfatter:
- en varmeudvekslingsenhed (22), der sikrer varmeveksling med luften uden for enheden, og som omfatter mindst én varmeveksler (32), nemlig en fordamper eller en kondensator, hvori en varmeoverføringsvæske ved tilstandsændring cirkulerer, idet enheden omfatter et indløb til den ydre indsugningsluft, et udløb (40) til udledningsluften og indsugningsmidler (34) for luften ved indgangen, således at den løber igennem den mindst ene veksler og udledes ved udløbet
 - en boks (24), hvori varmevekslingsenheden (22) er placeret, og som er åben på en af sine sider (24e), der befinder sig over for varmevekslingsenhedens udløb (40) for udledningsluften
 - midler til adskillelse (70) af udledningsluften og den ydre luft, der kommer ind i boksen gennem den åbne side (24e), og som er beregnet til varmevekslingsenhedens indløb for den ydre indsugningsluft, hvilke luftadskillelsesmidler strækker sig ud i længderetningen fra varmevekslingsenhedens udløb (40) og væk fra enheden, kendetegnet ved, at luftadskillelsesmidlerne:
 - er teleskopisk konfigureret med henblik på at lade deres langsgående udstrækning variere, og/eller
- omfatter en udledningskanal, der er placeret mod varmevekslingsenhedens (22) udløb (40).

2. System ifølge krav 1, kendetegnet ved, at luftadskillelsesmidlerne (70) desuden omfatter mindst én luftafbøjningsanordning (92), der er beregnet til at forhindre, at den luft, der ledes ud gennem varmeudvekslingsenhedens udløb (40), suges ind i varmevekslingsenhedens ydre indsugningsluft.

3. System ifølge krav 2, kendetegnet ved, at det omfatter en ydre ramme (94), der er placeret mod og i afstand fra boksens (24) åbne side (24e), idet den mindst ene afbøjningsanordning (92) er fastgjort til den ydre ramme.

5

4. System ifølge et af kravene 2 eller 3, kendetegnet ved, at udløbskanalen er placeret mellem varmevekslingsenhedens (22) udløb (40) og den mindst ene luftafbøjningsanordning (92).

10 5. System ifølge et af kravene 2 til 4, kendetegnet ved, at udledningskanalen (72, 90) omfatter en gennemgående ende (90b), og den mindst ene afbøjningsanordning (92) strækker sig i det mindste delvist ud omkring udledningskanalens gennemgående ende.

15 6. System ifølge et af kravene 1, 4 eller 5, kendetegnet ved, at udledningskanalen (72, 90) er monteret på en såkaldt indre ramme (79), der er adskilt fra varmevekslingsenheden (22), og som er placeret foran enhedens udløb (40).

20 7. System ifølge et af kravene 1 eller 4 til 6, kendetegnet ved, at udledningskanalen omfatter to dele (72, 90), der er sat ind i hinanden.

8. System ifølge et af kravene 2, 3 og 5 samt krav 6 og 7,
25 kendetegnet ved, at en første del (72) af kanalen er monteret på den indre ramme (79), og en anden del (90) af kanalen er monteret på den mindst ene luftafbøjningsanordning (92).

9. System ifølge krav 3 eller ifølge et af kravene 4 til 8,
30 når disse afhænger af krav 3, kendetegnet ved, at den ydre ramme (94) er lukket af et gitter (100), der muliggør tovejsgennemgang af luft, og bag hvilket luftadskillelsesmidlerne (70) er placeret.

35 10. System ifølge et af kravene 1 til 9, kendetegnet ved, at varmevekslingsenheden (22) er egnet til at hvile på en plade (42), der omfatter føringselementer (44, 46), som er beregnet til at føre enheden i en tværgående bevægelse mellem en af

pladens perifere kanter og et område af pladen, der svarer til opsætningsområdet for enheden i boksen.

11. System ifølge et af kravene 1 til 10, kendetegnet ved, at
5 det ud over den varmevekslingsenhed (22), der kaldes primær varmevekslingsenhed, omfatter en anden varmevekslingsenhed (26), der er adskilt og i afstand fra den første enhed, idet den anden enhed omfatter en varmeveksler, der er komplementær til varmeveksleren i den første enhed, nemlig en kondensator, hvis
10 veksleren i den første enhed er en fordamper, eller omvendt.

12. Bygning (10), kendetegnet ved, at et system (20) ifølge et af kravene 1 til 11 er installeret i bygningen, idet bygningen omfatter en væg (11), der afgrænser bygningens indre fra det
15 ydre, og hvori der er indrettet en åbning (13), som sætter det indre og det ydre af bygningen i forbindelse med hinanden, idet boksen (24) er delvist indlejret i åbningen (13) eller er placeret mod væggen (11) således, at boksens åbne side (24) er over for åbningen.

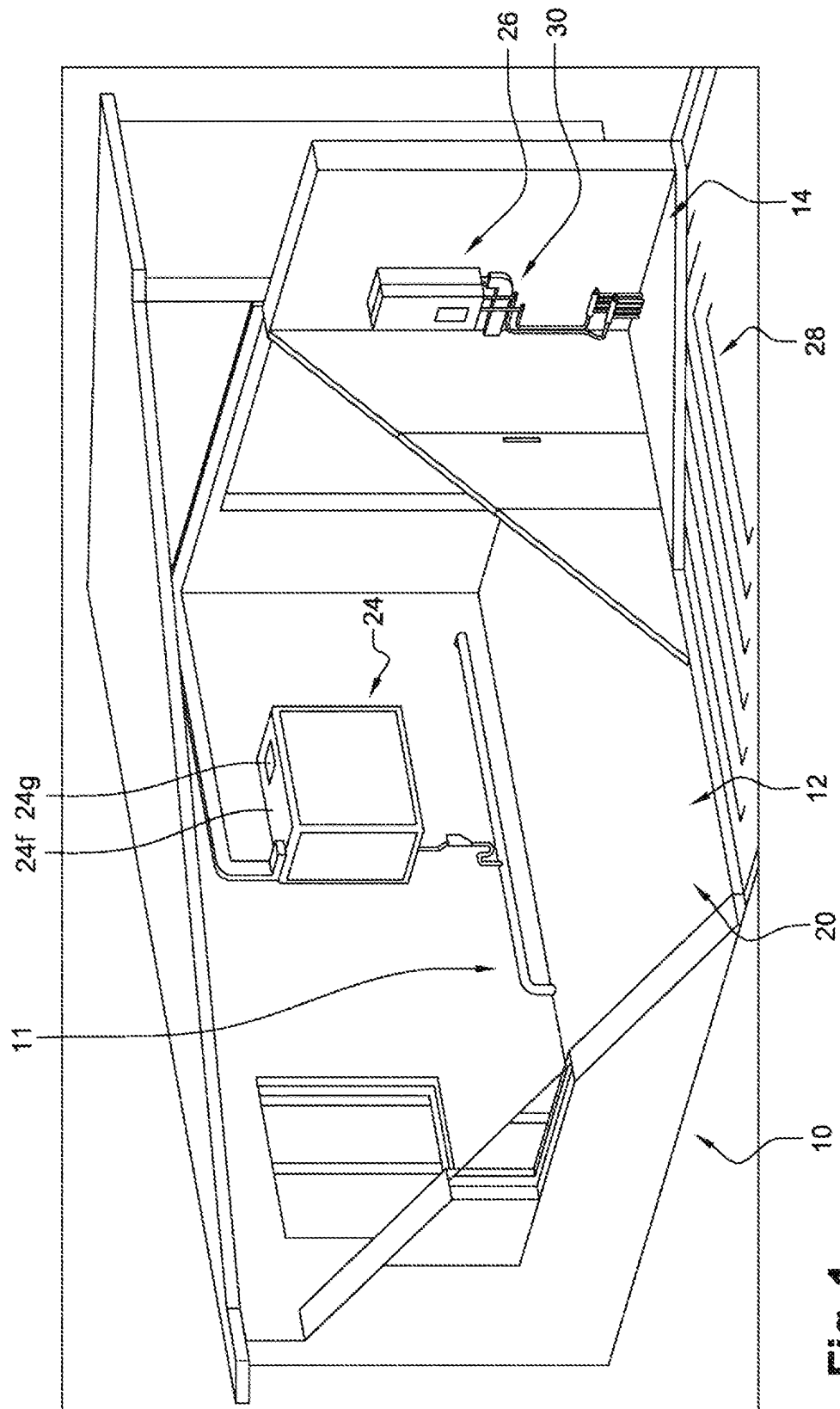


Fig. 1

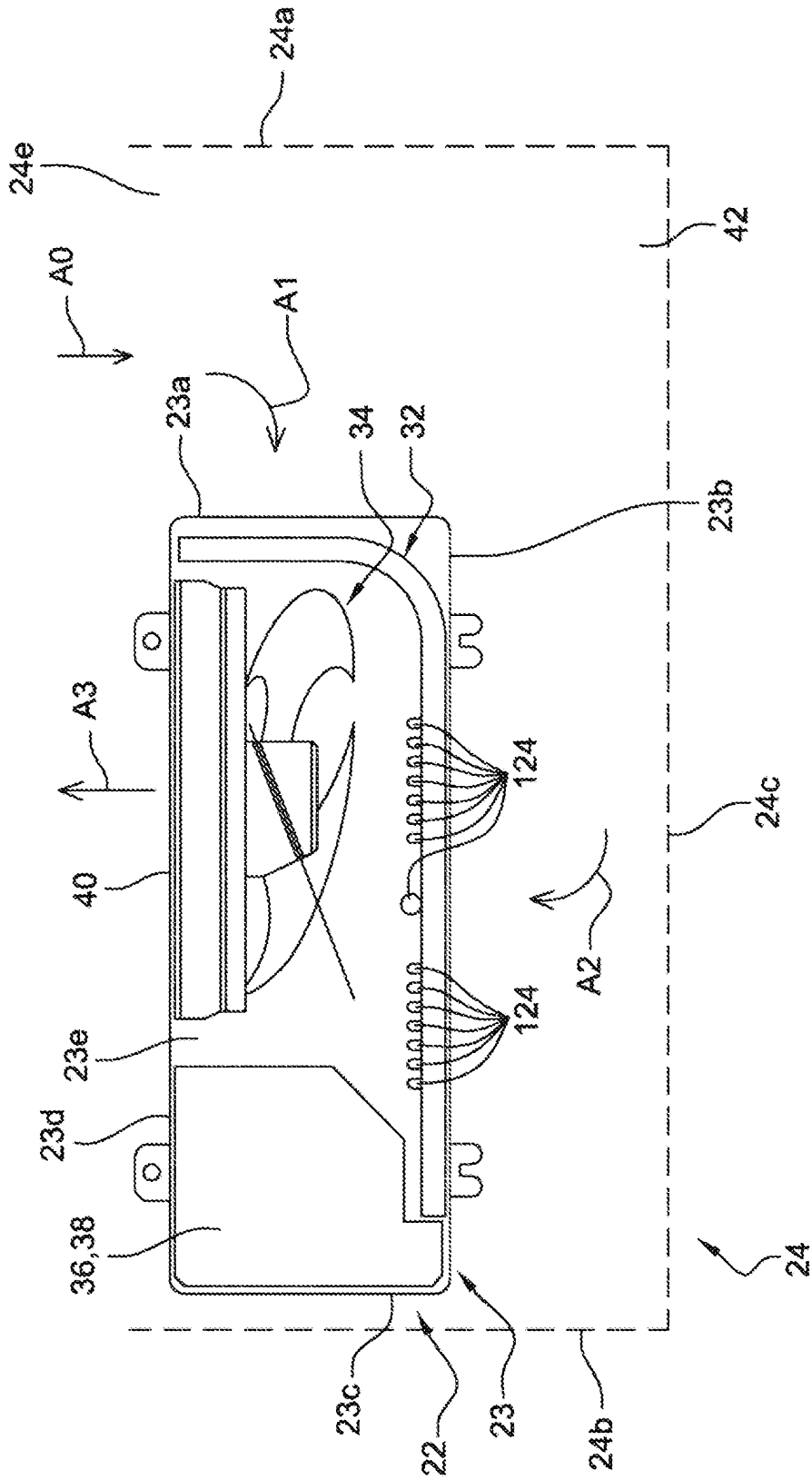


Fig. 2

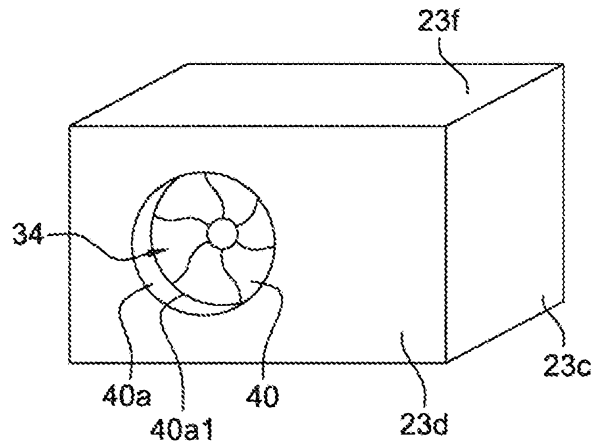


Fig. 3

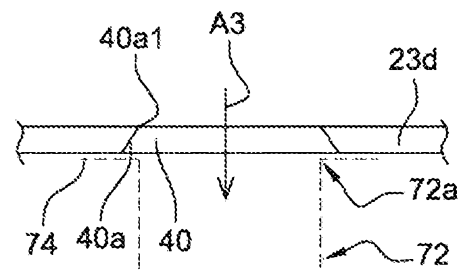


Fig. 4

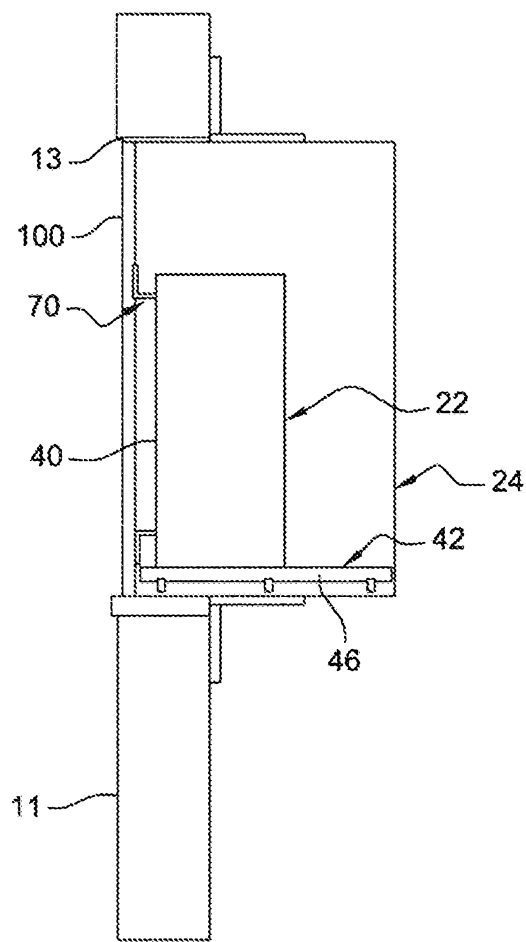


Fig. 7

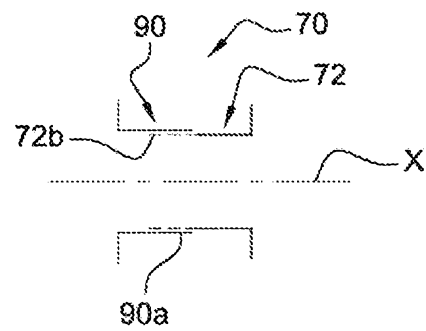
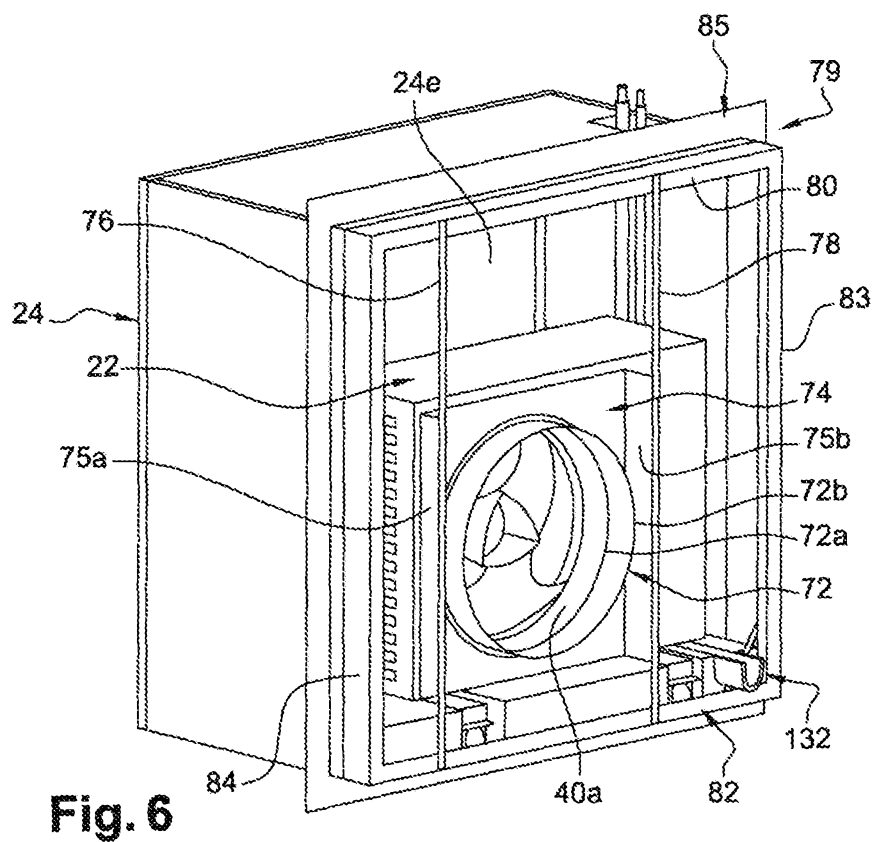
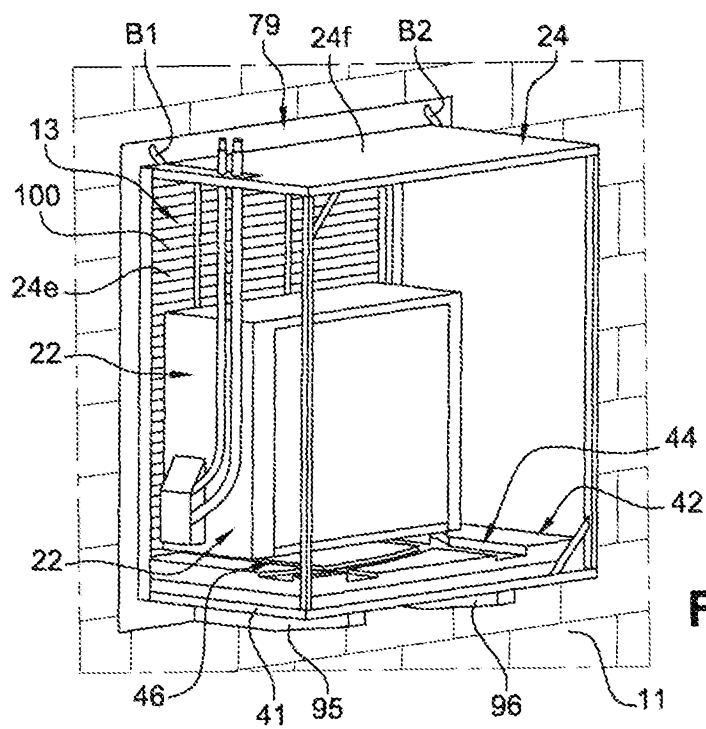


Fig. 8



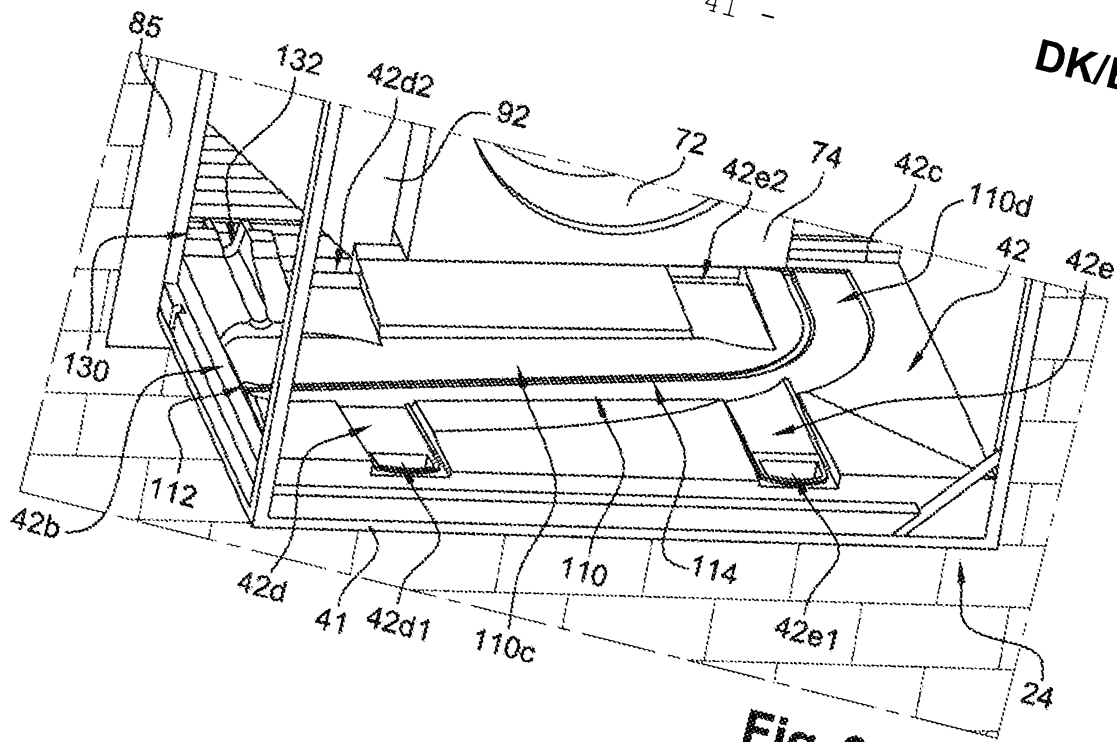


Fig. 9

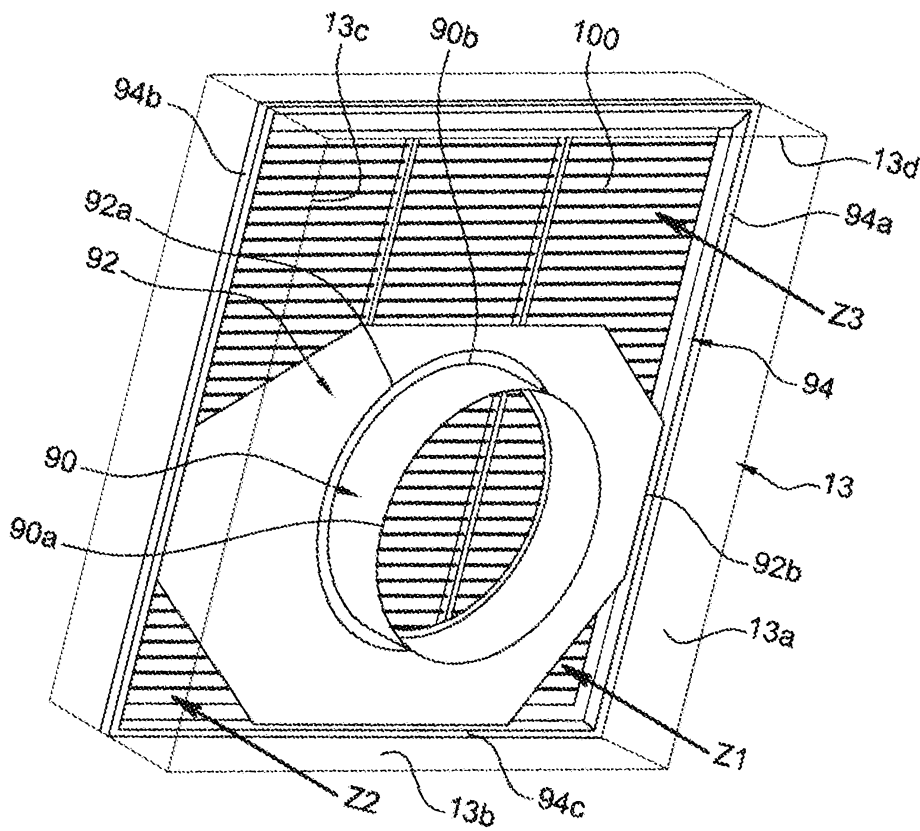


Fig. 10

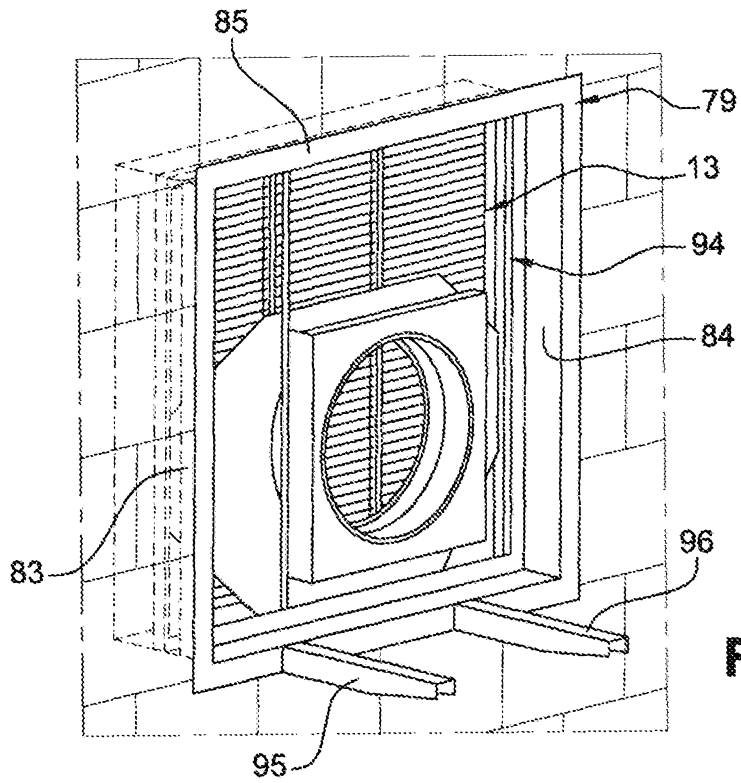


Fig. 11

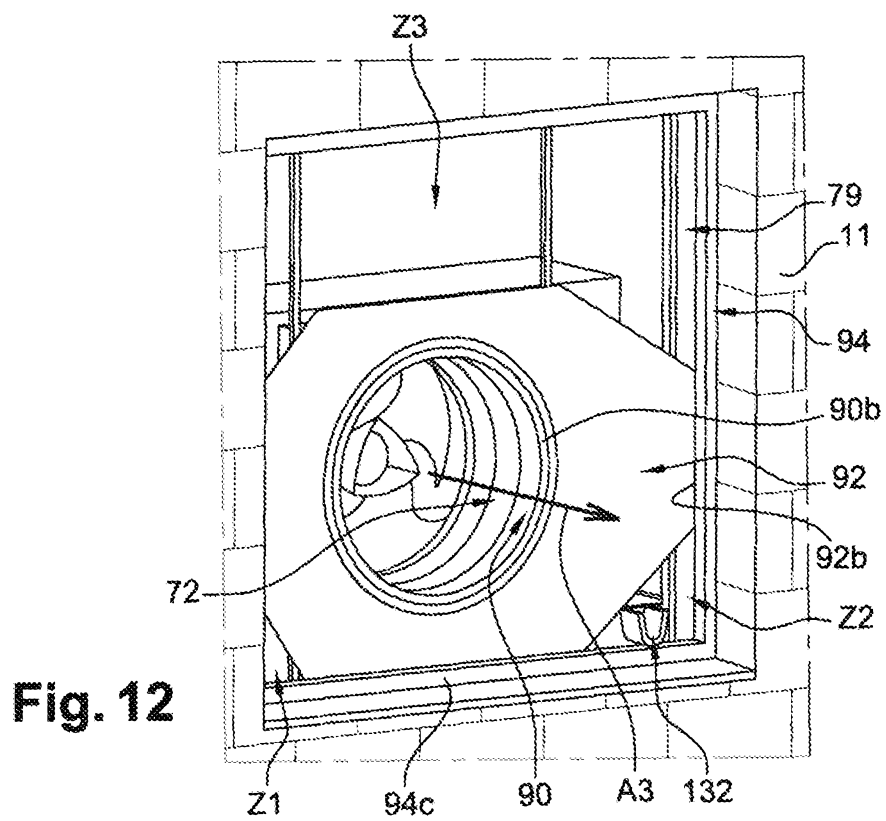


Fig. 12

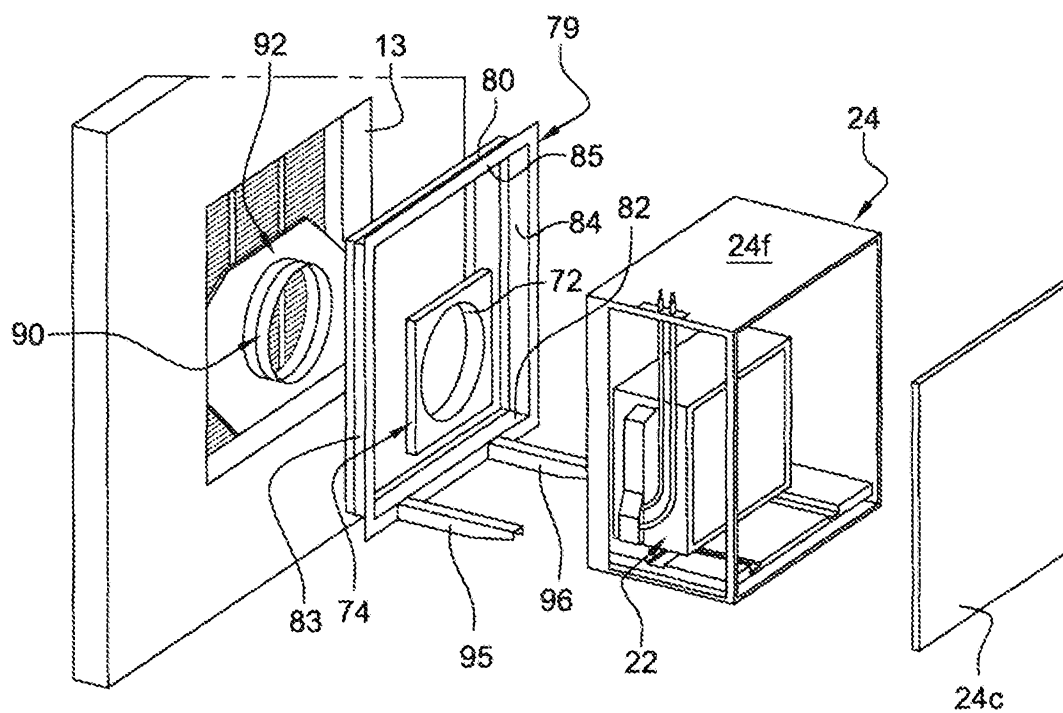


Fig. 13

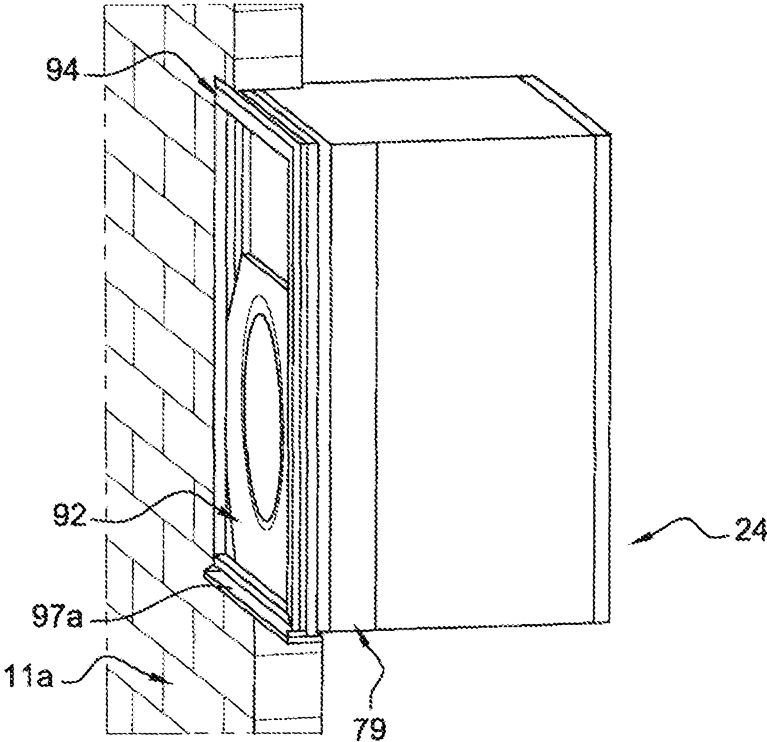


Fig. 14a

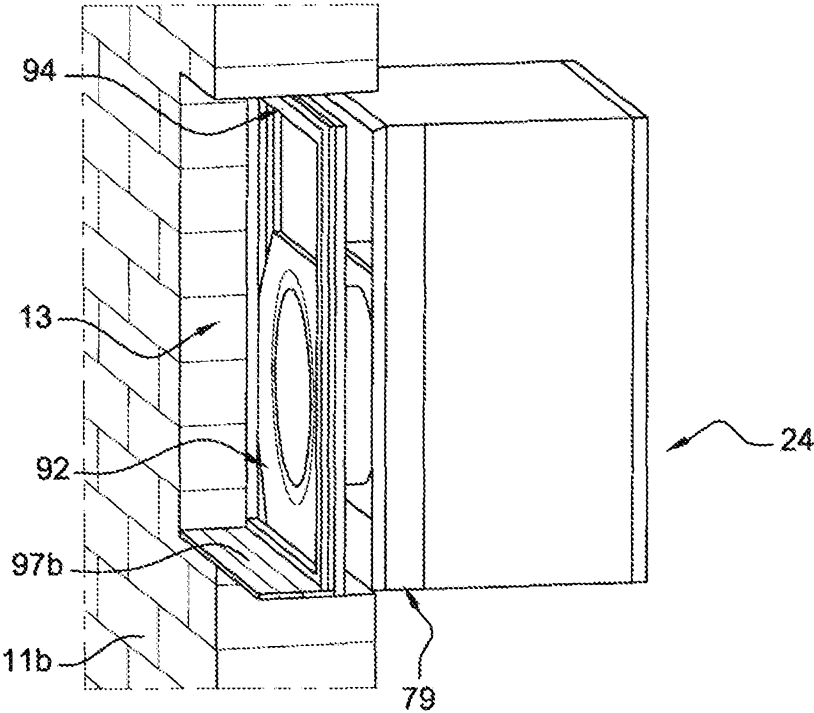
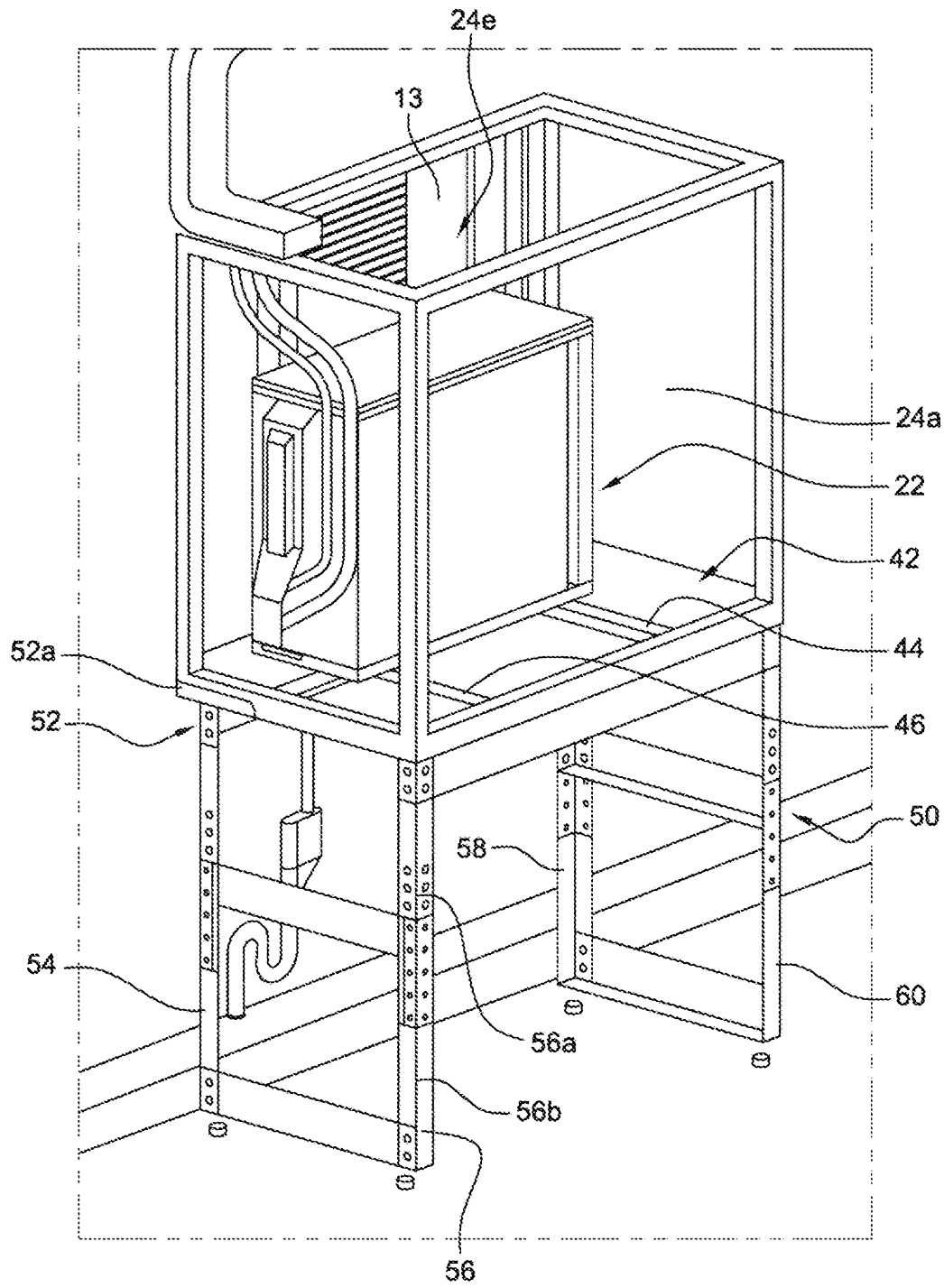


Fig. 14b

**Fig. 15**

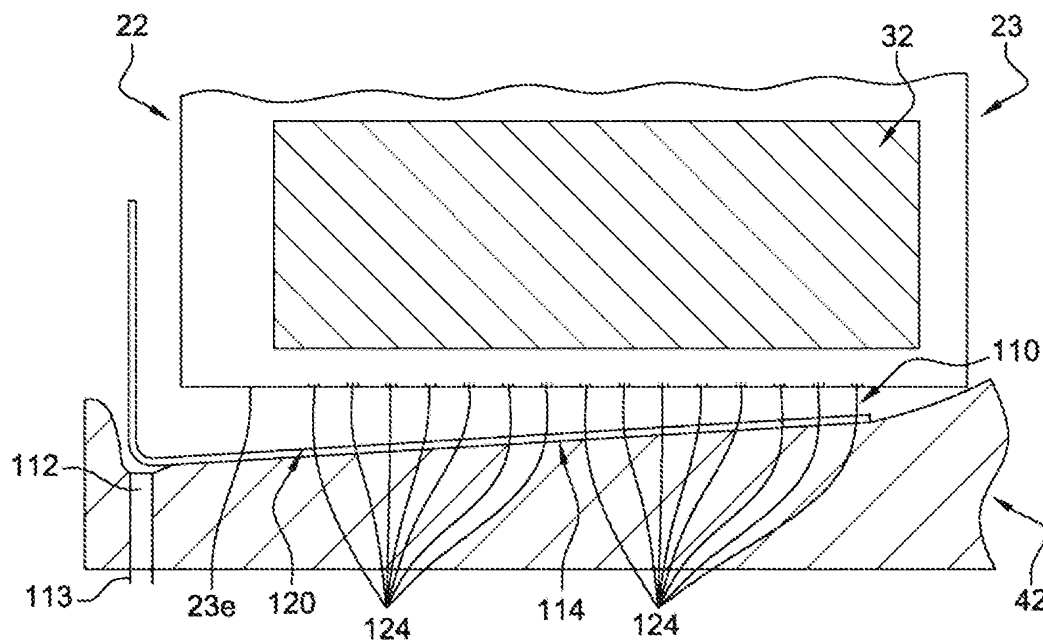


Fig. 16

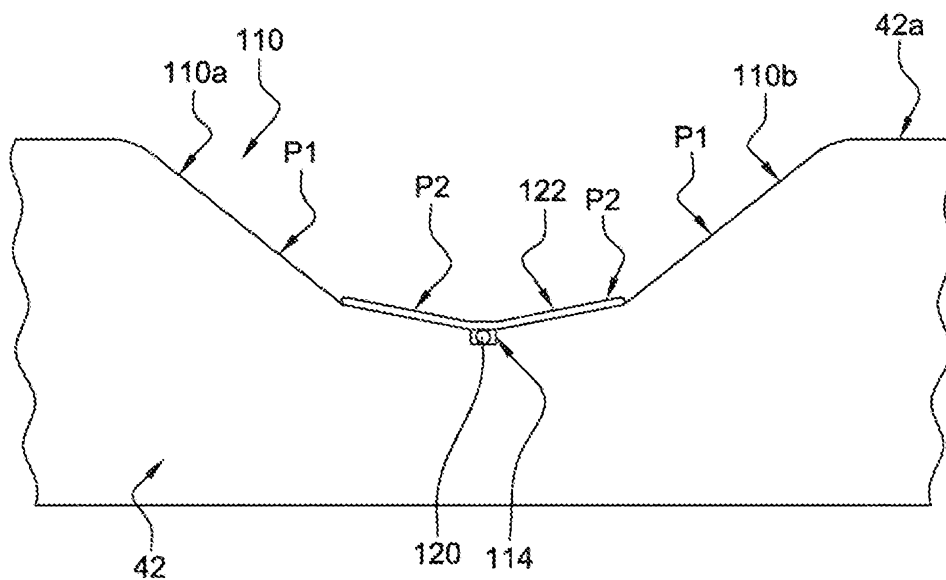


Fig. 17

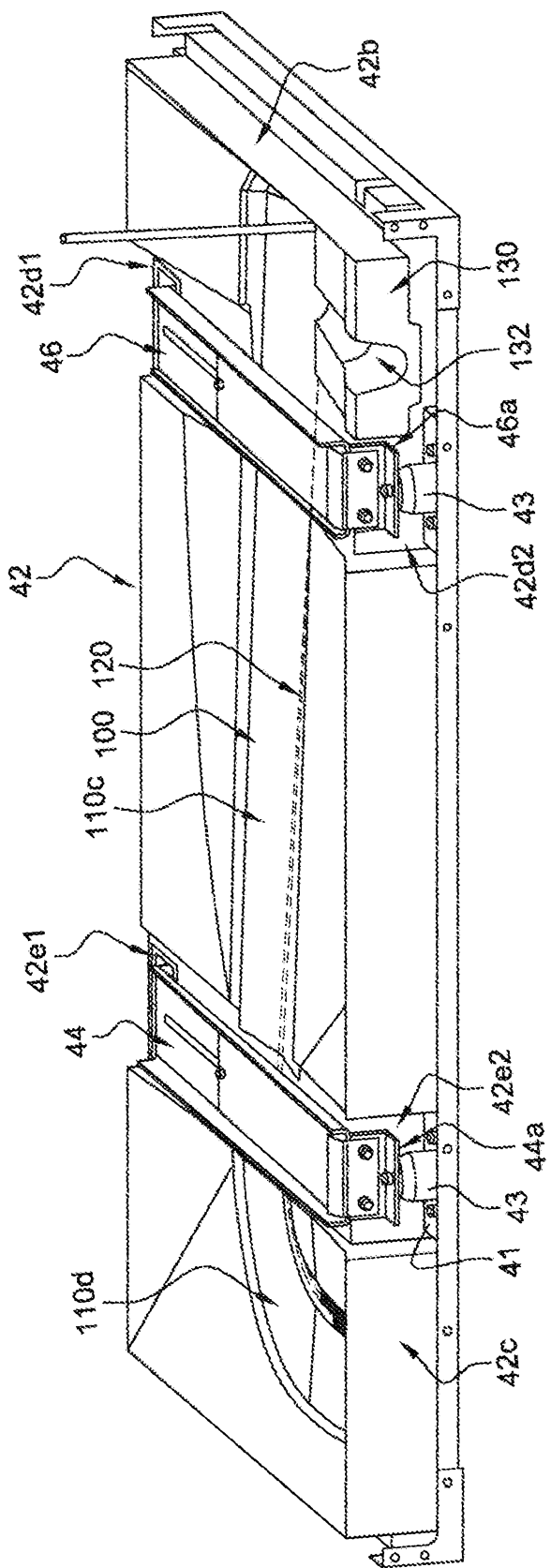


Fig. 18

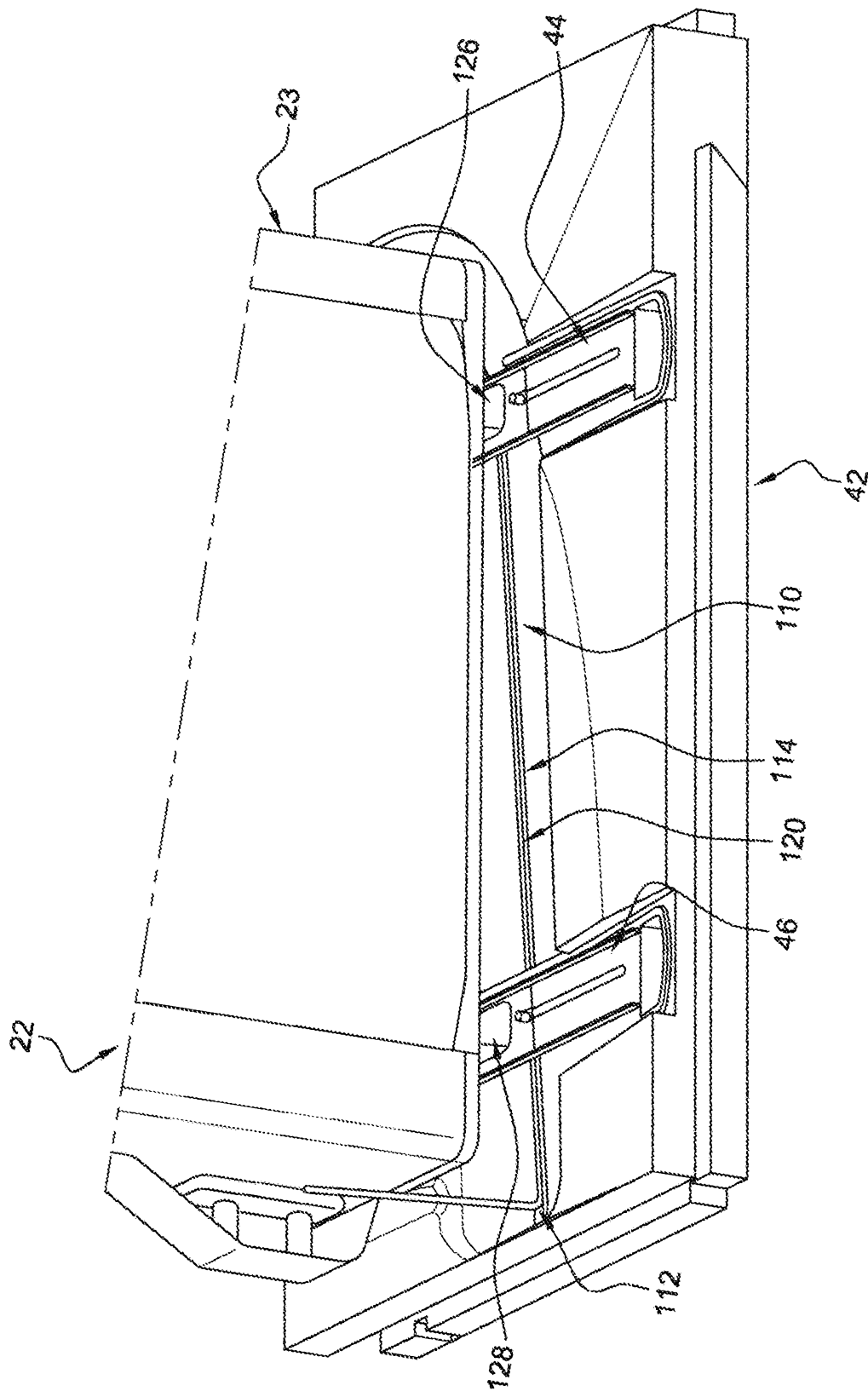


Fig. 19

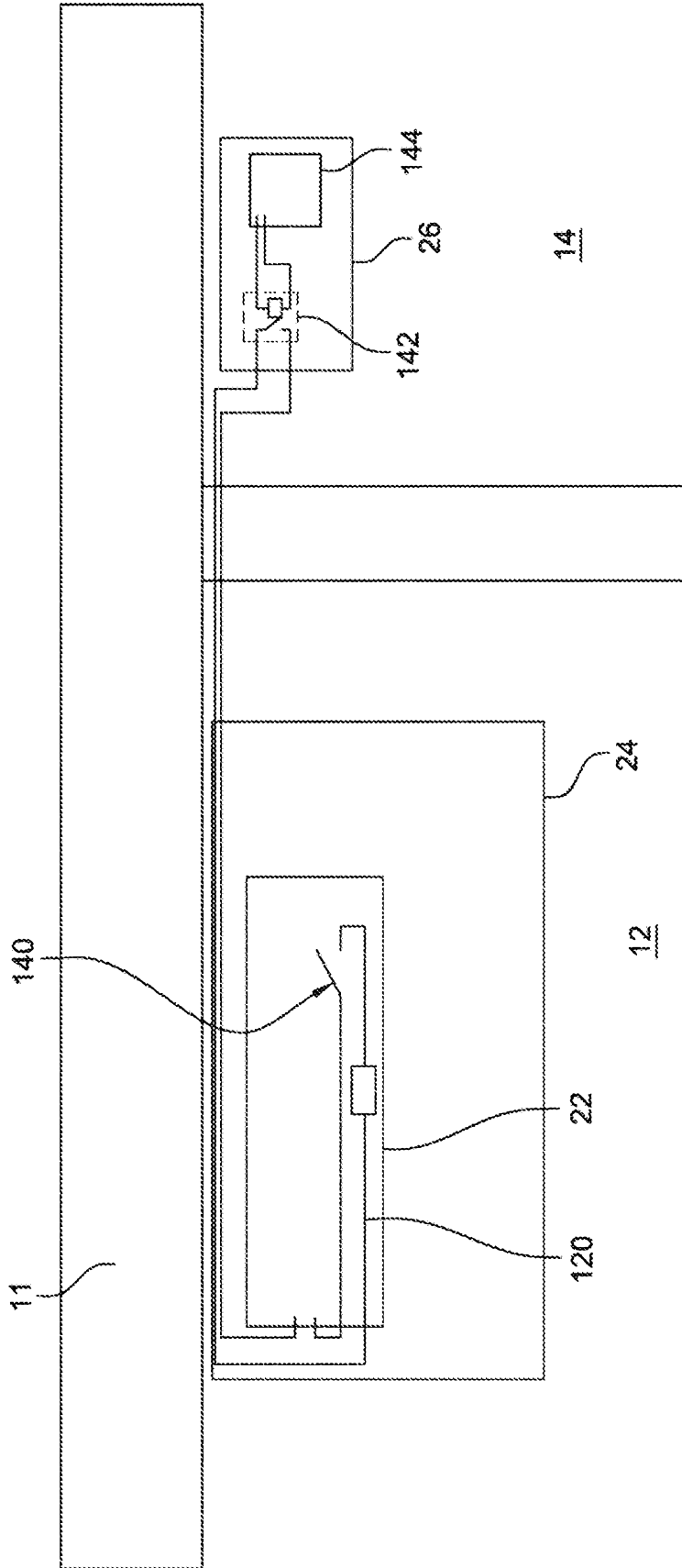
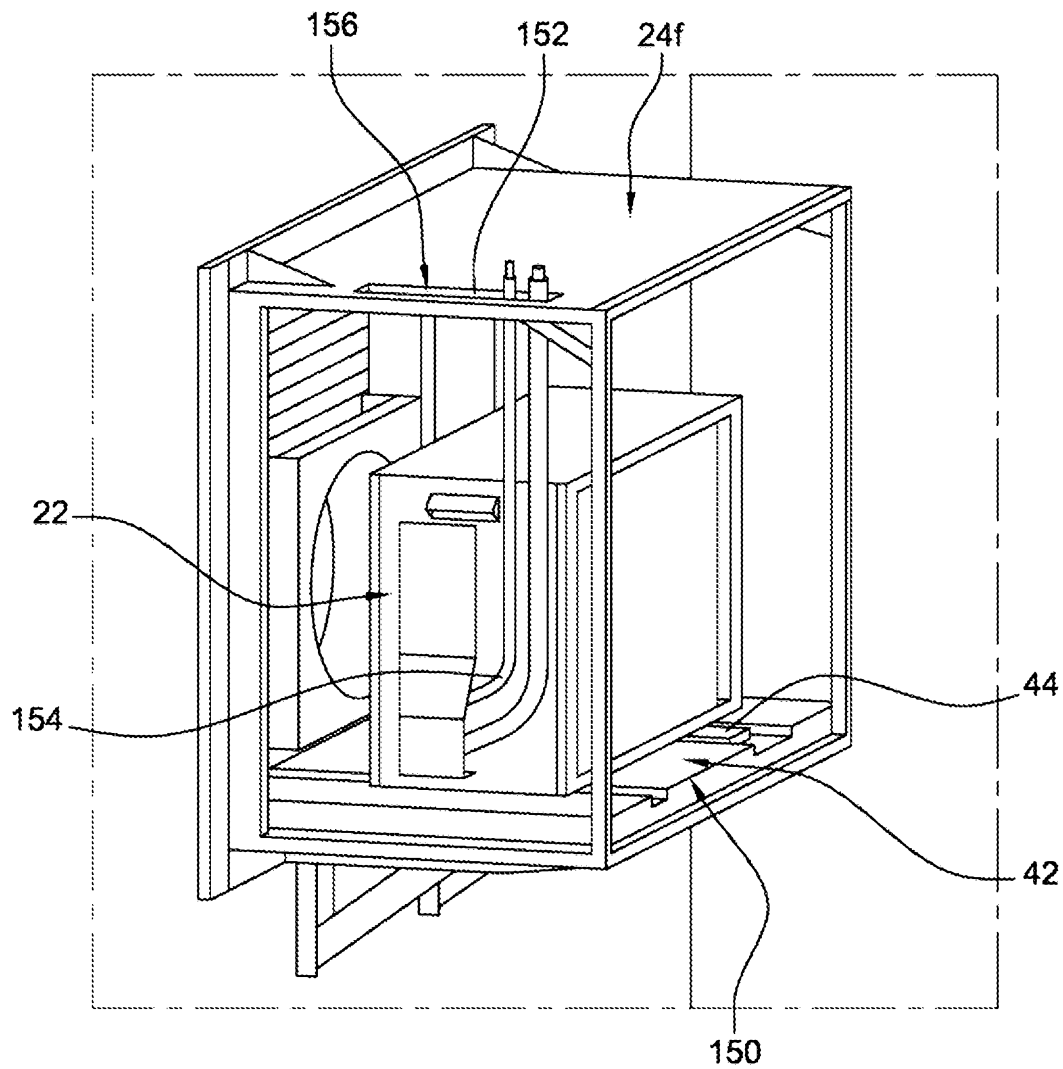


Fig. 20

**Fig. 21**