(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 4 242 536 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
13.09.2023 Bulletin 2023/37

(21) Application number: **22161653.5**

(22) Date of filing: **11.03.2022**

(51) International Patent Classification (IPC):
F24F 1/06 *(2011.01)* ***F24F 1/38*** *(2011.01)*
F24F 1/56 *(2011.01)* ***F24H 4/06*** *(2006.01)*
F24H 9/02 *(2006.01)*

(52) Cooperative Patent Classification (CPC):
F24F 1/06; F24F 1/38; F24F 1/56; F24H 4/06; F24H 9/02

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(71) Applicant: **BDR Thermea Group B.V.**
7332 BD Apeldoorn (NL)

(72) Inventors:
- **SIEGEL, Olivier**
  7332 BD Apeldoorn (NL)
- **ANTOINE, Florian**
  7332 BD Apeldoorn (NL)
- **VALIERE, Frédéric**
  7332 BD Apeldoorn (NL)

(74) Representative: **Dennemeyer & Associates S.A.**
Postfach 70 04 25
81304 München (DE)

(54) **MODULAR AIR GUIDING ASSEMBLY**

(57) Modular air guiding assembly (1) for a heating device (2), in particular for a heat pump, the heating device (2) having an heat exchanger (3) and at least a fan element (4) arranged in an internal space (17) defined at least in part by an external casing (18), wherein the assembly (1) comprises a plurality of components (5, 6, 7, 8) configured to be assembled together in one or more assembled configurations and to be disassembled in a disassembled configuration to form at least a seat (9, 10, 23) for the fan element (4) and an air duct (11) between the heat exchanger (3) and each of the at least two fan elements (4) and wherein the assembly (1), in particular is made of a polymeric material, in particular of foam plastic, more particularly of polypropylene expanded (PPE) or expanded polystyrene (EPS), and, is placeable in the internal space (17) of the heating device (2) between the external casing (18) and the heat exchanger (3).

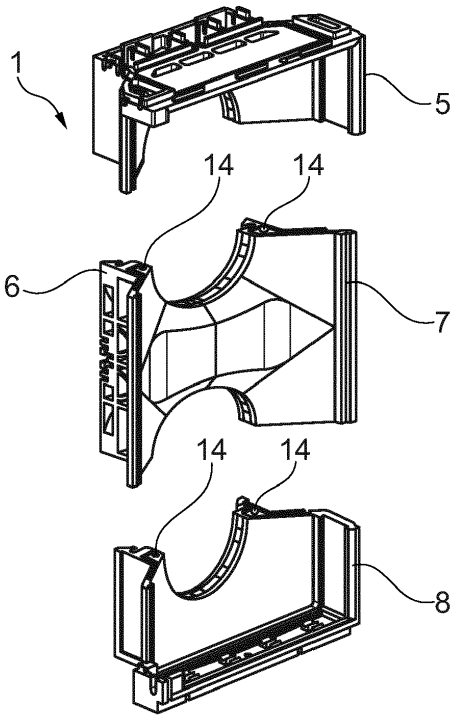

Fig. 2A

EP 4 242 536 A1

Description

[0001] The invention relates to a modular air guiding assembly for a heating device, in particular for a heat pump, and to a heating device comprising said modular air guiding assembly. Also, the invention relates to a use of said modular air guiding assembly in a heating device, in particular a heat pump device. In addition, the invention relates to a method for manufacturing the modular air guiding assembly.

[0002] A heating device like a heat pump is a device able to warm a closed space of a building or to warm domestic hot water by transferring thermal energy from a cooler space to a warmer space. This is obtained using a refrigeration cycle carried out in the opposite direction of the heat transfer. Among the different refrigeration cycles, the most widely used is the vapor compression refrigeration, in which a refrigerant undergoes phase changes.

[0003] Vapor-compression refrigeration uses a circulating liquid refrigerant as the medium which absorbs heat from one space, compresses it, thereby increasing its temperature before releasing it in another space. A vapor-compression refrigeration system usually comprises a compressor, a water tank, a reversing valve for selecting between a heating and cooling mode, expansion valves and heating exchangers. In heating mode the external heat exchanger is the evaporator and the internal one being the condenser; in cooling mode the roles are reversed. In particular, the thermodynamic circuit of a heat pump water heater comprises a first stage, or hot stage, including the condenser, and a second stage, or cold stage, including the evaporator. A heat transfer fluid circulates in a closed circuit, wherein this fluid flows in the evaporator at low pressure. At the evaporator outlet, the fluid is compressed by the compressor and flows in the condenser before passing through an expansion valve. The valve lowers the fluid's pressure so that the fluid can return to the evaporator. The condenser is usually arranged in, or around, a water tank in order to determine a heat transfer, whereas the evaporator is crossed by an air circulation path and is coupled to a fan element.

[0004] Usually, the region between the evaporator and the fan element is very bulky and heavy due to the presence of several elements, such as structural elements for supporting the fan, for supporting the evaporator, to maintain the external casing of the heating device, for supporting pipes, electrical cables, electronic components, etc. Also, in case of maintenance, the inspection and/or reparation processes can be extremely time consuming caused by the assembling and disassembling steps. These problems become more relevant if the heating device comprises additional structural elements, such as a plurality of fans.

[0005] It is therefore desirable to obtain a system for guiding air from the evaporator to the fan element that is more compact, light, and easy to assemble and/or disassemble compared to prior art.

[0006] The object is solved by a modular air guiding assembly for a heating device, in particular for a heat pump, the heating device having an heat exchanger and at a fan element arranged in an internal space defined at least in part by an external casing, wherein the assembly comprises a plurality of components configured to be assembled together in one or more assembled configurations and to be disassembled in a disassembled configuration to form at least a seat for the fan element and an air duct between the heat exchanger and the fan element and wherein the assembly, in particular is made of a polymeric material, in particular of foam plastic, more particularly of polypropylene expanded (PPE) or expanded polystyrene (EPS), and, is placeable in the internal space of the heating device between the external casing and the heat exchanger.

[0007] Advantageously, the shape of the present assembly can be adapted according to different configurations and in particular is shaped to form an efficient air duct of the heat pump, thereby allowing the possibility to combine several functions: structural base, maintain at least one fan, maintain the evaporator, guide the air, maintain the external casing, maintain the electronic control box, manage wire routing, maintain the sensors, collect the condensate at the bottom, maintain pipes for defrosting, save weight, save assembly time, easily disassembly for component replacement without dedicated tools for the maintenance.

[0008] It is noted that using the polymeric material, for example the foam, make it possible the combination of all the above-mentioned functions.

[0009] The plurality of components are configured to be assembled together in an assembled configuration and to be disassembled in a disassembled configuration. In this way, the maintenance of the heating device becomes easier and quicker since the element to be inspected or replaced can be easily reached by simply disassembling one or more of the plurality of components.

[0010] According to an example, in a first assembled configuration the plurality of components forms a first seat, a second seat and the air duct, and in a second assembled configuration the plurality of components forms a single seat and the air duct. The modularity aspect of the assembly allows the use of the assembly for different configuration, i.e., when the evaporator is coupled to a single fan element or to two fan elements.

[0011] In one example, the plurality of components comprises a first component, a second component, a third component, and a fourth component, wherein in the first assembled configuration the first component and the second component form at least in part the first seat and the air duct. In the first assembled configuration the third component and the fourth component form at least in part the second seat and the air duct. The possibility to separately form the first seat and the second seat with different components leads to the advantage of disassembling only the relevant components of the assembly

in case of maintenance. If for example one fan element is not working properly or is broken, it is possible to disassemble only the components forming the seat of that fan element, thereby leaving the other components in an assembled configuration so that other functions of the assembly, i.e., the support of the evaporator, the support of the casing, etc., are not compromised. In the second assembled configuration, the first component and the fourth component form the single seat and the air duct. In other words, based on the situation, the components of the modular assembly can be differently combined to implement a single or two fan elements. The second component and the third component can be made as one piece part or as two separate parts.

[0012] In another example, the first component is fixable to the second component and to the third component, wherein the fourth component is fixable to the second component and to the third component. Also, first component is fixable to the fourth component. In particular, the assembly of the first, second and third components defines a first aperture, in particular a first circular aperture, and the assembly of the second, third and fourth components defines a second aperture, in particular a second circular aperture. The assembly of the first and fourth component defines a third aperture, in particular a third circular aperture. The first aperture is advantageously located at the first seat for a first fan element, whereas the second aperture is advantageously located at the second seat for a second fan element. Therefore, if the first fan needs to be replaced, the replacement can be carried out by simply disassembling the first component and in principle leaving the second, the third, and fourth component in the assembled configuration. On the other hand, if the second fan needs to be replaced, the replacement can be carried out by simply disassembling the fourth component and in principle leaving the first, the second, and the third component in the assembled configuration. The third aperture is advantageously located at the single seat for a single fan element.

[0013] In order to maintain the components in the assembled configuration, the plurality of components each comprises connecting means, in particular pins and/or recesses, for assembly to each other. It is noted that the connecting means are made of the same material of the assembly and can be integrated in the components. In other words, the components can be directly assembled together without screw or rivet.

[0014] In another example, the air duct between the heat exchanger and the fan element has a variable cross-section. In particular, the cross-section of the air duct decreases along the direction from the heat exchanger to the fan element. In this way, the air conduction of the air is improved. Advantageously, the air duct formed by the assembly can extend from an inlet portion of the heat exchanger to an outlet portion of the fan element.

[0015] In one example, the assembly further comprises a supporting element for supporting the external casing.

[0016] In a further example, in order to firmly support the heat exchanger, the assembly further comprises a heat exchanger seat for positioning the heat exchanger. For example, the assembly comprises protruding edges forming said heat exchanger seat. Advantageously, the heat exchanger seat can be formed in only some of the components of the assembly. In particular, the protruding edges can be present in the first and fourth components. In the one or more assembled configurations, the assembly can define an internal seat to completely cover the fan element and/or the heat exchanger.

[0017] In another example, the assembly further comprises a condensate collection region located at the heat exchanger, wherein in particular the condensate collection region is located in a bottom region of the assembly. For example, the condensate collection region can be located in the fourth component of the assembly.

[0018] In an example, the assembly is devoid of any metal element. In other words, the assembly is metal free and is entirely made of polymeric material, such as foam.

[0019] It is noted that parts of the assembly can integrate on the internal elements at least two of these functions:

- support for the heat exchanger(s) (i.e., evaporator);
- support for the fan(s); and
- box for the condensate from the evaporator(s).

[0020] In addition, parts of the assembly can integrate on the external part at least one of these functions:

- support for the external casing; and
- support for other elements of the heat pump such as electrical harnesses or components of the heat pump.

[0021] In another aspect of the invention, a heating device, in particular a heat pump device, is provided, the heating device comprising the inventive assembly, wherein the assembly is placed in an internal space of the device between an heat exchanger and an external casing.

[0022] In a further aspect of the invention, a use of the inventive air guiding assembly is provided. The inventive air guiding assembly is used in a heating device, in particular a heat pump device.

[0023] In a still another aspect of the invention, a method for manufacturing the inventive assembly is provided. The method comprises:

a. introducing a polymeric material, in particular foam plastic, in a forming tool, the forming tool being shaped according to at least one component;
b. providing hot steam to the forming tool;
c. forming least one component;
d. repeating steps a, b, and c for another component; and
e. assembling the formed components to form the

air guiding assembly.

[0024] The manufacturing method is therefore fast and economic to realize, thereby offering the possibility for an assembly production.

[0025] In the figures, the subject-matter of the invention is schematically shown, wherein identical or similarly acting elements are usually provided with the same reference signs.

Figure 1 shows a schematic representation of the air guiding assembly according to an example.

Figures 2A-C show a perspective view of the assembly in a disassembled and in an assembled configuration according to a first and a second assembled configuration.

Figures 3A-B show a perspective view of the assembly coupled to the elements of a heating device according to an example.

[0026] Figure 1 illustrates the assembly 1 for guiding the air flow in a schematic representation. The assembly 1 can be coupled to a heating device 2, for example a heat pump water heater. The heating device 2 comprises at least a heat exchanger such as an evaporator 3 for absorbing heat and producing a fluid in a gas/vapor form at a lower temperature and low pressure and a plurality of fan elements 4. In the figures, two fan elements 4 are represented. However, the assembly 1 can be suitable for any number of fan elements 8 coupled to the evaporator 3. The evaporator 8 is crossed by an air circulating path. The air is conducted from the evaporator 8 to the fan elements 4 and then outside the heating device 2. In particular, the heating device 2 is a heat pump, and the evaporator 3 and the two fan elements 4 are arranged in an internal space 17 of the device 2 defined at least in part by an external casing 18. The external casing 19 can be formed of metallic parts.

[0027] The fan elements 4 are located in a first seat 9 and in a second seat 10 present in the assembly 1 and an air duct 11 is formed between the heat exchanger 3 and each of the two fan elements 4.

[0028] The assembly 1 is made of a polymeric material, in particular of foam plastic, more particularly of polypropylene expanded (PPE).

[0029] Figure 2A illustrates the assembly 1 in a disassembled configuration whereas Figures 2B and 2C illustrate the assembly 1 in a first assembled configuration (figure 2B) and in a second assembled configuration (figure 2C). The assembly 1 comprises four distinct components, i.e. a first component 5 or top component, a second component 6, or first central component, a third component 7, or second central component, and a fourth component 8, or bottom component. The second component 6 and the third component 7 are formed as two parts and are connected with each other in the state shown in figure 2A. However, in a non-shown embodiment the second component 6 and the third component 7 can be formed as a single piece part.

[0030] The different components 5, 6, 7, 8 can be assembled together using connecting means 14. The connecting means 14 are integral parts of the single components and are shaped as pins and recesses. Figure 2A shows for example that the second component 6 comprises at least a recess 14 and the third component 7 comprises at least a pin 14, both located on the upper portion of the components 6, 7. A corresponding pin is present on the lower portion of the first element 5 to be coupled with the recess 14 of the second element 6 and a corresponding recess is present on the lower portion of the first element 5 to be coupled with the pin 14 of the third element 7. The assembly occurs by simply connecting the lower portion of the first component 5 with the upper portions of the second and third component 6, 7. It is noted that the second and third components 6, 7 in the figure are represented in an assembled configuration. It is however clear that they can be disassembled and that the connection is carried out using similar connection means 14 (recesses and pins) located for example on the lateral internal portion of these two components 6, 7. Similarly, the fourth component 8 can be assembled by connecting the upper portion of the fourth component 8 with the lower portions of the second and third component 6, 7.

[0031] In the assembled configuration, the assembly 1 has the form of a polygonal, in particular rectangular, box. This shape basically serves to fit the form of the evaporator 8 that is inserted in the assembly 1 and to support the external casing of the heating device 2. In the first configuration (figure 2B), when the first, second, third and fourth components, 5, 6, 7, 8, are assembled together, two circular openings 12, 13 are formed. These openings 12, 13 represent, at least in part, the first seat 9 and the second seat 10 for arranging the two fans 4. The first and second seats 9, 10 can have a polygonal shape to arrange the body of the fans 4. In particular, the first opening 12 is formed when the first component 5 is connected to the second component 6 and the third component 7, whereas the second opening 13 is formed when the fourth component 8 is connected to the second component 6 and the third component 7. Accordingly, in case a fan element 4 arranged at the first opening 12 needs to be replaced, it is sufficient to disassemble only the first component 5 and maintaining the second, third and fourth components 6, 7, 8 in an assembled configuration. In the second configuration (figure 2C), only two of the fourth components are taken into account. In particular, the first component 5 and the fourth component 8 are assembled together to form a circular opening 21. This opening 21 represents the single seat 23 for accommodating a single fan element 4.

[0032] It is furthermore noted that in the assembled configurations, the internal surfaces of the assembly 1

are shaped to form an air duct 11 between the evaporator 8 and each of the fan elements 4. Also, the assembly 1 comprises a heat exchanger seat 15 to locate the evaporator 8. In particular, protruding edges 19 present in the first component 5 and the fourth component 8 define the heat exchanger seat 15. As shown in figure 2C, in the assembled configuration, an internal seat 24 can be formed to completely cover the fan element 4 and/or the heat exchanger 3. In particular, parts of the assembly 1 can cover whole periphery of the fans and the heat exchanger 3 (i.e. the evaporator). In addition, parts of the assembly 1 enclose the air flow along its entire path from the inlet to the heat exchanger (3) to the outlet of the fan. In other words, the assembly 1 can comprise parts configured to overhang or at least enclose the fan and the evaporator over their entire width.

[0033] At the bottom region of the assembly, i.e. in the fourth component 8, a condensate collection region 16 is provided for the collection of condensate fluid originating from the evaporator 3.

[0034] Figure 3A shows the assembly 1 coupled to the elements of the heating device 2. It is noted that this figure shows the assembly 1 according to the first configuration in order to accommodate two fan elements. In particular, it is noted that the evaporator 8 is located in the heat exchanger seat 15 and the two fan elements 4 are located in the corresponding first seat 9 and second seat 10. Other elements of the heating device 2, such as the compressor 20, are located outside the assembly 1. It is noted that the assembly 1 is a compact structure and efficiently functions for conducting the air flow from the evaporator to the two distinct fan elements 4. An additional external casing 18 (not shown in the figure) is provided in front of the heating device 2 to cover the assembly 1. The external casing 18 is of course provided with two opening at the position of the two fan elements 4. Figure 3B shows the assembly 1 coupled to the heating device 2 in a lateral view. From the figure, the compactness of the assembly 1 as well as the decreased cross-section of the air duct 11 from the evaporator 3 to the single fan elements 4 can be appreciated.

Reference Signs

[0035]

1 Air guiding assembly
2 Heating device
3 Heat exchanger
4 Fan element
5 First component
6 Second component
7 Third component
8 Fourth component
9 First seat
10 Second seat
11 Air duct
12 First aperture
13 Second aperture
14 Connecting means
15 Heat exchanger seat
16 Condensate collection region
17 Internal space
18 External casing
19 Protruding edge
20 Compressor
21 Third aperture
22 Supporting element
23 Single seat
24 Internal seat

Claims

1. Modular air guiding assembly (1) for a heating device (2), in particular for a heat pump, the heating device (2) having an heat exchanger (3) and at least a fan element (4) arranged in an internal space (17) defined at least in part by an external casing (18), wherein the assembly (1) comprises a plurality of components (5, 6, 7, 8) configured to be assembled together in one or more assembled configurations and to be disassembled in a disassembled configuration to form at least a seat (9, 10, 23) for the fan element (4) and an air duct (11) between the heat exchanger (3) and the fan element (4) and wherein the assembly (1), in particular is made of a polymeric material, in particular of foam plastic, more particularly of polypropylene expanded (PPE) or expanded polystyrene (EPS), and, is placeable in the internal space (17) of the heating device (2) between the external casing (18) and the heat exchanger (3).

2. Modular air guiding assembly (1) according to claim 1, **characterized in that** in a first assembled configuration the plurality of components forms a first seat (9), a second seat (10) and the air duct (11), and in a second assembled configuration the plurality of components forms a single seat (23) and the air duct (11).

3. Modular air guiding assembly(1) according to claim 1 or 2, **characterized in that** the plurality of components (5, 6, 7, 8) comprises a first component (5) and/or a second component (6) and/or a third component (7) and/or a fourth component (8), wherein

   a. in the first assembled configuration the first component (5) and the second component (6) form at least in part the first seat (9) and the air duct (11); and/or
   b. in the first assembled configuration the third component (7) and the fourth component (8) form at least in part the second seat (10) and the air duct (11); and/or
   c. in the second assembled configuration the

first component (5) and the fourth component (8) form the single seat (23) and the air duct (11).

4. Modular air guiding assembly (1) according to claim 3, **characterized in that**

a. the first component (5) is fixable to the second component (6) and to the third component (7), wherein the fourth component (8) is fixable to the second component (6) and to the third component (7); and/or
b. the first component (5) is fixable to the fourth component (8).

5. Modular air guiding assembly (1) according to any one of claims 3 to 4, **characterized in that**

a. the assembly of the first, second and third components (5, 6, 7) defines a first aperture (12), in particular a first circular aperture, and/or
b. the assembly of the second, third and fourth components (6, 7, 8) defines a second aperture (13), in particular a second circular aperture; and/or
c. the assembly of the first and fourth component (5, 8) defines a third aperture (21), in particular a third circular aperture.

6. Modular air guiding assembly (1) according to any one of claims 1 to 6, **characterized in that** the plurality of components (5, 6, 7, 8) each comprises connecting means (14), in particular pins and/or recesses, for assembly to each other.

7. Modular air guiding assembly (1) according to any one of claims 1 to 7, **characterized in that**

a. the air duct (11) between the heat exchanger (3) and the fan element (4) has a variable cross-section; and/or
b. the air duct (11) formed by the assembly (1) extends from an inlet portion of the heat exchanger (3) to an outlet portion of the fan element (4).

8. Modular air guiding assembly (1) according to claim 7, **characterized in that** the cross-section of the air duct (11) decreases along the direction from the heat exchanger (3) to the fan element (4).

9. Modular air guiding assembly (1) according to any one of claims 1 to 8, **characterized in that** the assembly (1) further comprises a supporting element (22) for supporting the external casing (18).

10. Modular air guiding assembly (1) according to any one of claims 1 to 9, **characterized in that**

a. the assembly (1) further comprises a heat exchanger seat (15) for positioning the heat exchanger (3); and/or
b. the assembly (1) further comprises protruding edges (19) forming a heat exchanger seat (15) for positioning the heat exchanger (3); and/or
c. in the one or more assembled configurations, the assembly (1) defines an internal seat (24) to completely cover the fan element (4) and/or the heat exchanger (3) .

11. Modular air guiding assembly (1) according to any one of claims 1 to 10, **characterized in that** the assembly (1) further comprises a condensate collection region (16) located at the heat exchanger (3), wherein in particular the condensate collection region (16) is located in a bottom region of the assembly (1).

12. Modular air guiding assembly (1) according to any one of claims 1 to 11, **characterized in that** the assembly (1) is devoid of any metal element.

13. Heating device (2), in particular a heat pump device, comprising the modular air guiding assembly (1) according to any one of clams 1 to 12, wherein the assembly (1) is placed in an internal space (17) of the device (2) between a heat exchanger (3) and an external casing (18).

14. Use of the modular air guiding assembly (1) according to any one of claims 1 to 12 for a heating device (2), in particular a heat pump device.

15. Method for manufacturing the modular air guiding assembly (1) according to any one of clams 1 to 12 comprising:

a. introducing a polymeric material, in particular foam plastic, in a forming tool, the forming tool being shaped according to at least one component (5, 6, 7, 8);
b. providing hot steam to the forming tool;
c. forming least one component (5, 6, 7, 8);
d. repeating steps a, b, and c for another component (5, 6, 7, 8); and
e. assembling the formed components (5, 6, 7, 8) to form the modular air guiding assembly (1).

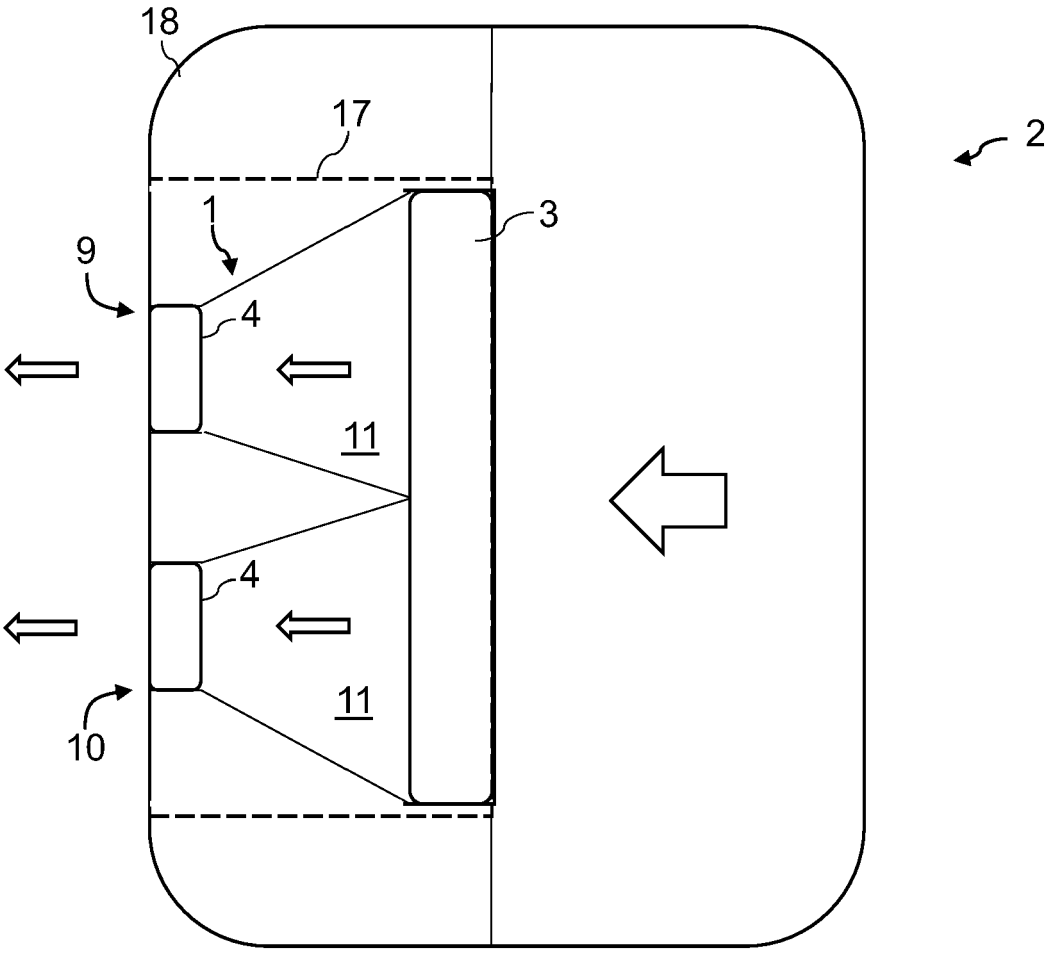

Fig. 1

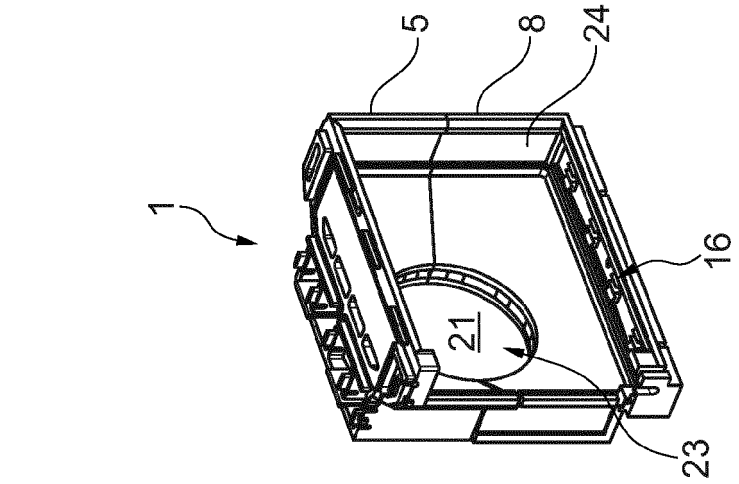

Fig. 2C

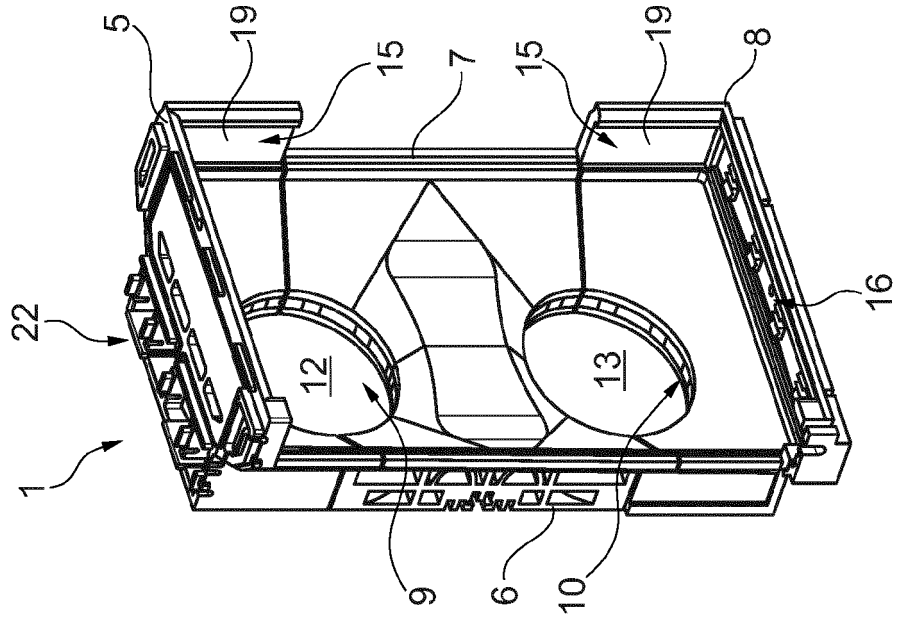

Fig. 2B

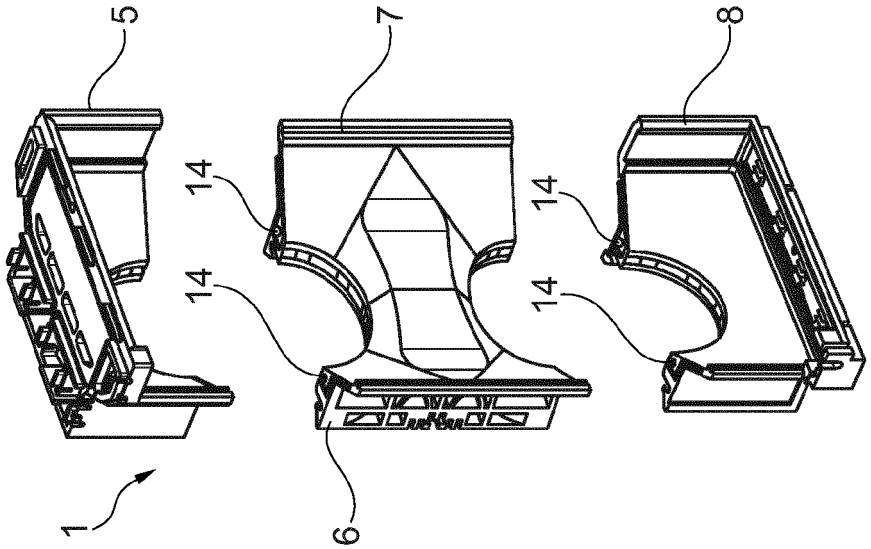

Fig. 2A

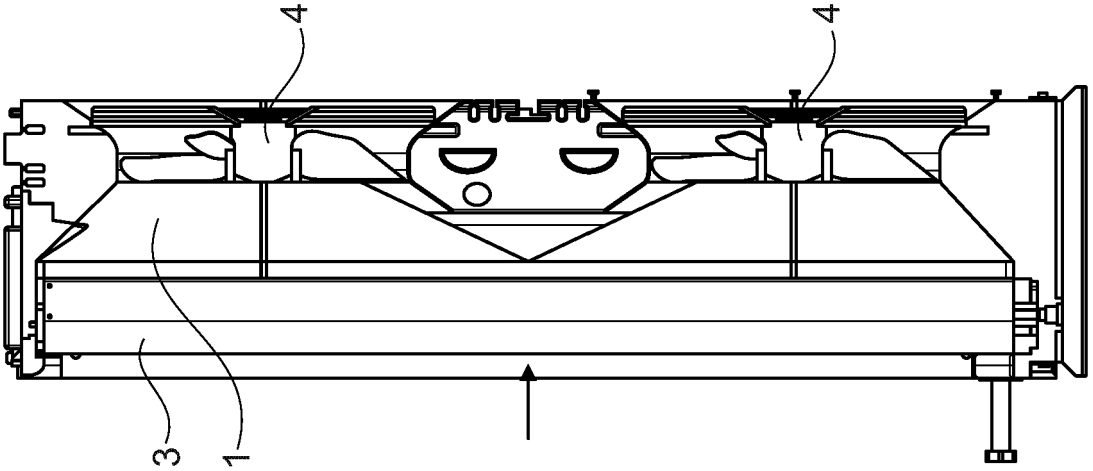

Fig. 3B

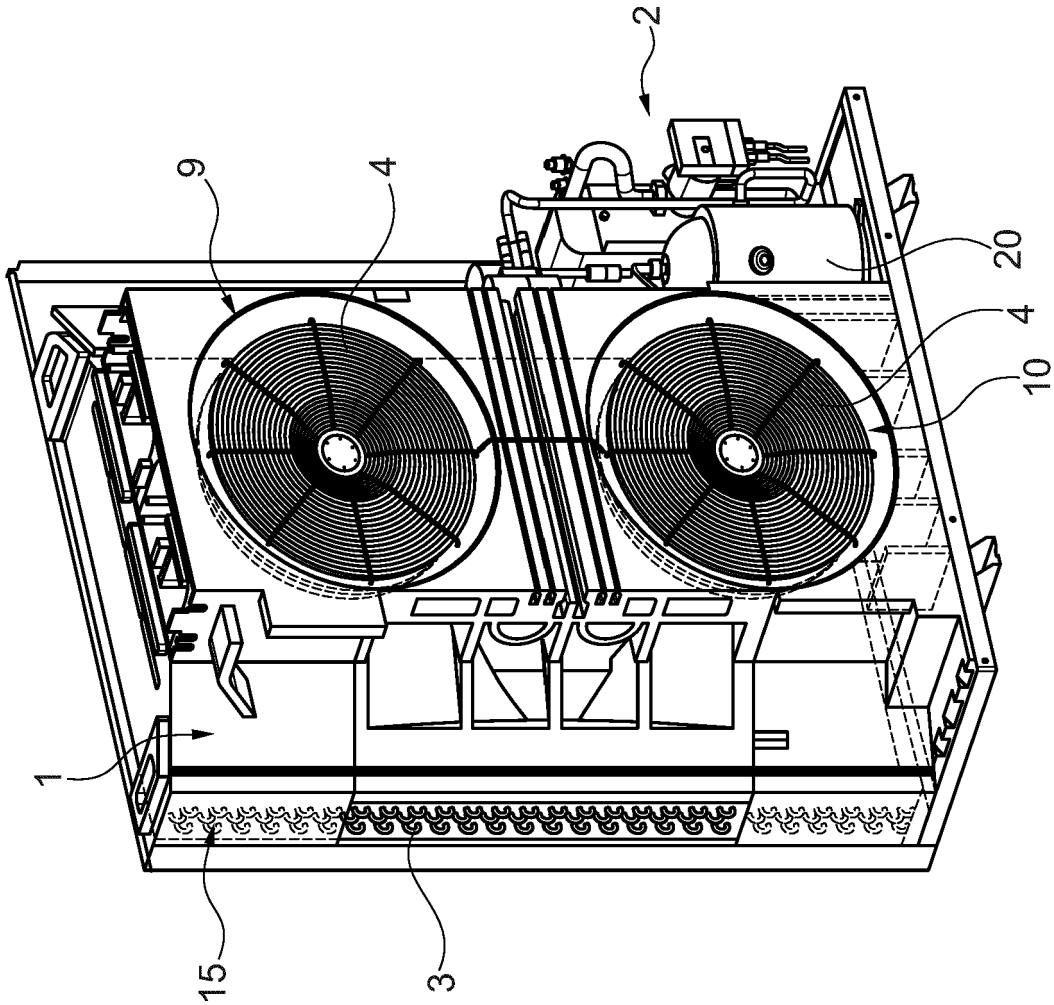

Fig. 3A

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 22 16 1653

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2019/154299 A1 (JEWELL ROBERT WILLIAM [US] ET AL) 23 May 2019 (2019-05-23)	1,3,6-14	INV.
			F24F1/06
Y	* the whole document *	4,5	F24F1/38
A		2	F24F1/56
			F24H4/06
Y	US 2019/003737 A1 (HICKEY ROB [US] ET AL) 3 January 2019 (2019-01-03) * figures 6,7 *	4,5	F24H9/02
X	WO 2019/193573 A1 (ZEHNDER GROUP INT AG [CH]; PLASTIC CONCEPT GMBH [DE]) 10 October 2019 (2019-10-10) * figures 1,2 *	1,14,15	
			TECHNICAL FIELDS SEARCHED (IPC)
			F24F
			F24H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	30 August 2022	Blot, Pierre-Edouard

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 22 16 1653

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

30-08-2022

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2019154299 A1	23-05-2019	NONE	
US 2019003737 A1	03-01-2019	NONE	
WO 2019193573 A1	10-10-2019	CA 3096238 A1	10-10-2019
		CN 112292275 A	29-01-2021
		EP 3781421 A1	24-02-2021
		JP 2021521060 A	26-08-2021
		KR 20200141052 A	17-12-2020
		US 2021148597 A1	20-05-2021
		WO 2019193573 A1	10-10-2019

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82