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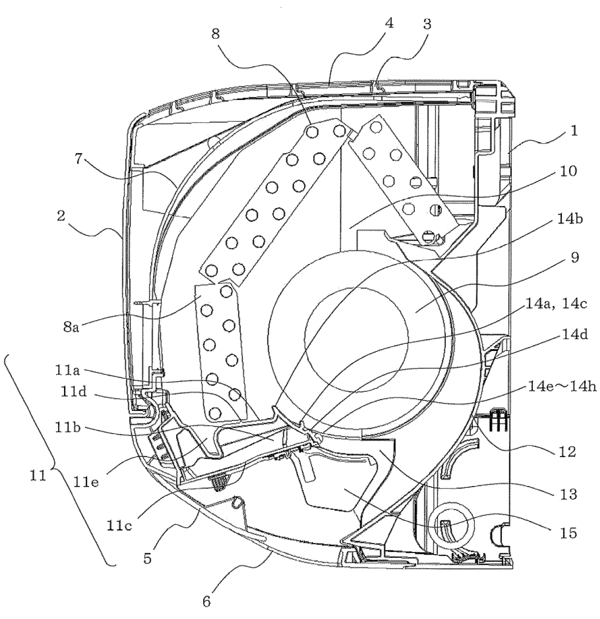
(54) ## INDOOR UNIT OF AIR CONDITIONER

(57) A cross-flow fan 9, a heat exchanger 8 provided so as to surround an upper side and a front side of the cross-flow fan 9, and a nozzle 11 which is located at a lower side of the front heat exchanger 8a located at the front side of the cross-flow fan 9 and is provided to face the cross-flow fan 9, are included. The nozzle 11 includes a drain pan 11 a which receives dew condensation water generated at the heat exchanger 8 and a drain groove 11 e into which the dew condensation water flows.

F I G. 1




EP 2 933 574 A1

# Description

## Technical Field

**[0001]** The present invention relates to an indoor unit of an air-conditioning apparatus, and particularly relates to the shape of a nozzle.

## Background Art

**[0002]** There is an existing indoor unit of an air-conditioning apparatus in which an a drain pan having substantially a U cross-sectional shape is disposed so as to surround a lower portion of a heat exchanger, and the drain pan includes a drain pan body and a drain pan heat insulating member disposed along an inner wall of the drain pan body (see Patent Literature 1).

## Citation List

### Patent Literature

**[0003]** Patent Literature 1: Japanese Unexamined Patent Application Publication No. 2006-300431 (e.g., see Fig. 1).

## Summary of Invention

### Technical Problem

**[0004]** In such a type of an existing indoor unit of an air-conditioning apparatus, since the drain pan has substantially a U cross-sectional shape, dew condensation water generated during cooling operation or dehumidifying operation accumulates in the drain pan and the lower portion of the heat exchanger is likely to be immersed in the water. Thus, if the amount of dew condensation is large, the lower portion of the heat exchanger is immersed in water, causing a decrease in heat exchange efficiency. In addition, since the drain pan heat insulating member is disposed along the inner wall of the drain pan body, the drain pan heat insulating member is required to have the same area as that of the inner wall of the drain pan body. This increases the cost.

**[0005]** The present invention has been made in order to solve the problem described above, and an object of the present invention is to provide an indoor unit of an air-conditioning apparatus which indoor unit prevents a lower portion of a heat exchanger from being immersed in water to decrease heat exchange efficiency.

### Solution to Problem

**[0006]** An indoor unit of an air-conditioning apparatus according to the present invention includes: a fan; a heat exchanger provided so as to surround an upper side and a front side of the fan; and a nozzle located below the heat exchanger located at the front side of the fan, the nozzle being provided to face the fan. The nozzle includes: a drain pan configured to receive dew condensation water generated at the heat exchanger; and a drain groove into which the dew condensation water flows.

### Advantageous Effects of Invention

**[0007]** According to the indoor unit of an air-conditioning apparatus according to the present invention, since the drain groove into which the dew condensation water generated at the heat exchanger flows is formed in the nozzle, it is possible to prevent a lower portion of the heat exchanger from being immersed in water to decrease heat exchange efficiency.

## Brief Description of Drawings

**[0008]**

[Fig. 1] Fig. 1 is a cross-sectional view of an indoor unit of an air-conditioning apparatus according to Embodiment of the present invention.

[Fig. 2] Fig. 2 is a perspective view of the entirety of the indoor unit of an air-conditioning apparatus according to Embodiment of the present invention.

[Fig. 3] Fig. 3 is a schematic view of a principal part of the indoor unit of an air-conditioning apparatus according to Embodiment of the present invention.

[Fig. 4] Fig. 4 is a perspective view of a stabilizer of the indoor unit of an air-conditioning apparatus according to Embodiment of the present invention.

[Fig. 5] Fig. 4 is an enlarged view of a principal part of Fig. 4.

## Description of Embodiments

**[0009]** Hereinafter, Embodiment of the present invention will be described with reference to the drawings.

**[0010]** Fig. 1 is a cross-sectional view of an indoor unit of an air-conditioning apparatus according to Embodiment of the present invention, and Fig. 2 is a perspective view of the entirety of the indoor unit of an air-conditioning apparatus according to Embodiment of the present invention.

**[0011]** The indoor unit 1 of an air-conditioning apparatus according to Embodiment includes air inlets 4 which are provided at a front upper side and surrounded by a design grille 2 and a panel 3. In addition, the indoor unit 1 includes an air outlet 6 which is provided at a front lower side and has an opening which is regulated in direction and size by a vertical wind direction variable vane 5. A wind path is formed within the indoor unit 1 so as to extend from the air inlets 4 to the air outlet 6.

**[0012]** On the wind path, a pre-filter 7 which removes foreign matter in air in a room, a heat exchanger 8 which exchanges heat with air in the room, a cross-flow fan 9, and a lateral wind direction variable vane 15 are provided. An air suction wind path 10 is formed at the upstream side (upper side) of the cross-flow fan 9 so as to be surrounded by the heat exchanger 8 and the cross-flow fan 9, and a blowout wind path 13 is formed at the downstream side (lower side) of the cross-flow fan 9 so as to be defined by a nozzle 11 and a box portion 12. The lateral wind direction variable vane 15 is provided on the blowout wind path 13 and changes a wind direction laterally. In addition, the pre-filter 7 is provided between the air inlets 4 and the heat exchanger 8 so as to cover the heat exchanger 8, and has a function to collect dust which has entered through the air inlets 4 together with air, before the dust enters the heat exchanger 8.

**[0013]** For the heat exchanger 8, a portion located in front of the cross-flow fan 9 is referred to as front heat exchanger 8a.

**[0014]** In addition, the nozzle 11 (11 a to 11 e) and a stabilizer 14 (14a to 14h) will be described later.

**[0015]** Fig. 3 is a schematic view of a principal part of the indoor unit of an air-conditioning apparatus according to Embodiment of the present invention.

**[0016]** As shown in Fig. 3, the nozzle 11 is located below the front heat exchanger 8a and extends from the design grille 2 toward the cross-flow fan 9. The upper surface (the heat exchanger 8 side) of the nozzle 11 forms a drain pan 11 a from a portion thereof located substantially directly below the front heat exchanger 8a toward the cross-flow fan 9, and receives dew condensation water generated at the heat exchanger 8 during cooling operation or dehumidifying operation. A portion of the drain pan 11 a is provided with a nozzle projection 11 d which projects toward the front heat exchanger 8a located at the upper side. The nozzle projection 11d is provided so as to ensure a desired distance between the nozzle 11 and the front heat exchanger 8a to make a lower portion of the front heat exchanger 8a less likely to be immersed in dew condensation water dropped on the drain pan 11 a, and also serves as a mark for positioning a later-described cushioning material when the cushioning material is attached between the drain pan 11 a and the front heat exchanger 8a.

**[0017]** Also, in a portion of the nozzle 11 at the design grille 2 side with respect to the drain pan 11 a has a drain groove 11 e which is formed so as to project downward and into which dew condensation water dropped on the drain pan 11 a flows. That is, the drain pan 11 a and the drain groove 11 e are continuously formed by the upper surface of the nozzle 11, and the drain pan 11 a is located at the cross-flow fan 9 side with respect to the drain groove 11 e. Dew condensation water is caused to flow from the drain pan 11 a to the drain groove 11 e and accumulate therein. This causes the lower portion of the front heat exchanger 8a to be less likely to be immersed in water. Thus, the drain pan 11 a is inclined downward toward the drain groove 11e in order that dew condensation water dropped thereon easily flows into the drain groove 11e.

**[0018]** A nozzle cover 11 c is mounted at the lower surface of the nozzle 11 (at the side opposite to the heat exchanger 8) via an air layer 11 b and forms a part of the blowout wind path 13. Thus, the air layer 11 b is present between the drain pan 11 a and the nozzle cover 11 c and serves as a heat insulating layer. Therefore, even when the drain pan 11a is cooled by dew condensation water generated at the heat exchanger 8, the nozzle cover 11c is less likely to cause dew condensation thereon.

**[0019]** However, if the air layer 11 b is incompletely sealed, dew condensation water accumulates in the drain groove 11e, thus a portion around the drain groove 11e is cooled, and dew condensation intensively forms on the back surface of the drain groove 11 e. Then, when dew condensation water generated due to the dew condensation drops on the upper surface of the nozzle cover 11 c, the nozzle cover 11 c is cooled, and dew condensation easily forms thereon to generate dew condensation water on the lower surface of the nozzle cover 11c. When the dew condensation water generated thus drops around the air outlet 6 below the nozzle cover 11c, dew is scattered into the room by wind blown out from the air outlet 6.

**[0020]** In such a case, it is possible to prevent drop of dew condensation water on the upper surface of the nozzle cover 11 c, by attaching at least either one of a heat insulating material and a water absorbing material (hereinafter, referred to as a heat insulating material or the like) on the back surface of the drain groove 11 e. Thus, it is possible to prevent generation of dew condensation water on the lower surface of the nozzle cover 11c. If the nozzle 11 is configured without the drain groove 11e, it is necessary to attach a heat insulating material or the like on the entirety of the back surface of the drain pan 11a. However, in Embodiment, since there is the drain groove 11 e, it is simply necessary to attach a heat insulating material or the like only on the back surface of the drain groove 11 e, thereby decreasing the area where the heat insulating material or the like is attached as compared to the case without the drain groove 11 e. Thus, it is possible to take a countermeasure against scattering of dew while reducing the cost.

**[0021]** The stabilizer 14 is provided on a surface of the nozzle 11 that is opposed to the cross-flow fan 9, and along a portion of the outer periphery of the cross-flow fan 9. An end portion 14b is provided at the boundary between the stabilizer 14 and the nozzle 11, and a projection 14a is provided at a portion extending downward from the end portion 14b along the outer periphery of the cross-flow fan 9 and determines a minimum distance from the cross-flow fan 9. A first recess portion 14c is formed between the projection 14a and the end portion 14b so as to be continuous in the longitudinal direction of the cross-flow fan 9 and have a recess shape. Furthermore, a second recess portion 14d is formed at a lower portion of the first recess portion 14c so as to be continuous in the longitudinal direction of the cross-flow fan 9 and have a recess shape.

**[0022]** Fig. 4 is a perspective view of the stabilizer of the indoor unit of an air-conditioning apparatus according to Embodiment of the present invention, and Fig. 5 is an enlarged view of a principal part of Fig. 4.

**[0023]** At the boundary between the stabilizer 14 and the blowout wind path 13, the stabilizer 14 is provided with an R portion 14g which is curved so as to be convex toward the cross-flow fan 9, and a plurality of vertical grooves 14e are formed in the R portion 14g so as to be aligned in the longitudinal direction of the cross-flow fan 9. Vertical groove ribs 14f are provided in the plurality of vertical grooves 14e such that their positions are regularly varied along the outer periphery of the cross-flow fan 9 in an oblique direction. Third recess portions 14h are formed by the vertical groove ribs 14f partially filling the vertical grooves 14e.

**[0024]** Next, an operation during cooling operation or dehumidifying operation of the indoor unit 1 of an air-conditioning apparatus according to Embodiment will be described.

**[0025]** When the indoor unit 1 is powered on with a remote controller or the like which is not shown and cooling operation or dehumidifying operation is selected, a refrigerant becomes a high-temperature and high-pressure refrigerant by a compressor which is not shown and then is discharged therefrom. The refrigerant becomes a low-temperature and low-pressure refrigerant by flowing through a condenser and an expansion valve which are not shown, and then flows into the heat exchanger 8. Meanwhile, when the cross-flow fan 9 rotates, dust is removed by the pre-filter 7 from air in the room that has been sucked through the air inlets 4, and then the air flows into the heat exchanger 8. The air exchanges heat with the refrigerant within the heat exchanger 8 and then is blown out through the air outlet 6 into the room. At that time, the air is blown out to a direction corresponding to the positions of the vertical wind direction variable vane 5 and the lateral wind direction variable vane 15. The user is allowed to set the positions of the vertical wind direction variable vane 5 and the lateral wind direction variable vane 15 manually or automatically with the remote controller.

**[0026]** Thereafter, the air in the room is sucked through the air inlets 4 again and the series of operations is repeated. As a result, dust is removed from the air in the room and the air is cooled, and thus the quality of the air is changed.

**[0027]** When the air in the room flows through the heat exchanger 8 to be cooled or dehumidified, water vapor in the air forms dew condensation at the heat exchanger 8, and dew condensation water drops on the drain pan 11 a. Thereafter, the dropped dew condensation water is introduced to the drain groove 11 e due to the inclination of the drain pan 11 a and discharged out of the room through a drain hose which is mounted to a drain hose mount portion 16 and is not shown. At that time, if the depth of the drain groove 11 e is small, the dew condensation water overflows therefrom, so that the lower portion of the front heat exchanger 8a is immersed in the dew condensation water. Accordingly, the air in the room cannot pass through the immersed lower portion, thereby decreasing the heat exchange efficiency. Thus, it is necessary to make the depth of the drain groove 11e sufficiently large.

**[0028]** As shown in Fig. 4, the drain hose mount portion 16 is present at both left and right sides, a drain hose is connected to either one of the drain hose mount portions 16 depending on an installation environment, and a rubber stopper is connected to the other drain hose mount portion 16. If the indoor unit 1 is inclined laterally due to distortion of a wall surface on which the indoor unit 1 is installed, deformation of a mount metal fitting, an improper installation operation, or the like, the drain hose mount portion 16 to which the drain hose is connected may be located at a higher position than the lowest point of the drain groove 11e. If so, dew condensation water stored in the drain groove 11e is not discharged to the outside through the drain hose. Even in such a case, it is necessary to make the depth of the drain groove 11e sufficiently large to prevent dew condensation water from overflowing from the drain groove 11e to immerse the lower portion of the front heat exchanger 8a in the dew condensation water. It is recognized from actual measurement or the like that when the depth of the drain groove 11e is equal to or larger than 2% of the horizontal width dimension of the indoor unit 1, even if a lateral inclination is 1.1 degrees, it is possible to prevent overflow of dew condensation water, and it is possible to cover most of installation states.

**[0029]** In addition, even if the indoor unit 1 is inclined frontward, it is possible to introduce dew condensation water to the drain groove 11 e by sufficiently inclining the drain pan 11 a. It is recognized from actual measurement or the like that when an inclination angle downward to the drain groove 11e is equal to or greater than 2 degrees, it is possible to cover most of installation states.

**[0030]** With the above configuration, the lower portion of the front heat exchanger 8a is not immersed in dew condensation water. Thus, the air in the room is allowed to pass also through the lower portion of the front heat exchanger 8a, and the heat exchange efficiency is not decreased during cooling operation and during dehumidifying operation.

**[0031]** Moreover, since the boundary between the drain groove 11e and the drain pan 11a has a shape curved so as to be convex toward the front heat exchanger 8a, when dew condensation water flows through the drain groove 11e, the dew condensation water flows along the surface of the curved shape. Thus, it is possible to make it less likely to generate dropping sound produced by dropped dew condensation water and water stored in the drain groove 11e when the dew condensation water drops to the drain groove 11e.

**[0032]** In Embodiment, as shown in Fig. 1, the boundary between the drain groove 11e and the drain pan 11a is located directly below the front heat exchanger 8a, and thus a portion of the drain groove 11e is also located directly below the front heat exchanger 8a. Therefore, the boundary between the drain groove 11 e and the drain pan 11 a is located at the design grille 2 side with respect to the position directly below the heat exchanger 8, and the drain groove 11 e is formed such that there is no portion of the drain groove 11 e that is located directly below the front heat exchanger 8a. Accordingly, it is possible to prevent dew condensation water from dropping from the front heat exchanger 8a directly to the drain groove 11e. As a result, it is possible to make it further less likely to generate dropping sound.

**[0033]** During cooling operation or during dehumidifying operation, if the gap between the drain pan 11a and the front heat exchanger 8a (or the nozzle projection 11 d) is opened wide, the volume of high-temperature humid air that does not flow through the heat exchanger 8 and passes through the gap from the front side of the indoor unit 1 to the back side thereof (hereinafter, referred to as secondary air) is increased. Then, the secondary air is cooled when passing through the end portion 14b of the stabilizer 14, generating dew condensation water on the end portion 14b. If the volume of the dew condensation water is increased, the dew condensation water overflows from the end portion 14b to the vicinity of the air outlet 6, and dew is scattered into the room by wind blown out from the air outlet 6.

**[0034]** Therefore, in order to reduce the secondary air which causes dew condensation on the end portion 14b, it is necessary to decrease the gap between the drain pan 11a and the front heat exchanger 8a (or the nozzle projection 11 d), and it is recognized from actual measurement or the like that the gap is desirably equal to or less than 2 mm. The gap between the drain pan 11 a and the front heat exchanger 8a may be sealed by a cushioning material interposed therebetween.

**[0035]** By so doing, the volume of the secondary air is decreased, thus it is possible to reduce the volume of dew condensation water which is generated on the end portion 14b, and dew condensation water is less likely to overflow from the end portion 14b. Therefore, it is possible to prevent occurrence of scattering of dew.

**[0036]** Even if dew condensation water is generated on the end portion 14b, since the first recess portion 14c is formed between the projection 14a and the end portion 14b so as to be continuous in the longitudinal direction of the cross-flow fan 9, the first recess portion 14c is able to receive the dew condensation water. Furthermore, since the recess-shaped second recess portion 14d is formed at the lower portion of the first recess portion 14c so as to be continuous in the longitudinal direction of the cross-flow fan 9, even if dew condensation water overflows from the first recess portion 14c, the second recess portion 14d is able to receive the dew condensation water. Moreover, the plurality of vertical grooves 14e are formed in the R portion 14g, the vertical groove ribs 14f are provided in the plurality of vertical grooves 14e such that their positions are regularly varied along the outer periphery of the cross-flow fan 9 in the oblique direction, and the third recess portions 14h are formed by the vertical groove ribs 14f partially filling the vertical grooves 14e. Thus, the third recess portions 14h are also able to receive overflowing dew condensation water. As described above, the stabilizer 14 has three types of recess portions, the first recess portion 14c, the second recess portion 14d, and the third recess portions 14h, and is structured to triply receive dew condensation water. Thus, it is possible to prevent dew condensation water from overflowing from the stabilizer 14 to the vicinity of the air outlet 6 to cause scattering of dew into the room by wind blown out from the air outlet 6. It should be noted that dew condensation water stored in the three types of recess portions evaporates during low-load operation or during stop of operation.

**[0037]** As described above, since the stabilizer 14 has three types of recess portions, the three types of recess portions are able to store dew condensation water generated within the indoor unit 1 during cooling operation or during dehumidifying operation, and the dew condensation water is prevented from dropping to the vicinity of the air outlet 6. Thus, it is possible to prevent occurrence of scattering of dew into the room caused by wind blown out from the air outlet 6.

**[0038]** In addition, since the gap between the drain pan 11 a and the front heat exchanger 8a (or the nozzle projection 11 d) is made equal to or less than 2 mm, the volume of the secondary air is decreased, the volume of dew condensation water generated on the end portion 14b is decreased, and dew condensation water is made less likely to overflow from the end portion 14b. Thus, it is possible to prevent occurrence of scattering of dew.

**[0039]** The nozzle cover 11c is mounted at the lower surface of the nozzle 11 via the air layer 11 b, whereby the air layer 11 b between the drain pan 11 a and the nozzle cover 11c becomes a heat insulating layer. Thus, it is possible to prevent generation of dew condensation water on the lower surface of the nozzle cover 11 c, dropping of the dew condensation water to the vicinity of the air outlet 6, and occurrence of scattering of dew into the room by wind blown out from the air outlet 6.

**[0040]** Even if the air layer 11 b is not completely sealed, it is possible to prevent generation of dew condensation water on the lower surface of the nozzle cover 11 c, by attaching a heat insulating material or the like only to the back surface of the drain groove 11 e. Thus, it is possible to take a countermeasure against scattering of dew while reducing the cost.

**[0041]** The drain pan 11 a and the drain groove 11 e are formed in the nozzle 11, and the drain pan 11a is inclined downward toward the drain groove 11e, so that dew condensation water is caused to flow from the drain pan 11a into the drain groove 11 e and accumulate therein. This causes the lower portion of the front heat exchanger 8a to be less likely to be immersed in water.

**[0042]** Even if the indoor unit 1 is inclined laterally so that dew condensation water stored in the drain groove 11 e is not discharged through the drain hose to the outside, it is possible to prevent overflow of dew condensation water in most of installation states by making the depth of the drain groove 11e equal to or larger than 2% of the vertical width dimension of the indoor unit 1.

**[0043]** Even if the indoor unit 1 is inclined frontward, it is possible to introduce dew condensation water to the drain groove 11e in most of installation states by making the inclination angle of the drain pan 11 a equal to or greater than 2 degrees.

**[0044]** With the configuration described above, it is possible to prevent the lower portion of the front heat exchanger 8a from being immersed in dew condensation water to decrease the heat exchange efficiency.

**[0045]** Since the boundary between the drain groove 11e and the drain pan 11a has a shape curved so as to be convex toward the front heat exchanger 8a, dew condensation water flows along the surface of the curved shape. Thus, it is possible to make it less likely to generate dropping sound when dew condensation water drops to the drain groove 11e.

**[0046]** The drain groove 11 e is formed such that there is no portion of the drain groove 11e that is located directly below the heat exchanger 8, whereby it is possible to prevent dew condensation water from dropping from the heat exchanger 8 directly to the drain groove 11 e, and it is possible to make it further less likely to generate dropping sound.

**[0047]** Regarding the heat exchanger 8, a heat transfer tube which is not shown may be formed of aluminum.

**[0048]** In an existing indoor unit 1, copper is used for the heat transfer tube of the heat exchanger 8, but by forming the heat transfer tube from aluminum, it is possible to configure the heat exchanger 8 at reduced cost. In addition, since aluminum is more susceptible to corrosion than copper, it is necessary to take a countermeasure against corrosion on the assumption that the lower portion of the front heat exchanger 8a is immersed in water. Thus, it is necessary to take cost for the countermeasure against corrosion. However, in Embodiment, the lower portion of the front heat exchanger 8a is less likely to be immersed in dew condensation water, and thus it is possible to increase the resistance of the aluminum heat transfer tube to corrosion. As a result, the cost taken for the countermeasure against corrosion is reduced.

Reference Signs List

**[0049]** 1 indoor unit 2 design grille 3 panel 4 air inlet 5 vertical wind direction variable vane 6 air outlet 7 prefilter 8 heat exchanger 8a front heat exchanger 9 crossflow fan 10 suction wind path 11 nozzle 11 a drain pan 11 b air layer 11c nozzle cover 11d nozzle projection 11e drain groove 12 box portion 13 blowout wind path 14 stabilizer 14a projection 14b end portion 14c first recess portion 14d second recess portion 14e vertical groove 14f vertical groove rib 14g R portion 14h third recess portion 15 lateral wind direction variable vane 16 drain hose mount portion

## Claims

**1.** An indoor unit of an air-conditioning apparatus comprising:

a fan;
a heat exchanger provided so as to surround an upper side and a front side of the fan; and
a nozzle located below the heat exchanger located at the front side of the fan, the nozzle being provided to face the fan, wherein
the nozzle includes
a drain pan configured to receive dew condensation water generated at the heat exchanger; and
a drain groove into which the dew condensation water flows.

**2.** The indoor unit of an air-conditioning apparatus of claim 1, wherein
the drain pan and the drain groove are continuously formed by an upper surface of the nozzle, and
the drain pan is located at the fan side with respect to the drain groove.

**3.** The indoor unit of an air-conditioning apparatus of claim 1 or 2, wherein the drain pan is inclined downward toward the drain groove.

**4.** The indoor unit of an air-conditioning apparatus of claim 3, wherein the drain pan has an inclination angle equal to or greater than 2 degrees.

**5.** The indoor unit of an air-conditioning apparatus of any one of claims 1 to 4, wherein the drain groove has a depth equal to or larger than 2% of a horizontal width dimension of the indoor unit.

**6.** The indoor unit of an air-conditioning apparatus of any one of claims 1 to 5, wherein a boundary between the drain groove and the drain pan has a shape curved so as to be convex toward the heat exchanger.

**7.** The indoor unit of an air-conditioning apparatus of any one of claims 1 to 6, wherein the boundary between the drain groove and the drain pan is located at a side opposite to the fan with respect to a position directly below the heat exchanger.

**8.** The indoor unit of an air-conditioning apparatus of any one of claims 1 to 7, wherein a heat transfer tube of the heat exchanger is formed of aluminum.

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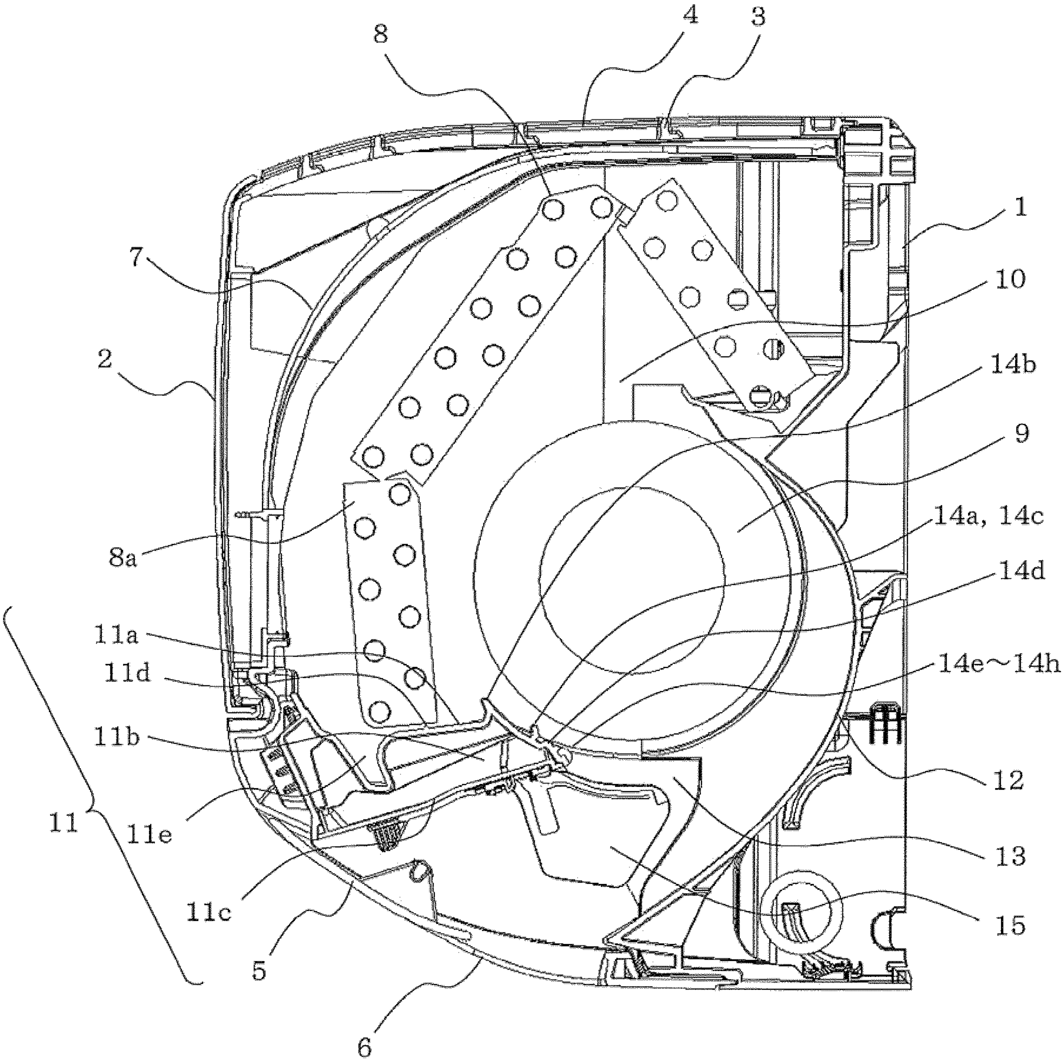
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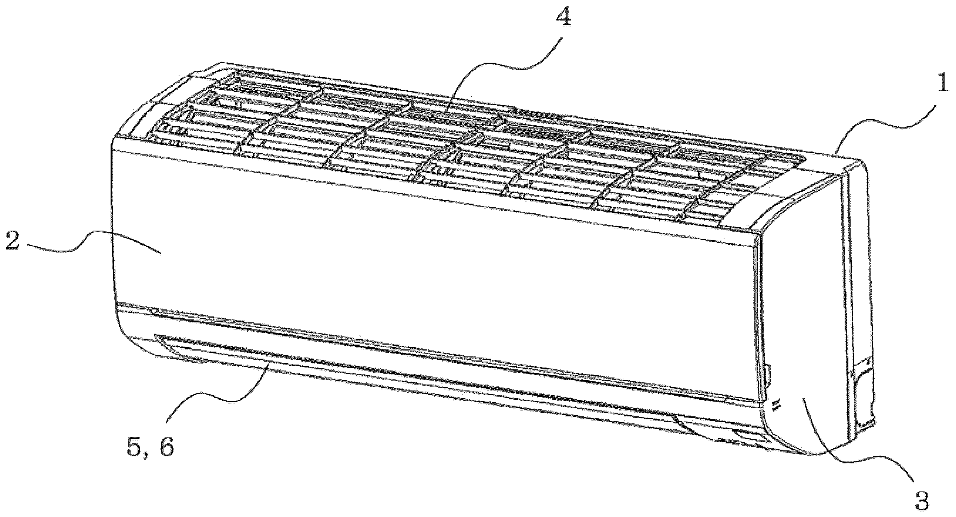
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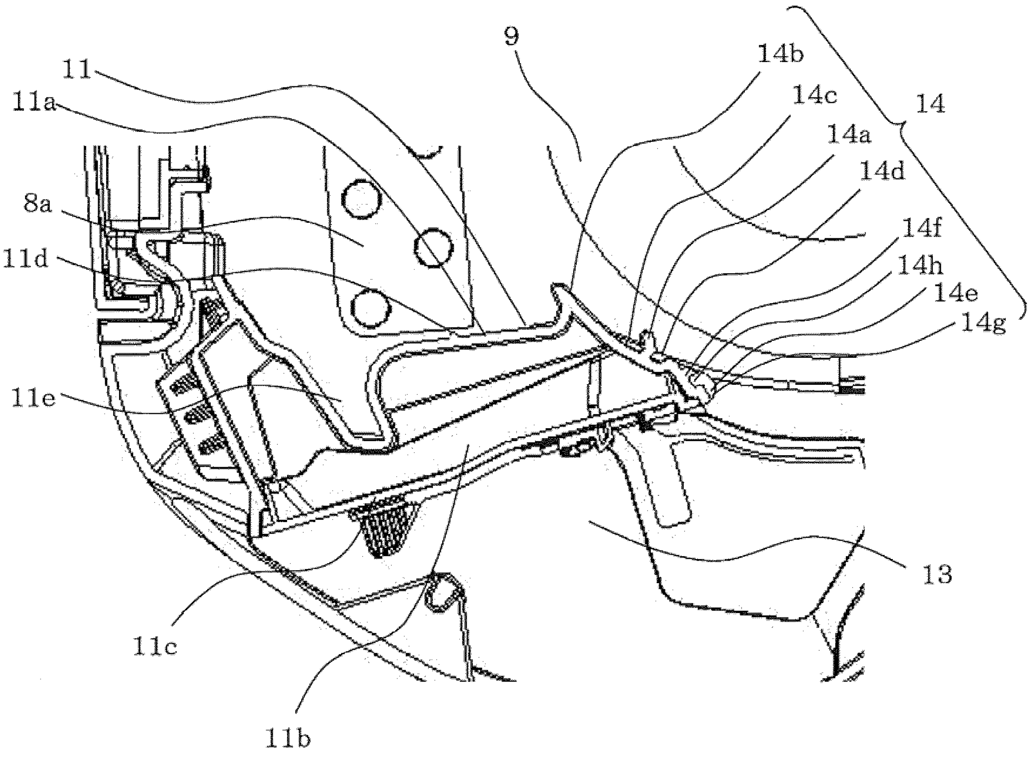
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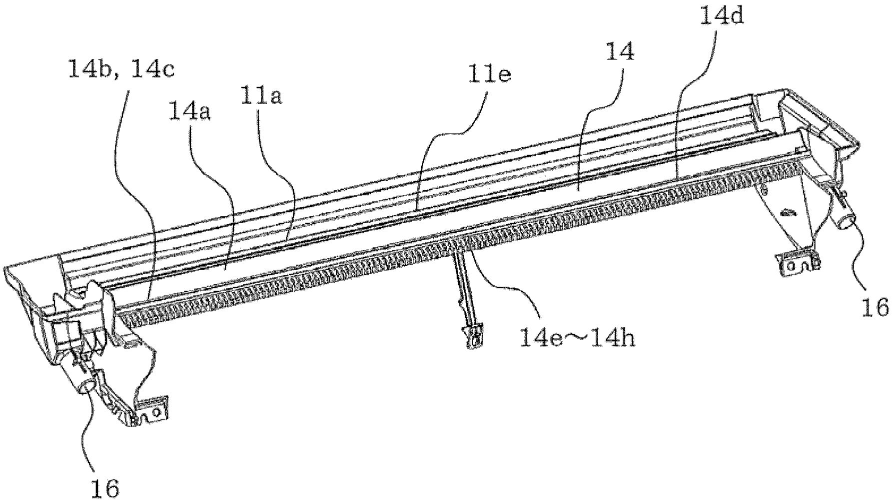
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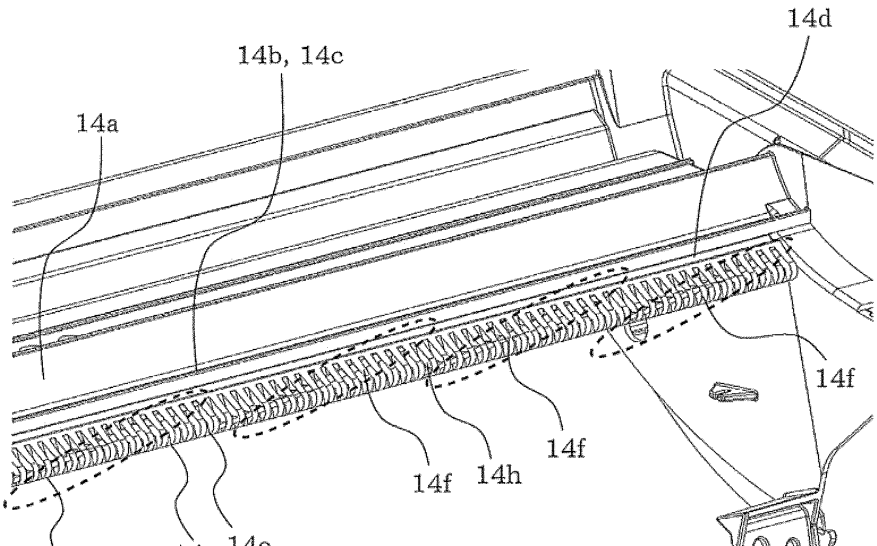
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## INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2013/073632

A. CLASSIFICATION OF SUBJECT MATTER
*F24F13/22*(2006.01)i

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)
F24F13/22

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

| | | | |
|---|---|---|---|
| Jitsuyo Shinan Koho | 1922-1996 | Jitsuyo Shinan Toroku Koho | 1996-2013 |
| Kokai Jitsuyo Shinan Koho | 1971-2013 | Toroku Jitsuyo Shinan Koho | 1994-2013 |

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. |
|---|---|---|
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| Y | JP 2004-061007 A (Sanyo Electric Co., Ltd.), 26 February 2004 (26.02.2004), paragraph [0027]; fig. 3 (Family: none) | 1-8 |
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☒ Further documents are listed in the continuation of Box C.

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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|---|---|---|
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