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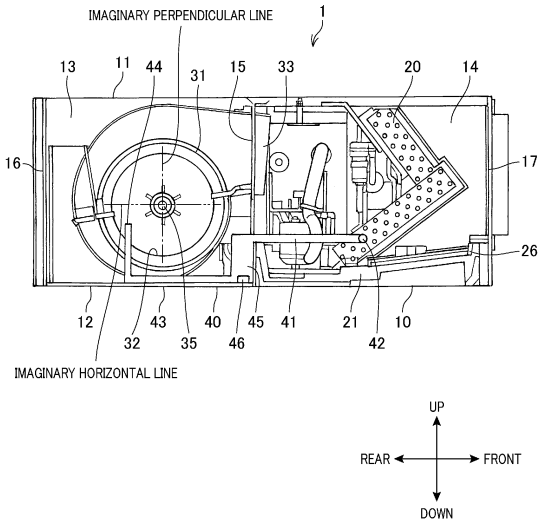
(54) **AIR CONDITIONER**

(57) An air conditioner capable of detecting refrigerant leakage on a heat exchanger chamber side with high accuracy is provided. A refrigerant detection duct 40 that opens in a heat exchanger chamber 14 and an air-sending chamber 13 at respective ends, and a refrigerant detection sensor 46 that detects a refrigerant inside the refrigerant detection duct 40 are included, and an air-sending chamber-side opening 44 of the refrigerant detection duct 40 is disposed in a region overlapping a semi-circular region of a fan opening part 32 on a suction port 16 side relative to an imaginary perpendicular line passing a rotating shaft 35 of a sirocco fan 30 when viewed from a direction of the rotating shaft 35.

FIG.1



EP 4 290 147 A1

Description

[Technical Field]

[0001] The present disclosure relates to an air conditioner.

[Background Art]

[0002] Patent Literature 1 discloses a refrigerant detection device that includes a refrigerant detection air passage having both ends connected to a main air passage extending from a suction port to an blowoff port of an indoor unit of an air-conditioning apparatus, and a refrigerant detection sensor that detects a refrigerant inside the refrigerant detection air passage, in which the refrigerant detection air passage allows an air-sending port side and an intake port side of an air blower to communicate with each other, the air blower being provided in the main air passage and being configured to send air from the suction port to the blowoff port, and the air is guided to the outside of the main air passage in a housing of the indoor unit of the air-conditioning apparatus, so that refrigerant leakage can be detected.

[Citation List]

[Patent Literature]

[0003] [Patent Literature 1] WO2018/198165

[Summary of Invention]

[Technical Problem]

[0004] Thus, the present disclosure provides an air conditioner capable of detecting refrigerant leakage on a heat exchanger chamber side with high accuracy.

[Solution to Problem]

[0005] The present disclosure is an air conditioner that includes: a housing including a suction port through which air flows in and a blowoff port through which the air flows out; a partitioning wall that partitions an inside of the housing into an air-sending chamber and a heat exchanger chamber having a heat exchanger; a refrigerant detection duct that provides communication between an inside of the air-sending chamber and an inside of the heat exchanger chamber; and a refrigerant detection sensor that detects a refrigerant inside the refrigerant detection duct, in which a scroll casing in which a fan opening part is formed, a sirocco fan housed inside the scroll casing, and an air-sending passage that discharges the air sucked through the fan opening part by rotation of the sirocco fan toward the heat exchanger chamber are provided, an end of the refrigerant detection duct is an air-sending chamber-side opening disposed inside the air-sending chamber, another end of the refrigerant detection duct is a heat exchanger chamber-side opening disposed inside the heat exchanger chamber, and the air-sending chamber-side opening is disposed in a region of the fan opening part, the region being on a side of the suction port relative to a rotating shaft of the sirocco fan, when viewed from a direction of the rotating shaft.

[0006] Note that the entire content of Japanese Patent Application No. 2021-017423 filed on February 5, 2021 is hereby incorporated into this specification.

[Advantageous Effects of Invention]

[0007] According to the present disclosure, refrigerant leakage on a heat exchanger chamber side can be detected with high accuracy.

[Brief Description of Drawings]

[0008]

[Figure 1] Figure 1 is a cross-sectional side view showing an air conditioner according to Embodiment 1.

[Figure 2] Figure 2 is a plan view showing the air conditioner according to Embodiment 1.

[Description of Embodiment]

(Knowledge and the like as a basis of the present disclosure)

[0009] Around the time when the inventors conceived of the present disclosure, a technique had been known in a form of a refrigerant detection device, in which a refrigerant detection air passage having both ends connected to a main air passage extending from a suction port to an blowoff port of an indoor unit of an air-conditioning apparatus, and a refrigerant detection sensor that detects a refrigerant inside the refrigerant detection air passage are provided, and the refrigerant detection air passage allows an air-sending port side and an intake port side of an air blower to communicate with each other, the air blower being provided in the main air passage and being configured to send air from the suction port to the blowoff port.

[0010] In the conventional technique, an inlet of the refrigerant detection air passage is disposed in the blowoff port of the indoor unit and an outlet is disposed in a suction port of the indoor unit. When the air blower is driven, due to the pressure on the blowoff port side of the air blower, the pressure on the suction port side tends to be reduced, and thus, due to the difference in pressure, the air on the blowoff port side more easily flows through the refrigerant detection air passage to the suction port side.

[0011] However, the inventors have found a problem that not all regions in a space on the suction port side of

the indoor unit necessarily have a negative pressure and there are cases in which the difference in pressure between the blowoff port side and the suction port side does not occur and thus refrigerant detection accuracy is degraded, and have arrived at the configuration of the subject matter of the present disclosure so as to solve the problem.

[0012] Thus, the present disclosure provides an air conditioner capable of detecting refrigerant leakage on the heat exchanger chamber side with high accuracy.

[0013] Hereinafter, an embodiment will be described in detail with reference to the drawings. However, unnecessarily detailed descriptions are omitted in some cases. For example, the detailed descriptions of well-known matters or overlapping descriptions of substantially the same components are omitted in some cases. This is for facilitating understanding by those skilled in the art of the present disclosure by avoiding the following descriptions to be unnecessarily redundant.

[0014] Note that the attached drawings and the following descriptions are provided for allowing those skilled in the art to fully understand the present disclosure, and are not intended to limit the subject matter described in the claims.

(Embodiment 1)

[0015] Hereinafter, Embodiment 1 will be described with reference to Figure 1 and Figure 2.

[0016] Figure 1 is a cross-sectional side view of an air conditioner of Embodiment 1. Figure 2 is a plan view of the air conditioner of Embodiment 1.

[1-1. Configuration]

[0017] As shown in Figure 1 and Figure 2, an air conditioner 1 of the present embodiment includes a box-shaped housing 10. The housing 10 includes a top plate 11 and a bottom plate 12.

[0018] The left side of the housing 10 in Figure 1 is an air-sending chamber 13 and the right side of the housing 10 in Figure 1 is a heat exchanger chamber 14 that houses a heat exchanger 20. The air-sending chamber 13 and the heat exchanger chamber 14 are partitioned by a partitioning wall 15.

[0019] A rear of the air-sending chamber 13 is provided with a suction port 16 to take in indoor air, and an inside of the air-sending chamber 13 is provided with a plurality of (three in the present embodiment) scroll casings 31, each scroll casing 31 housing a sirocco fan 30. A forward side relative to the heat exchanger 20 of the heat exchanger chamber 14 is provided with a blowoff port 17.

[0020] The scroll casing 31 includes a fan opening part 32 that is formed at each of both ends of the scroll casing 31 and sucks air flown in through the suction port 16 by rotation of the sirocco fan 30, and an air-sending passage 33 that discharges the air sucked through the fan opening part 32 toward the heat exchanger chamber 14.

[0021] An electric motor 34 is provided between the scroll casings 31. The electric motor 34 is coupled to a rotating shaft 35 of the sirocco fan 30 and rotationally drives the sirocco fan 30.

[0022] The sirocco fan 30 is a centrifugal fan, and by an operation of the sirocco fan 30, air is sucked through the suction port 16 and is made to flow, through the fan opening part 32, into the scroll casing 31 from the direction of the rotating shaft 35, and is blown out from the air-sending passage 33 to the heat exchanger 20, and the conditioned air after being heat-exchanged in the heat exchanger 20 is discharged to the inside of a room through the blowoff port 17.

[0023] In a lower portion of the heat exchanger 20 housed in the heat exchanger chamber 14 in Figure 1, a drain pan 21 is disposed.

[0024] Further, in the present embodiment, the heat exchanger chamber 14 is provided with a partitioning plate 25 that partitions between a heat exchanging region 22 of the heat exchanger 20 and a header region 23, to which a refrigerant pipe 24 is connected, at each of both ends of the heat exchanger 20.

[0025] The heat exchanger chamber 14 is provided with a refrigerant suction duct 41. The refrigerant suction duct 41 extends in the width direction of the heat exchanger chamber 14, and a heat exchanger chamber-side opening 42 at each of both ends of the refrigerant suction duct 41 is configured to provide communication between each partitioning plate 25 and the header region 23.

[0026] In a midway portion of the refrigerant suction duct 41 positioned in the heat exchanging region 22, a branched duct 43 is connected. The branched duct 43 passes through the partitioning wall 15 to extend to the air-sending chamber 13.

[0027] In the present embodiment, the refrigerant suction duct 41 and the branched duct 43 form a refrigerant detection duct 40.

[0028] Note that the refrigerant detection duct 40 may be configured to provide communication between either the heat exchanging region 22 or the header region 23 and the air-sending chamber 13.

[0029] In the present embodiment, the branched duct 43 extends downward near and along the partitioning wall 15, and an end portion on the air-sending chamber 13 side of the branched duct 43 extends upward from a lower side of the sirocco fan 30, with an air-sending chamber-side opening 44 opened upward.

[0030] In the present embodiment, the branched duct 43 is disposed in a region between two of the scroll casings 31 and where the electric motor 34 is not disposed. Specifically, since the position between the fan opening parts 32 of the two scroll casings 31 has a more negative pressure than a space between the scroll casings 31 and a side wall of the housing 10, the refrigerant inside the branched duct 43 is more easily discharged to the fan opening part 32.

[0031] Note that the branched duct 43 may be dis-

posed in a position other than the position between the scroll casings 31.

[0032] In a midway portion of the branched duct 43, a refrigerant trap 45 is formed, the refrigerant trap 45 having an inner volume being formed greater than an inner diameter of the branched duct 43.

[0033] In the refrigerant trap 45, a refrigerant detection sensor 46 that detects the refrigerant is disposed.

[0034] Note that the position where the refrigerant detection sensor 46 is disposed may appropriately be set, but since the refrigerant is heavier than air, it is preferable to dispose the refrigerant detection sensor 46 in a lowermost position of the branched duct 43.

[0035] In the present embodiment, the air-sending chamber-side opening 44 of the branched duct 43 is disposed in a region overlapping a semi-circular region of the fan opening part 32 on a suction port 16 side relative to an imaginary perpendicular line (denoted by a dashed line in Figure 1) passing the rotating shaft 35 of the sirocco fan 30 when viewed from the direction of the rotating shaft 35 of the sirocco fan 30.

[0036] Further, the air-sending chamber-side opening 44 is preferably disposed in a periphery portion of the fan opening part 32 when viewed from the direction of the rotating shaft 35 of the sirocco fan 30.

[0037] When the sirocco fan 30 is rotationally driven, in the fan opening part 32, the periphery portion has a more negative pressure compared to a center portion where the rotating shaft 35 is located, and therefore, the refrigerant more easily flows out through the air-sending chamber-side opening 44.

[0038] In this case, the air-sending chamber-side opening 44 may be disposed near an end portion of the fan opening part 32 on the suction port 16 side when viewed from the direction of the rotating shaft 35 of the sirocco fan 30.

[0039] In this manner, the refrigerant inside the branched duct 43 is more easily discharged to the air-sending chamber-side opening 44.

[0040] Further, the air-sending chamber-side opening 44 of the branched duct 43 is preferably disposed in a region overlapping a region on a bottom plate 12 side of the housing 10 relative to an imaginary horizontal line (denoted by a dashed-two dotted line in Figure 1) passing the rotating shaft 35 of the sirocco fan 30 in the fan opening part 32.

[0041] In general, since in a region lower than the imaginary horizontal line passing the rotating shaft 35, the rotating direction of the sirocco fan 30 and the direction of a main stream of the air sucked through the suction port 16 are opposite, the air flow generated by the rotation of the sirocco fan 30 and the air flow of the main stream collide with each other, thereby preventing the air from flowing into the fan opening part 32.

[0042] Thus, with the air-sending chamber-side opening 44 of the branched duct 43 disposed in the region overlapping the region on the bottom plate 12 side of the housing 10 relative to the imaginary horizontal line passing the rotating shaft 35, the branched duct 43 can also play a role as a partitioning wall to prevent air collision in the sirocco fan 30. In this manner, a space having a negative pressure in a lower region of the fan opening part 32 can be broadened, so that the inflow of the refrigerant from the refrigerant detection duct 40 can be prompted and suction of the air of the main stream through the fan opening part 32 can also be prompted.

[0043] Note that the air-sending chamber-side opening 44 may be disposed in a region overlapping a region on a top plate 11 side of the housing 10 relative to the imaginary horizontal line passing the rotating shaft 35 of the sirocco fan 30.

[0044] In the region on the top plate 11 side relative to the imaginary horizontal line, since the flow of the main stream and the rotating direction of the sirocco fan 30 are in the same direction, the speed of sucking the main stream into the fan opening part 32 increases to thus more easily generate a negative pressure. Thus, with the air-sending chamber-side opening 44 disposed in the position, the air smoothly flows into the refrigerant detection duct 40, and therefore, the refrigerant leakage can be quickly detected by the refrigerant detection sensor 46 at the time of refrigerant leakage.

[0045] Specifically, the air-sending chamber-side opening 44 is most preferably disposed in a position that is in the periphery portion of the fan opening part 32 and that is slightly closer to the top plate 11 side relative to the end portion on the suction port 16 side of the fan opening part 32.

[0046] Furthermore, since the sirocco fan 30 rotates clockwise in the drawing, the direction of the refrigerant flow in the air-sending chamber-side opening 44 and the rotating direction of the sirocco fan 30 can be made substantially consistent by disposing the air-sending chamber-side opening 44 facing upward in the periphery portion of the fan opening part 32, and in this manner, the leaked refrigerant from the branched duct 43 can be smoothly sucked into the fan opening part 32.

[0047] Further, the heat exchanger chamber-side opening 42 of the refrigerant detection duct 40 is disposed in a position at the highest of a bank portion 26 of the drain pan 21. In this manner, the inflow of the drain water accumulated in the drain pan 21 through the heat exchanger chamber-side opening 42 into the refrigerant detection duct 40 can be suppressed.

[0048] In addition, the heat exchanger chamber-side opening 42 is disposed in a position lower than a lower edge of the blowoff port 17 of the housing 10. Since the specific gravity of a refrigerant R32 is heavier than air, the leaked refrigerant is accumulated near the bottom plate, when the refrigerant leakage occurs. Further, near the bottom plate of the heat exchanger chamber 14, the air blown out through the blowoff port 17 does not flow and the air stagnates. Therefore, with the heat exchanger chamber-side opening 42 disposed in a position lower than the lower edge of the blowoff port 17 of the housing 10, the effect of the air blown out through the blowoff port

17 is mitigated, so that the leaked refrigerant can be made to more easily flow into the heat exchanger chamber-side opening 42.

[1-2. Function]

[0049] Next, the function of the present embodiment will be described.

[0050] The air is sucked through the suction port 16 by driving the motor 34 to rotationally drive the sirocco fan 30, and the air flows into the scroll casing 31 from the direction of the rotating shaft 35 through the fan opening part 32 and is blown out from the air-sending passage 33 to the heat exchanger 20, and the conditioned air after being heat-exchanged in the heat exchanger 20 is discharged through the blowoff port 17.

[0051] Since the pressure near the air-sending chamber-side opening 44 of the branched duct 43 is negative, in a case where the refrigerant leakage occurs in the heat exchanger chamber 14, the leaked refrigerant in the heat exchanger chamber 14 is sucked through the heat exchanger chamber-side opening 42 to flow to the air-sending chamber-side opening 44 via the refrigerant duct and the branched duct 43.

[0052] In this case, the refrigerant can be detected by means of the refrigerant detection sensor 46 housed in a housing portion midway in the branched duct 43.

[0053] Further, since the heat exchanger chamber-side opening 42 is disposed in a position lower than the blowoff port 17, when the sirocco fan 30 is in a stopped state and in a case where the refrigerant leakage occurs, the refrigerant is heavier than air and thus enters the heat exchanger chamber-side opening 42 before leaking through the blowoff port 17, and is then accumulated in the refrigerant trap 45.

[0054] In this manner, even when the sirocco fan 30 is in a stopped state, the leaked refrigerant can be sent to the refrigerant detection sensor 46, so that the refrigerant leakage can be detected.

[1-3. Effects and the like]

[0055] As described above, according to the present embodiment, the refrigerant detection duct 40 that opens in the heat exchanger chamber 14 and the air-sending chamber 13 at respective ends, and the refrigerant detection sensor 46 that detects the refrigerant inside the refrigerant detection duct 40 are provided, and the air-sending chamber-side opening 44 of the refrigerant detection duct 40 is disposed in the region overlapping the semi-circular region of the fan opening part 32 on the suction port 16 side relative to the imaginary perpendicular line passing the rotating shaft 35 of the sirocco fan 30 when viewed from the direction of the rotating shaft 35.

[0056] In this manner, the pressure near the air-sending chamber-side opening 44 of the refrigerant detection duct 40 can be maintained at a negative pressure. Therefore, the refrigerant leakage on the heat exchanger chamber 14 side can be detected with high accuracy.

[0057] Furthermore, according to the present embodiment, the air-sending chamber-side opening 44 of the refrigerant detection duct 40 is disposed in the periphery portion of the fan opening part 32 when viewed from the direction of the rotating shaft 35 of the sirocco fan 30.

[0058] In this manner, when the sirocco fan 30 is rotationally driven, in the fan opening part 32, the periphery portion has a more negative pressure compared to the center portion where the rotating shaft 35 is located, and therefore, the refrigerant is made to more easily flow out through the air-sending chamber-side opening 44. Thus, the leaked refrigerant from the refrigerant detection duct 40 can be smoothly sucked into the fan opening part 32.

[0059] In addition, according to the present embodiment, the air-sending chamber-side opening 44 of the refrigerant detection duct 40 opens toward the top plate 11 of the housing 10.

[0060] In this manner, with the air-sending chamber-side opening 44 provided so as to face upward, the direction of the refrigerant flow in the air-sending chamber-side opening 44 and the rotating direction of the sirocco fan 30 can be made substantially consistent. Therefore, the leaked refrigerant from the refrigerant detection duct 40 can be smoothly sucked into the fan opening part 32.

[0061] Further, according to the present embodiment, the air-sending chamber-side opening 44 of the refrigerant detection duct 40 is disposed in the region overlapping the region on the bottom plate 12 side of the housing 10 relative to the rotating shaft 35 of the sirocco fan 30 in the fan opening part 32.

[0062] Thus, with the air-sending chamber-side opening 44 of the branched duct 43 disposed in the region overlapping the region on the bottom plate 12 side of the housing 10 relative to the rotating shaft 35, the refrigerant detection duct 40 can also play a role as a partitioning wall to prevent air collision in the sirocco fan 30. In this manner, the space having a negative pressure in the lower region of the fan opening part 32 can be broadened, so that the inflow of the refrigerant from the refrigerant detection duct 40 can be prompted and suction of the air of the main stream through the fan opening part 32 can also be prompted.

[0063] In addition, according to the present embodiment, the air-sending chamber-side opening 44 of the refrigerant detection duct 40 is disposed near the end portion of the fan opening part 32 on the suction port 16 side when viewed from the direction of the rotating shaft 35 of the sirocco fan 30.

[0064] Thus, with the air-sending chamber-side opening 44 disposed near the end portion on the suction port 16 side of the fan opening part 32, the direction of the refrigerant flow in the air-sending chamber-side opening 44 and the rotating direction of the sirocco fan 30 can be made substantially consistent. Therefore, the refrigerant inside the branched duct 43 is more easily discharged to the air-sending chamber-side opening 44.

[0065] Furthermore, according to the present embod-

iment, the air-sending chamber-side opening 44 of the refrigerant detection duct 40 is disposed in the region overlapping the region on the top plate 11 side of the housing 10 relative to the rotating shaft 35 of the sirocco fan 30.

[0066] In this manner, with the air-sending chamber-side opening 44 disposed in the region on the top plate 11 side relative to the rotating shaft 35 of the sirocco fan 30, the speed of sucking the main stream into the fan opening part 32 increases to thus enable a negative pressure to be more easily generated. Therefore, the refrigerant more easily flows into the fan opening part 32.

[0067] In addition, according to the present embodiment, the sirocco fan 30 includes the plurality of scroll casings 31, and the air-sending chamber-side opening 44 of the refrigerant detection duct 40 is disposed in a region between the plurality of scroll casings 31.

[0068] In this manner, since the position between the fan opening parts 32 of the two scroll casings 31 has a more negative pressure than the space between the scroll casings 31 and the side wall of the housing 10, the pressure near the air-sending chamber-side opening 44 can be made further negative. Therefore, the refrigerant inside the refrigerant detection duct 40 can be more easily discharged to the fan opening part 32.

[0069] Further, according to the present embodiment, the heat exchanger chamber-side opening 42 of the refrigerant detection duct 40 is disposed in a position higher than the highest portion of the bank portion 26 of the drain pan 21 provided in the housing 10.

[0070] In this manner, the inflow of the drain water accumulated in the drain pan 21 through the heat exchanger chamber-side opening 42 into the refrigerant detection duct 40 can be suppressed.

[0071] Furthermore, according to the present embodiment, the refrigerant trap 45 is formed in a midway portion of the refrigerant detection duct 40, and the refrigerant detection sensor 46 is disposed in the refrigerant trap 45.

[0072] Thus, even when the sirocco fan 30 is in a stopped state, the leaked refrigerant can be accumulated in the refrigerant trap 45. Therefore, even the sirocco fan 30 is in a stopped state, the refrigerant leakage can be detected.

[0073] Note that since the aforementioned embodiment is provided as an exemplary technique of the present disclosure, various changes, replacements, additions, omissions, and the like can be made within the scope of the claims or the equivalent scope.

[Industrial Applicability]

[0074] As described above, the air conditioner according to the present disclosure is preferably applicable to an air conditioner in which when refrigerant leakage occurs in the heat exchanger chamber, the pressure near the air-sending chamber-side opening is maintained at a negative pressure to thus enable the leaked refrigerant to be drawn into the refrigerant detection duct so that the refrigerant leakage can be detected by the refrigerant detection sensor provided in the refrigerant detection duct.

[Reference Signs List]

[0075]

1	air conditioner
10	housing
11	top plate
12	bottom plate
13	air-sending chamber
14	heat exchanger chamber
15	partitioning wall
16	suction port
17	blowoff port
20	heat exchanger
21	drain pan
22	heat exchanging region
23	header region
24	refrigerant pipe
25	partitioning plate
26	bank portion
30	sirocco fan
31	scroll casing
32	fan opening part
33	air-sending passage
34	electric motor
35	rotating shaft
40	refrigerant detection duct
41	refrigerant suction duct
42	heat exchanger chamber-side opening
43	branched duct
44	air-sending chamber-side opening
45	refrigerant trap
46	refrigerant detection sensor

Claims

1. An air conditioner comprising:

a housing including a suction port through which air flows in and a blowoff port through which the air flows out;
a partitioning wall that partitions an inside of the housing into an air-sending chamber and a heat exchanger chamber having a heat exchanger;
a refrigerant detection duct that provides communication between an inside of the air-sending chamber and an inside of the heat exchanger chamber; and
a refrigerant detection sensor that detects a refrigerant inside the refrigerant detection duct,
characterized in that a scroll casing in which a fan opening part is formed, a sirocco fan housed

inside the scroll casing, and an air-sending passage that discharges the air sucked through the fan opening part by rotation of the sirocco fan toward the heat exchanger chamber are provided,
an end of the refrigerant detection duct is an air-sending chamber-side opening disposed inside the air-sending chamber,
another end of the refrigerant detection duct is a heat exchanger chamber-side opening disposed inside the heat exchanger chamber, and the air-sending chamber-side opening is disposed in a region of the fan opening part, the region being on a side of the suction port relative to a rotating shaft of the sirocco fan, when viewed from a direction of the rotating shaft.

2. The air conditioner according to claim 1, wherein the air-sending chamber-side opening of the refrigerant detection duct is disposed in a periphery portion of the fan opening part when viewed from the direction of the rotating shaft of the sirocco fan.

3. The air conditioner according to claim 1, wherein the air-sending chamber-side opening of the refrigerant detection duct opens toward a top plate of the housing.

4. The air conditioner according to claim 3, wherein the air-sending chamber-side opening of the refrigerant detection duct is disposed in a region overlapping a region on a bottom plate side of the housing relative to the rotating shaft of the sirocco fan in the fan opening part.

5. The air conditioner according to claim 4, wherein the air-sending chamber-side opening of the refrigerant detection duct is disposed near an end portion of the fan opening part on the side of the suction port when viewed from the direction of the rotating shaft of the sirocco fan.

6. The air conditioner according to claim 3, wherein the air-sending chamber-side opening of the refrigerant detection duct is disposed in a region overlapping a region on a top plate side of the housing relative to the rotating shaft of the sirocco fan.

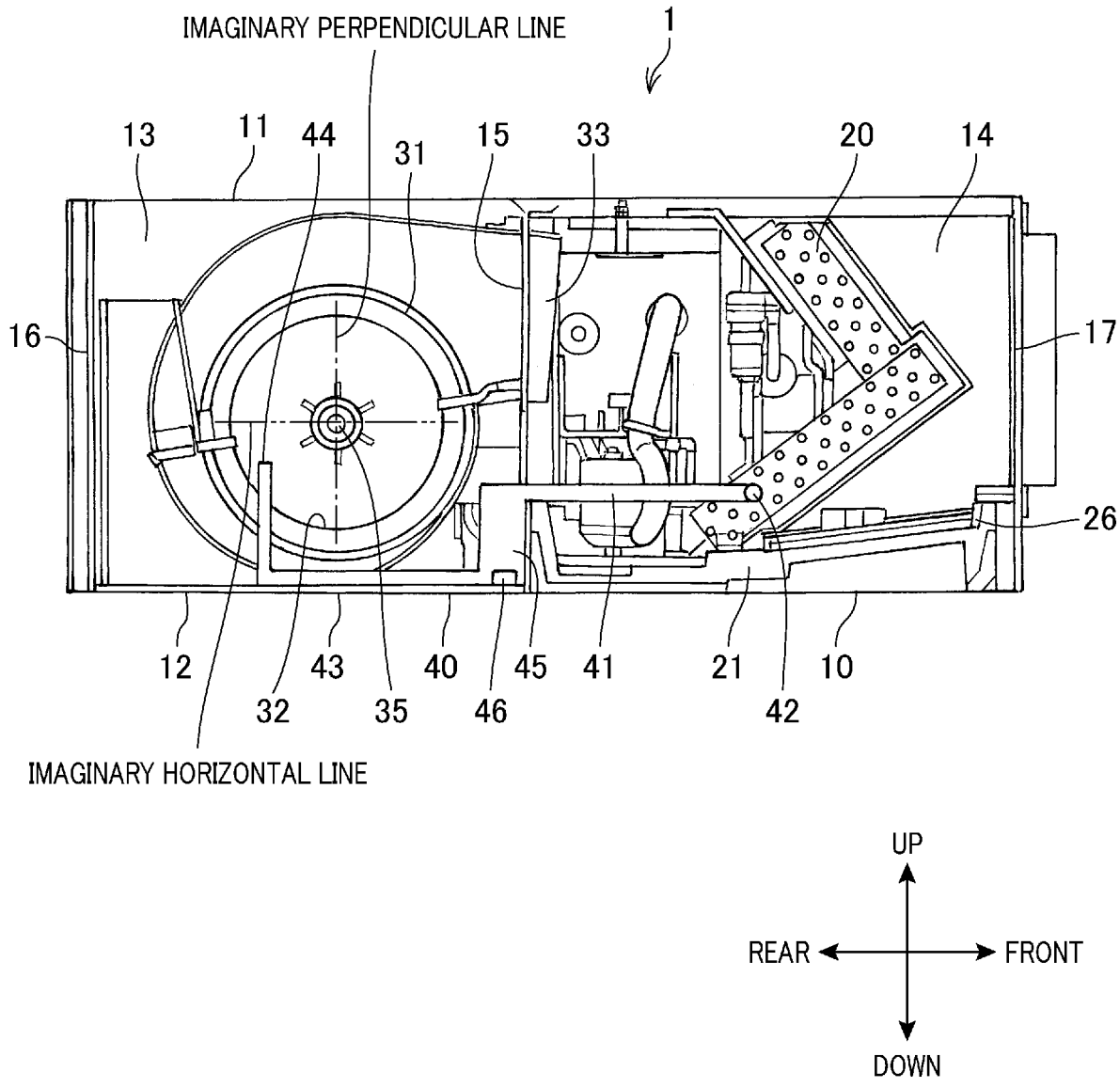
7. The air conditioner according to claim 1, wherein

the sirocco fan comprises a plurality of the scroll casings, and
the air-sending chamber-side opening of the refrigerant detection duct is disposed in a region between the plurality of scroll casings.

8. The air conditioner according to claim 1, wherein the heat exchanger chamber-side opening of the refrigerant detection duct is disposed in a position higher than a highest portion of a bank portion of a drain pan provided in the housing.

9. The air conditioner according to claim 1, wherein a refrigerant trap is formed in a midway portion of the refrigerant detection duct, and the refrigerant detection sensor is disposed in the refrigerant trap.

FIG.1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IMAGINARY HORIZONTAL LINE
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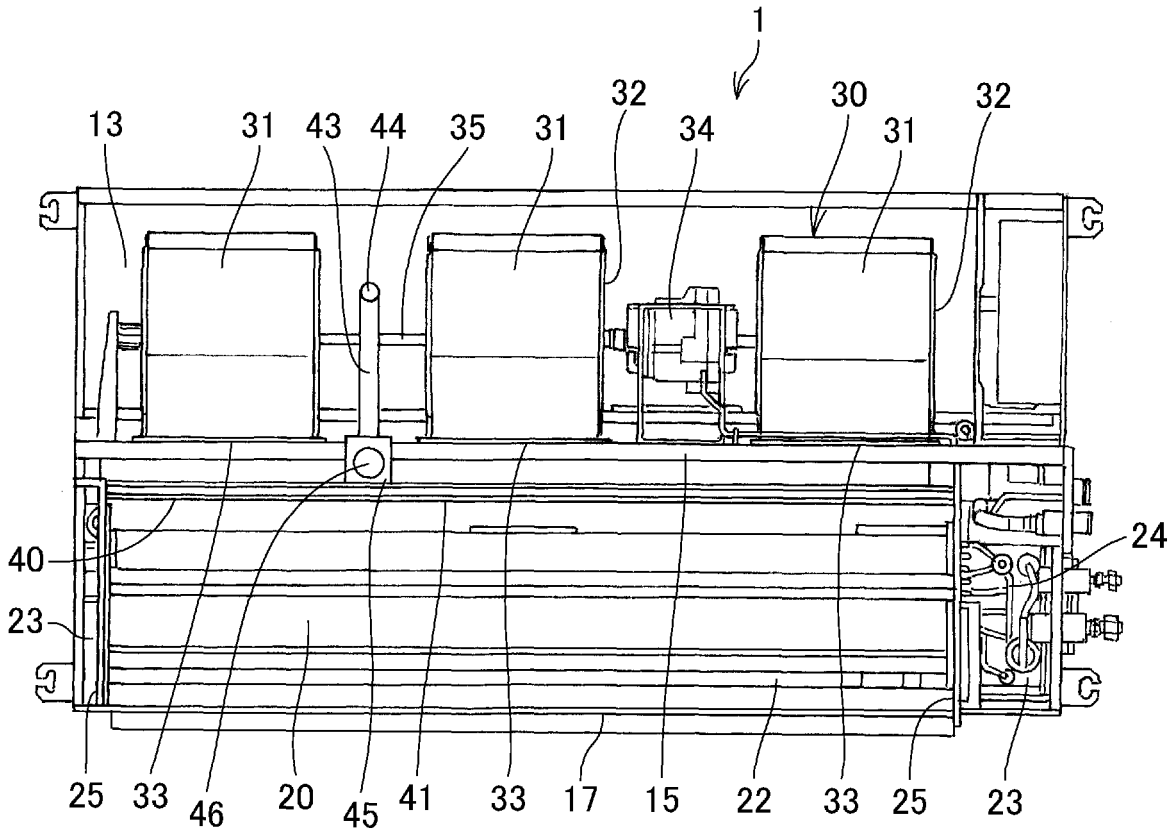
DOWN

FIG.2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INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2021/044486

A. CLASSIFICATION OF SUBJECT MATTER

F24F 11/36(2018.01)i; ***F24F 11/89***(2018.01)i; ***F24F 1/0007***(2019.01)i; ***F24F 13/20***(2006.01)i
FI: F24F1/02 411E; F24F11/36; F24F11/89; F24F1/0007 321

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F24F11/36; F24F11/89; F24F1/0007; F24F13/20

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Published examined utility model applications of Japan 1922-1996
Published unexamined utility model applications of Japan 1971-2022
Registered utility model specifications of Japan 1996-2022
Published registered utility model applications of Japan 1994-2022

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2018/198165 A1 (MITSUBISHI ELECTRIC CORP.) 01 November 2018 (2018-11-01) paragraphs [0014]-[0016], [0027], [0033], [0039]-[0040]	1-9
A	JP 2016-109112 A (TORNADO SYSTEMS CO., LTD.) 20 June 2016 (2016-06-20) entire text, all drawings	1-9
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24 January 2022	**01 February 2022**

Name and mailing address of the ISA/JP	Authorized officer
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