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(54) **AN AIR CONDITIONING DEVICE**

(57) The invention relates to an air conditioning device (10) comprising a main drain pan (1), a drain pipe (1.1) connected so as to be positioned at the bottom of the main drain pan (1) and at the corner where water accumulates, a plate (3) forming the lateral body of the air conditioning device (10), an additional drain pan (2) configured outwardly from the body to coincide with the valve connections on the plate (3), a transfer pipe (2.1) connected with the additional drain pan (2), characterized in that the bottom of said additional drain pan (2) is positioned upwardly from the bottom of the main drain pan (1), and the transfer pipe (2.1) is configured to extend from the additional drain pan (2) towards the main drain pan (1).

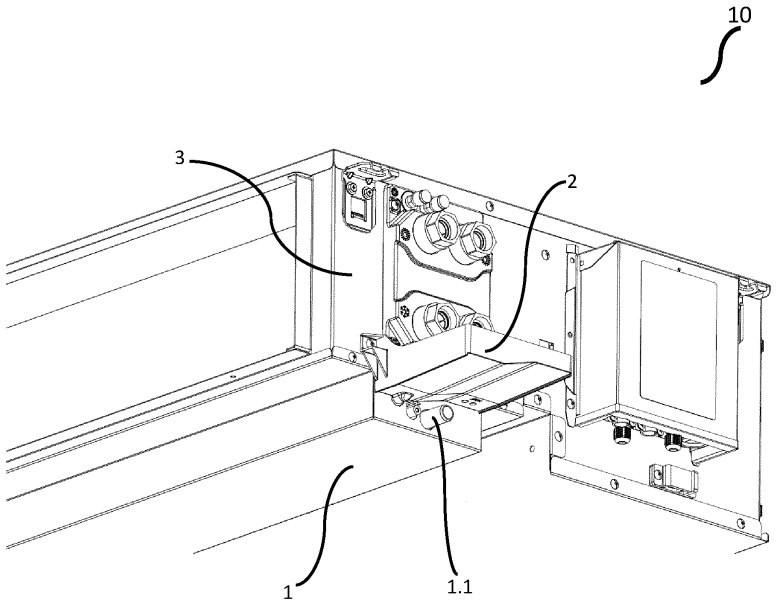

Figure 1

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Description

Technical Field

[0001] The present invention relates to air conditioning devices comprising an additional drain pan outside the main body.

[0002] In particular, the invention discloses an air conditioning device comprising a main drain pan for draining condensed water from the indoor units of the appliance, an additional drain pan positioned at a level above the bottom of the main drain pan and configured outwardly from the housing so as to coincide with the bottom of the valve connections, and a transfer pipe connected between the additional drain pan and the main drain pan.

State of The Art

[0003] As is well known, the air conditioning unit or FCU (fan coil unit) is connected to the water pipework at the installation site. The connection to the pipework must be adequately insulated. If the insulation is insufficient, condensation may form on the cold-water pipe connection and condensation water may drip down. Even if adequate insulation is intended, the insulation may be missing for any reason. For this reason, most fan coil drain pans are designed to catch condensate dripping from these pipe connections.

[0004] Collecting condensed water and discharging it without forming puddles (drain) is important to protect the equipment from corrosion and similar problems caused by water. However, in the drain pan structures in the current technique, especially in the fan coils where the drain pan is attached to the outside of the unit body, there is an air leakage problem between the unit body and the drain pan. The air leakage in question also causes energy waste.

[0005] In such configurations, the drain pan is designed to be longer than the heat exchanger, and the additional pan of the drain pan is located outside the device. The additional pan of the drain pan is designed to collect water from the valves and inlet and outlet pipes. Thus, with a single main drain pan, the condensed water on the heat exchanger and the condensed water formed outside the device are discharged.

[0006] Nowadays, due to the increasing demand for energy saving, some companies are adopting another structure that minimizes air leakage in the flanking coils. In such fan coils, the main drain pan is placed inside the unit body and an additional drain pan is installed outside the unit to catch the condensate water from the pipe connections (Figure 8). The water from the main drain pan (1) and the water from the additional drain pan (2) are combined and then discharged through a single outlet.

[0007] In such a configuration, drain occurs by gravity and therefore the additional drain pan has to be positioned lower than the unit body. Therefore, the total height (L1) of the additional drain pan and the unit body is greater than the height (L2) of the unit body alone, which is disadvantageous for spaces with limited installation space. With the competition in the air conditioning sector, while reducing the size of the devices has gained great importance for the manufacturers, such configurations are not preferred. Therefore, alternative configurations have been developed with the inventions mentioned below.

[0008] In the utility model No. CN202792459U, a water pan, and an air pipe. The water pan comprises a pan body and a water outlet nozzle integrally arranged on the pan body, the water outlet nozzle directs water from the pan body out of the water pan, and the pan body and the water outlet nozzle are integrally formed by injection moulding. There is no solution here to prevent condensation from collecting in the bottom drain pan and to prevent airflow.

[0009] In the utility model No. CN204100529U, a water intake tray, and an air duct machine are disclosed. The dewatering tray comprises a first dewatering portion, a second dewatering portion, and a drainage port, wherein the first dewatering portion and the second dewatering portion form an integral structure, the first dewatering portion comprising a first guide layer and a first foam layer, and the second dewatering portion comprising a second guide layer and a second foam layer. Here, there is no solution for preventing the condensate collected in the lower drain pan from accumulating and preventing airflow.

[0010] It is understood that the above-mentioned prior art problems cannot be solved by the inventions described in the given utility model documents. Therefore, there is a need for an embodiment of the design limitations that efficiently realize the drain of condensation water in the fan coils.

Objectives and Brief Description of the Invention

[0011] The main purpose of the invention is to provide a structure suitable for the physical limitations of the area where the device will be located in order to efficiently provide the discharge of condensed water in the indoor units of the air conditioning devices.

[0012] Another aim of the invention is to prevent water from splashing out of the additional drain pan.

[0013] Another aim of the invention is to create a device that is safe for human health by preventing the growth of water-borne microorganisms in air conditioning systems over time.

[0014] In order to accomplish the above objectives, the invention is an air conditioning apparatus comprising a main drain pan, a drain pipe connected to be positioned at the bottom of the main drain pan and at the corner where water accumulates, a plate forming the lateral body of the air conditioning device, an additional drain pan configured outwardly from the body so as to coincide with the valve connections on the plate, and a transfer pipe connected with the additional drain pan, the bottom of the additional drain pan is positioned above the bottom of the

main drain pan, and the transfer pipe is configured to extend from the additional drain pan towards the main drain pan.

[0015] The additional drain pan in the air conditioning unit according to the invention has a structured bottom sloping downwards towards the transfer pipe.

[0016] The air conditioning device comprises at least one connecting pipe connected to and extending between the transfer pipe and the discharge pipe.

[0017] The connecting pipe comprises a first end connected to the discharge outlet end of the transfer pipe and a second end connected to the inlet end of the discharge pipe.

[0018] In the preferred embodiment of the invention, the diameter of the first end of the connecting pipe is smaller than or the same as the diameter of the transfer pipe. Furthermore, the diameter of the second end of said connecting pipe is smaller than the diameter of the discharge pipe.

[0019] In a further preferred embodiment of the invention, the additional drain pan is portable and removable.

[0020] In a further preferred embodiment of the invention, the additional drain pan has at least one mounting extension having connection holes thereon.

Brief Description of the Figures

[0021]

Figure 1 shows a perspective view of the air conditioning device.

Figure 2 shows a top perspective view of the additional drain pan.

Figure 3 shows the top perspective view of the connection pipe positioned in the air conditioning device.

Figure 4a shows a perspective view of the connection pipe.

Figure 4b shows a front view of the connection pipe.

Figure 5 shows a side-sectional view of the air conditioning device.

Figure 6 shows a front view of the main drain pan.

Figure 7 shows the positions of the additional drain pan and the main drain pan on the device from the side.

Figure 8 shows the positions of the additional drain pan and the main drain pan on the device in the prior art from the side.

Reference Numbers

[0022]

10	Air conditioning device
1	Main drain pan
1.1	Drain pipe
2	Additional drain pan
2.1	Transfer pipe
2.2	Mounting extension
3	Plate
4	Connection pipe
4.1	First end
4.2	Second end
L1	Total height of the unit body and additional drain pan
L2	Unit body height

Detailed Description of the Invention

[0023] The present invention relates to an air conditioning device (10) comprising a main drain pan (1) for draining condensed water from the indoor units of the appliance, an additional drain pan (2) positioned at a level above the bottom of the main drain pan (1) and configured outwardly from the housing to correspond to the bottom of the valve connections, and a transfer pipe (2.1) connected between the additional drain pan (2) and the main drain pan (1).

[0024] A perspective view of the inventive air conditioning device (10) is shown in Figure 1. Air conditioning device (10) comprising;

- a main drain pan (1),
- a drain pipe (1.1) connected so as to be positioned at the bottom of the main drain pan (1) where water accumulates,
- a plate (3) forming the lateral body of the air conditioning device (10),
- an additional drain pan (2) configured outwards from the body so as to be located under the valve connections on the plate (3),
- a transfer pipe (2.1) in connection with the additional drain pan (2).

[0025] As shown in Figure 1, the bottom of the said additional drain pan (2) is positioned above the bottom of

the main drain pan (1). In this positioning, the size of the main drain pan (1) remains the same, and the condensate water collected in the main drain pan (1) is discharged from the drain pipe (1.1) without changing the device or unit body height (L2).

[0026] The aforementioned additional drain pan (2) has mounting extensions (2.2) with connection holes. The additional drain pan (2) is connected to the plate (3) through the mounting extensions (2.2) so that they coincide with the valve connections. The connection of the additional drain pan (2) to the plate (3) is preferably made by screwing through the mounting holes. However, this connection or assembly can also be achieved by other constructions. For example, it may be by means of a snap-fit or by gluing. Furthermore, the additional drain pan (2) may be of a portable construction which can be mounted and dismounted.

[0027] The additional drain pan (2) comprises a transfer pipe (2.1) for transferring the water accumulated in its bottom to the main drain pan (1). The transfer pipe (2.1) is preferably cylindrical, extending from the additional drain pan (2) towards the main drain pan (1). In a preferred embodiment, the bottom of the additional drain pan (2) is designed to slope downwards towards the transfer pipe (2.1). The structure in question is shown in Figure 2. This slope ensures that the water in the additional drain pan (2) is directed toward the transfer pipe (2.1) in any case and no water accumulates in the additional drain pan (2). On the other hand, it is also preferable that the said transfer pipe (2.1) is connected in such a way that it is positioned at the bottom of the additional drain pan (2) and at the corner where water accumulates.

[0028] In the preferred embodiment of the invention, said main drain pan (1) comprises at least one drain pipe (1.1), said drain pipe (1.1) being connected so as to be positioned at the bottom of the main drain pan (1), in particular at the corner where water accumulates.

[0029] The inventive air conditioning device (10) may further comprise at least one connection pipe (4) connected with and extending between the transfer pipe (2.1) and the drain pipe (1.1).

[0030] Figure 3 shows a top perspective view of the connection pipe (4) positioned in the air conditioning device (10). The connection pipe (4) comprising;

- a first end (4.1) connected with the discharge outlet end of the transfer pipe (2.1) and
- a second end (4.2) connected to the inlet end of the drain pipe (1.1)

[0031] Wherein the first end (4.1) diameter of the connection pipe (4) is configured to be smaller than or the same as the diameter of the transfer pipe (2.1). The second end (4.2) diameter of said connection pipe (4) is also configured to be smaller than the diameter of the drain pipe (1.1).

[0032] As shown in Figure 3, there is a height difference in the direction of gravity between the first end (4.1) and the second end (4.2) of the connection pipe (4). Due to the height difference, when water accumulates in the connection pipe (4), the water pressure is sufficiently high compared to the airflow into the drain pipe (1.1). Thus, the condensate water in the additional drain pan (2) is directed through the transfer pipe (2.1) to the main drain pan (1) via the connection pipe (4) and discharged through the drain pipe (1.1) without being affected by any airflow. Figure 5 shows the structure in question.

[0033] Figure 4a and Figure 4b show the perspective and frontal views of the connection pipe (4), respectively. As seen in Figure 4a, the second end (4.2) of the connection pipe (4) is cut or opened from the end to the body to ensure continuous water flow from the main drain pan (1) to the drain pipe (1.1).

[0034] On the other hand, the lowest static pressure in the air conditioning device (10) is where the airflow is the fastest. Therefore, the place where the airflow is the fastest is the drain pipe (1.1) located at the outlet of the main drain pan (1). This airflow is shown with arrows in Figure 5.

[0035] As shown in Figure 6, the second end (4.2) is positioned in the same direction as the airflow in the drain pipe (1.1). Thus, the condensate is discharged in the same direction without being affected by the airflow. Moreover, the diameter of the mentioned second end (4.2) is smaller than the diameter of the drain pipe (1.1).

[0036] As shown in Figure 7, the additional drain pan (2) is positioned higher than the main drain pan (1). In this way, the condensate is directed from the additional drain pan (2) towards the main drain pan (1) and finally discharged from the main drain pan (1). This positioning of the additional drain pan (2) does not affect the device height (L1).

[0037] Figure 8 shows the position of the main drain pan (1) and the additional drain pan (2) on the device in the known state of the art. In the said configuration, the device height (L1) of the device increases as. On the other hand, there is no change in the unit body height (L2) of the device with the present invention. Wherein, the height L2 provided by the invention is shorter than the height L1.

Claims

1. An air conditioning device (10) comprising

- a main drain pan (1),
- a drain pipe (1.1) connected so as to be positioned at the bottom of the main drain pan (1) where water accumulates,
- a plate (3) forming the lateral body of the air conditioning device (10),
- an additional drain pan (2) configured outwards from the body so as to be located under the valve connections on the plate (3),

- a transfer pipe (2.1) in connection with the additional drain pan (2)

characterized in that

- the bottom of the additional drain pan (2) is positioned above the bottom of the main drain pan (1),
- the transfer pipe (2.1) is configured to extend from the additional drain pan (2) towards the main drain pan (1).

2. The air conditioning device (10) according to claim 1, wherein the additional drain pan (2) has a base structured as sloping downwards towards the transfer pipe (2.1).

3. The air conditioning device (10) according to claim 1, wherein comprises at least one connection pipe (4) connected to the transfer pipe (2.1) and the drain pipe (1.1) and extending in between.

4. The air conditioning device (10) according to claim 3, wherein the connection pipe (4) comprises

- a first end (4.1) connected with the discharge outlet end of the transfer pipe (2.1), and
- a second end (4.2) connected to the inlet end of the drain pipe (1.1).

5. The air conditioning device (10) according to claim 4, wherein the diameter of the second end (4.2) of the connection pipe (4) is smaller than the diameter of the drain pipe (1.1).

6. The air conditioning device (10) according to claim 5, the diameter of the first end (4.1) of the connection pipe (4) is smaller than or equal to the diameter of the transfer pipe (2.1).

7. The air conditioning device (10) according to any one of the preceding claims wherein the additional drain pan (2) is of portable construction which is attachable and removable.

8. The air conditioning device (10) according to any one of the preceding claims wherein the mentioned additional drain pan (2) has at least one mounting extension (2.2) with connection holes on it.

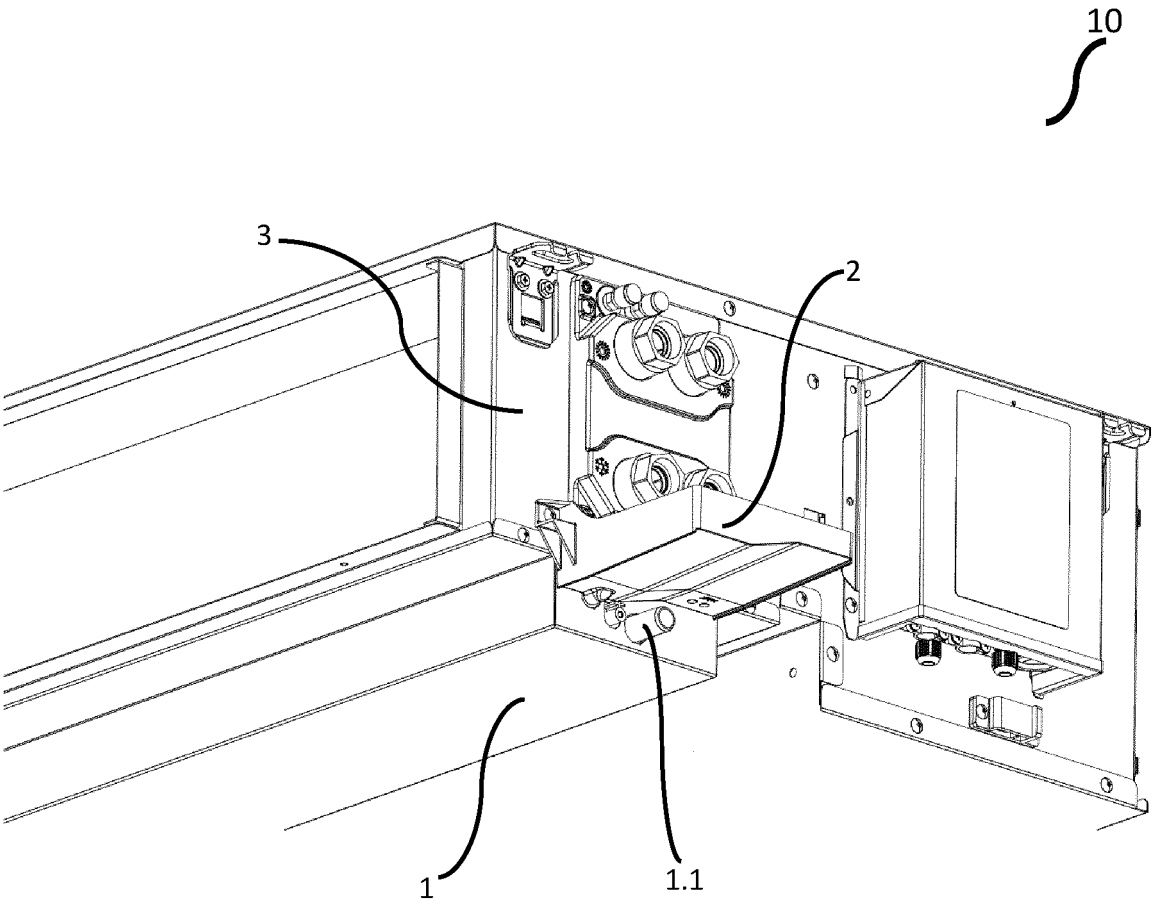

Figure 1

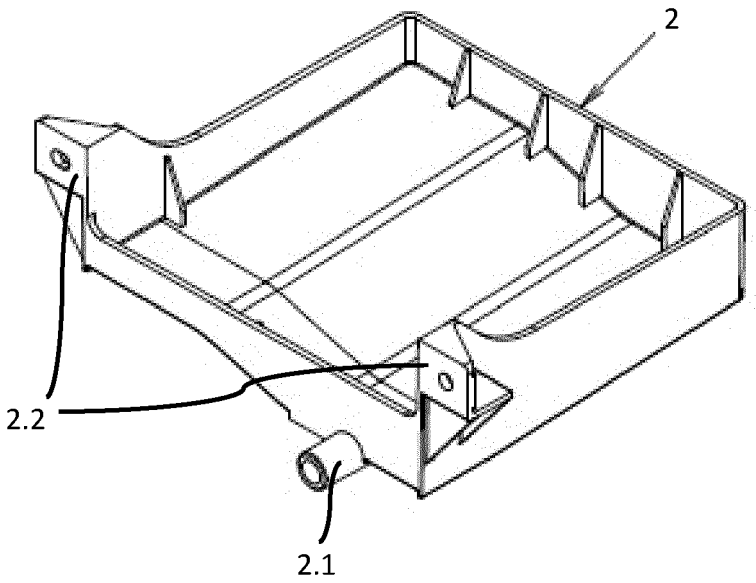

Figure 2

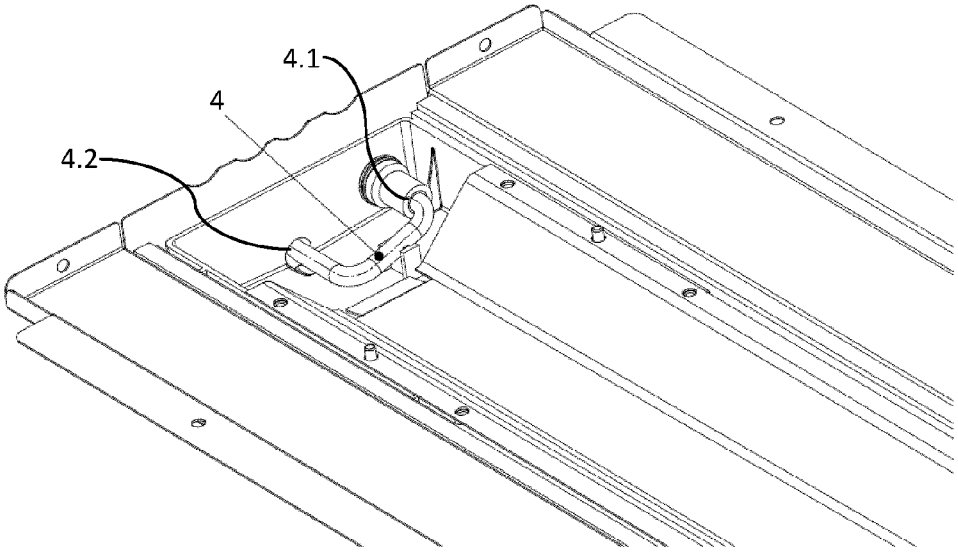

Figure 3

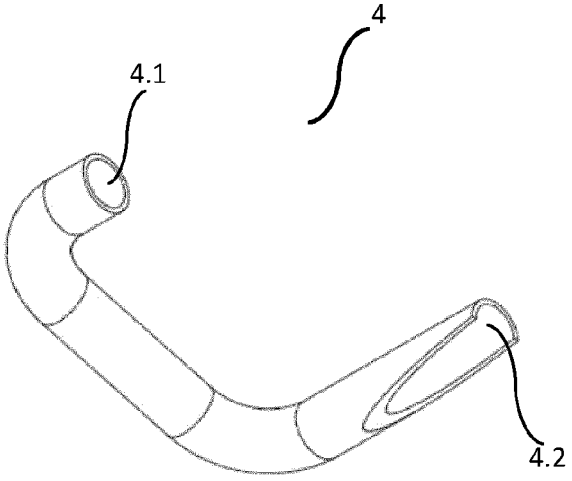

Figure 4a

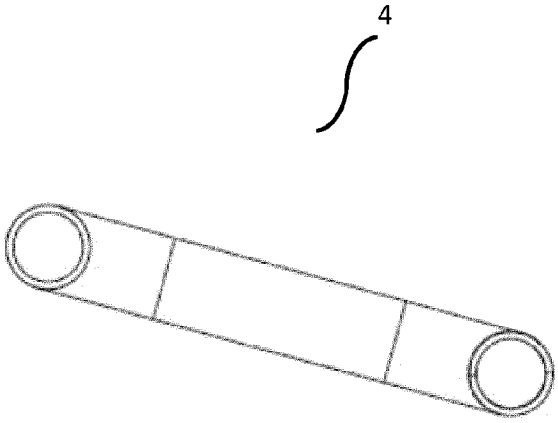

Figure 4b

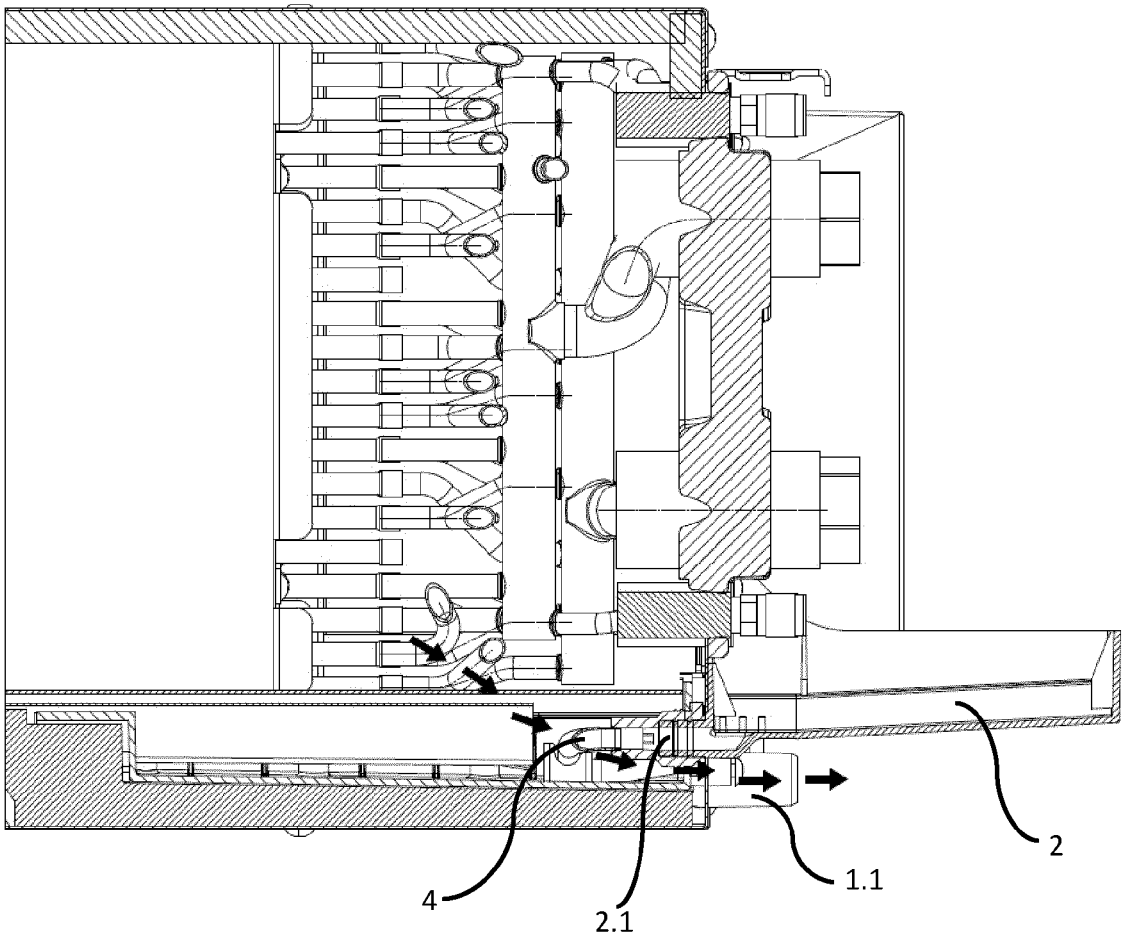

Figure 5

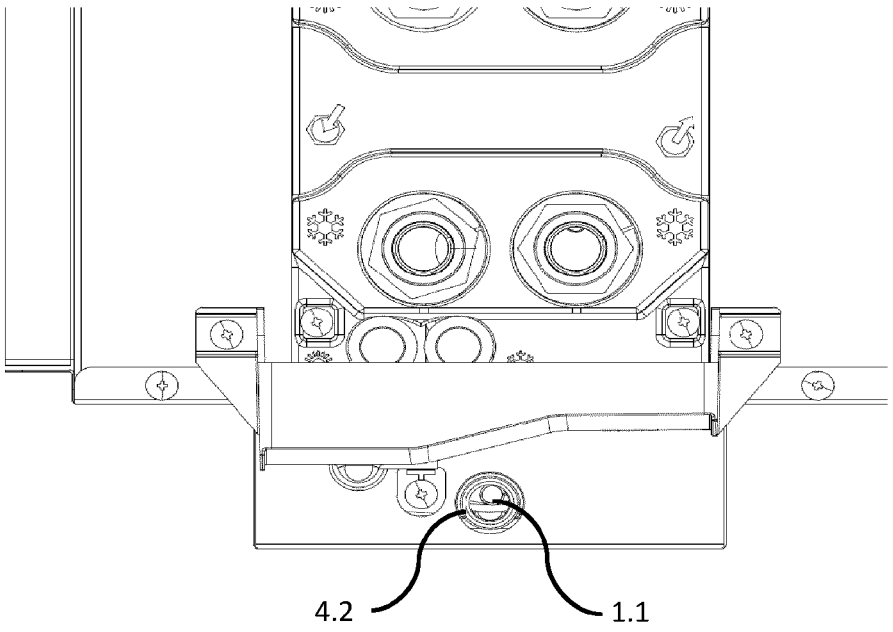

Figure 6

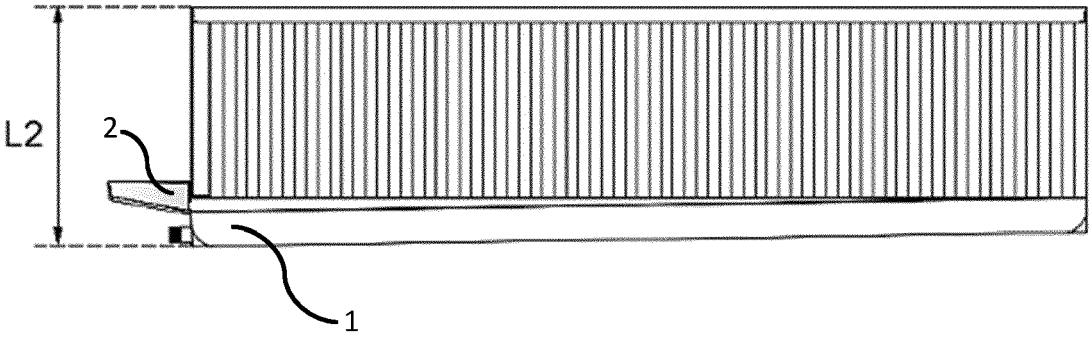

Figure 7

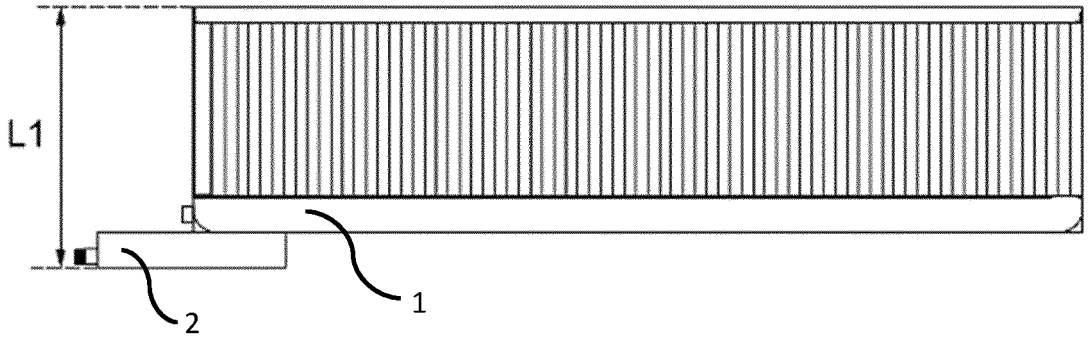

Figure 8 (Prior Art)

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EUROPEAN SEARCH REPORT

Application Number
EP 24 02 0346

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	JP 3 013566 B2 (MITSUBISHI ELECTRIC CORP) 28 February 2000 (2000-02-28) * the whole document *	1-8	INV. F24F1/0047 F24F13/22
A	US 8 869 548 B2 (PICCIONE DAVID [US]; ASPEN MFG LLC [US]) 28 October 2014 (2014-10-28) * the whole document *	1-8	
A	KR 2002 0009723 A (LG ELECTRONICS INC [KR]) 2 February 2002 (2002-02-02) * the whole document *	1-8	

TECHNICAL FIELDS SEARCHED (IPC)

F24F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	28 March 2025	Decking, Oliver

CATEGORY OF CITED DOCUMENTS

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