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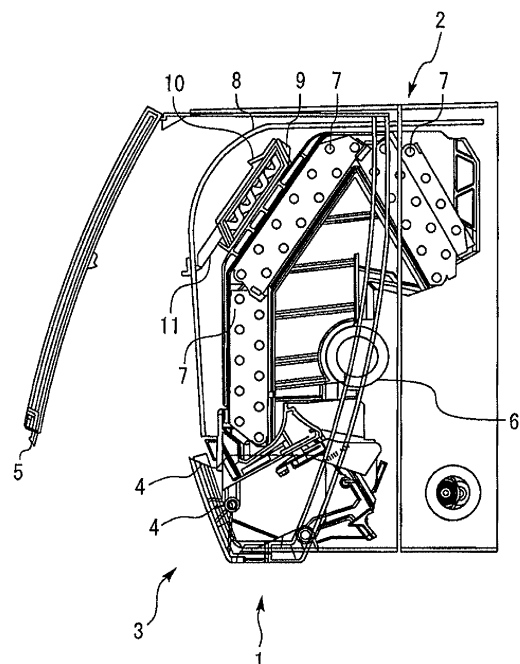
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(54) **AIR CONDITIONER**

(57) A wall-mounted air conditioner in which an air cleaning device can be easily and reliably secured is provided. The air conditioner includes: a body including an inlet port in an upper portion and an air blowing port in a lower portion; a lid provided in a front portion of the body; a fan that is provided in the body, takes air from the inlet port and supplies the air to the air blowing port; a heat exchanger provided between the inlet port and the fan; a filter provided so as to cover the heat exchanger from a side of the lid; a securing frame provided between the filter and the heat exchanger; and an air cleaning device placed on the securing frame on a side of the filter, wherein only when the air cleaning device placed on the securing frame on the side of the filter is incompletely placed, the air cleaning device is pressed by the filter pressed by the lid that is closed and thus secured to the securing frame.

FIG. 1



Description

Technical Field

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

Background Art

[0002] A wall-mounted air conditioner including an air cleaning device is proposed in which a lock mechanism of a securing frame secured to a tilted heat exchanger is used to firmly secure the air cleaning device to the securing frame. The air conditioner can prevent the air cleaning device from falling (for example, see Patent Literature 1).

[0003] However, providing a firm lock mechanism in Patent Literature 1 makes it difficult to place the air cleaning device in a fitting manner. When the wall-mounted air conditioner is placed near a ceiling, an operator presses up a body lid of the air conditioner toward the ceiling for operation. Specifically, the air cleaning device is placed toward the ceiling from a lower position with an operation space. Thus, the lock mechanism is placed in a position remote from an operator's hand. Thus, it is difficult for the operator to visually recognize complete placement of the air cleaning device. When the air cleaning device is incompletely placed, a gap is created in a power feeding unit of the air cleaning device. If power is fed to the air cleaning device in this state, an abnormal discharge or uncomfortable discharge noise is generated.

[0004] In contrast to this, a ceiling-embedded air conditioner including an air cleaning device is proposed in which the air cleaning device is placed by closing a lid with the air cleaning device resting on a horizontal rail. This air conditioner can simplify placement of the air cleaning device (for example, see Patent Literature 2).

Citation List

Patent Literature

[0005]

Patent Literature 1: Japanese Patent Laid-Open No. 2001-65903

Patent Literature 2: Japanese Utility Model Publication No. 6-23850

Summary of Invention

Technical Problem

[0006] However, if the rail described in Patent Literature 2 is applied to a wall-mounted air conditioner, the rail is mounted to a tilted heat exchanger. Thus, the air cleaning device falls before the body lid is closed.

[0007] The present invention has been made to solve the above described problems, and has an object to provide a wall-mounted air conditioner in which an air cleaning device can be easily and reliably secured.

Means for Solving the Problems

[0008] A discharge device of the present invention includes a body including an inlet port in an upper portion and an air blowing port in a lower portion; a lid provided in a front portion of the body; a fan that is provided in the body, takes air from the inlet port and supplies the air to the air blowing port; a heat exchanger provided between the inlet port and the fan; a filter provided so as to cover the heat exchanger from a side of the lid; a securing frame provided between the filter and the heat exchanger; and an air cleaning device placed on the securing frame on a side of the filter, wherein only when the air cleaning device placed on the securing frame on the side of the filter is incompletely placed, the air cleaning device is pressed by the filter pressed by the lid that is closed and thus secured to the securing frame.

Advantageous Effects of Invention

[0009] According to the present invention, the air cleaning device can be easily and reliably secured.

Brief Description of the Drawings

[0010]

Figure 1 is a vertical sectional view of an air conditioner according to Embodiment 1 of the present invention with a body lid being opened.

Figure 2 is a vertical sectional view of the air conditioner according to Embodiment 1 of the present invention with the body lid being closed.

Figure 3 is an exploded perspective view of the air cleaning device included in the air conditioner according to Embodiment 1 of the present invention.

Figure 4 is a perspective view of the securing frame of the air conditioner according to Embodiment 1 of the present invention.

Figure 5 is a sectional view taken in an xy plane of the first power feeding unit provided on the securing frame of the air conditioner according to Embodiment 1 of the present invention.

Figure 6 is a sectional view taken in a yz plane of the second power feeding unit provided on the securing frame of the air conditioner according to Embodiment 1 of the present invention.

Description of Embodiments

[0011] An embodiment of the present invention will be described with reference to the accompanying drawings. The same reference numerals denote the same or cor-

responding components throughout the drawings, and overlapping descriptions will be simplified or omitted.

Embodiment 1

[0012] Figure 1 is a vertical sectional view of an air conditioner according to Embodiment 1 of the present invention with a body lid 5 being opened.

[0013] In Figure 1, a back surface of a body 1 of the air conditioner is hung on a room wall. An inlet port 2 is formed in an upper portion of the body 1. An air blowing port 3 is provided in a lower portion of the body 1. A flap 4 is provided in the air blowing port 3. A body lid 5 is provided in a front portion of the body 1.

[0014] A blast fan 6 is provided in the body 1. The blast fan 6 has a function of taking air from the inlet port 2 and supplying the air to the air blowing port 3. A heat exchanger 7 is provided between the inlet port 2 and the blast fan 6 in the body 1. The heat exchanger 7 is placed in a bent manner so as to surround the blast fan 6. The heat exchanger 7 has an inclined surface with a lower portion closer to the body lid 5. In the body 1, a filter 8 is provided so as to cover the heat exchanger 7 from a side of the body lid 5.

[0015] A securing frame 9 is mounted to the inclined surface of the heat exchanger 7 on the side of the body lid 5. An air cleaning device 10 is detachably mounted to the securing frame 9. A handle 11 is provided at a center of a lower edge of the air cleaning device 10. The handle 11 is formed so as to be gripped by a human when holding the air cleaning device 10 by hand.

[0016] In the air conditioner, when the blast fan 6 is driven, outside air is taken from the inlet port 2 into the body 1. Bacteria, mold, viruses, or the like suspended in the air are also taken into the body 1.

[0017] At this time, corona discharge occurs in the air cleaning device 10. Thus, an electric field and a discharge product destroy the bacteria, mold, viruses, or the like when passing through the air cleaning device 10. The destruction kills or inactivates the bacteria, mold, viruses, or the like. The killed or inactivated bacteria, mold, viruses, or the like are discharged from the air cleaning device 10. This removes bacteria, mold, viruses, or the like suspended in a room.

[0018] On the other hand, dust in a room accumulates on the air cleaning device 10. Thus, the air cleaning device 10 needs to be washed with running water at least every six months. Specifically, the filter 8 is easily removed with the body lid 5 being opened. Then, dust or the like adhering to a surface of the filter 8 is removed.

[0019] With the filter 8 being removed, the air cleaning device 10 is exposed to the operator. In this state, the handle 11 is lifted from the securing frame 9. Then, the air cleaning device 10 is easily removed from the securing frame 9. Then, the air cleaning device is washed by running water.

[0020] Next, with reference to Figure 2, a method of placing the air cleaning device 10 washed with running

water will be described.

[0021] Figure 2 is a vertical sectional view of the air conditioner according to Embodiment 1 of the present invention with the body lid being closed.

[0022] As shown in Figure 2, a press-up portion 5a is provided at a center of a back surface of the body lid 5. A protruding portion is provided in a lower portion of the press-up portion 5a. The protruding portion protrudes toward the filter 8. A contact portion 8a is provided on a surface of the filter 8. A first protruding portion is provided in a lower portion of the contact portion 8a on the side of the body lid 5. The first protruding portion protrudes toward the body lid 5. A second protruding portion is provided in the lower portion of the contact portion 8a on a side of the handle 11. The second protruding portion protrudes toward the handle 11.

[0023] When the air cleaning device 10 washed with running water is placed, the air cleaning device 10 is placed on the securing frame 9. Then, the filter 8 is placed in a predetermined position. Only when the device is incompletely placed, the contact portion 8a of the filter 8 comes into contact with the handle 11 of the air cleaning device 10. The body lid 5 is closed in this state. At this time, the protruding portion in the press-up portion 5a of the body lid 5 presses up the first protruding portion in the contact portion 8a of the filter 8 from below against gravity. By the pressing up, the second protruding portion in the contact portion 8a of the filter 8 presses up the handle 11 of the air cleaning device 10 from below against gravity. By the pressing up, the air cleaning device 10 is completely placed on the securing frame 9.

[0024] Next, with reference to Figure 3, the air cleaning device 10 will be described.

[0025] Figure 3 is an exploded perspective view of the air cleaning device included in the air conditioner according to Embodiment 1 of the present invention.

[0026] The air cleaning device 10 is formed to be substantially rectangular when seen from front. An outline of the air cleaning device is formed of an upper frame 12 and a lower frame 13. The upper frame 12 and the lower frame 13 include therein a discharge electrode 14, a counter electrode 15, a first support unit 16, a second support unit 17, a first power feeding terminal 18, and a second power feeding terminal 19.

[0027] The upper frame 12 is placed on the most windward side of the air cleaning device 10. For example, the upper frame 12 is entirely made of resin. The handle 11 is integrally formed at a center of one of long edges of the upper frame 12. The upper frame 12 integrally includes a lattice. The lattice is formed to prevent a human's finger from entering the air cleaning device 10. Each hole partitioned by the lattice is an opening portion.

[0028] The lattice integrally includes an upper rib. For example, the upper rib is formed of a triangular plate-like member. The upper rib has a tip protruding into the air cleaning device 10 so as to be perpendicular to a surface of the upper frame 12 having the opening portion. A pair of fitting portions 12a are integrally formed at the center

of one of the long edges of the upper frame 12. The pair of fitting portions 12a are formed to be surrounded by the handle 11.

[0029] The lower frame 13 is placed on the most leeward side of the air cleaning device 10. For example, the lower frame 13 is entirely made of resin. The lower frame 13 integrally includes a lattice. Each hole partitioned by the lattice is an opening portion. The opening portion is formed to discharge air taken into the air cleaning device 10 to an outside of the air cleaning device 10.

[0030] The lattice integrally includes a lower rib. For example, the lower rib is formed of a triangular plate-like member. The lower rib has a tip protruding into the air cleaning device 10 so as to be perpendicular to a surface of the lower frame 13 having the opening portion. A pair of fitting portions 13a are integrally formed at a center of one of long edges of the lower frame 13. The pair of fitting portions 13a are formed to fit the pair of fitting portions. A lock portion 13b is integrally formed at the center of one of the long edges of the lower portion. The lock portion 13b is formed between the pair of fitting portions 13a.

[0031] An essential portion of the discharge electrode 14 is formed of a long plate-like metal member. The discharge electrode 14 is preferably made of tungsten, copper, nickel, stainless, zinc, iron, molybdenum, or the like. The discharge electrode 14 may be made of alloys mainly consisting of the above described metal, or the above described metal plated with noble metal such as silver, gold, or platinum.

[0032] The discharge electrode 14 has a rectangular section surrounded by short and long sides. For example, in the section of the discharge electrode 14, the short side has a length of 0.01 to 0.1 mm. The long side has a length of 0.1 to 1.0 mm. A terminal is mounted to each end of the discharge electrode 14. The terminal has a ring shape. The discharge electrode 14 is housed in the air cleaning device 10 with an intermediate portion being folded back about twice to four times.

[0033] The discharge electrode 14 may be a wire of several tens microns to several hundreds microns diameter, a needle electrode, or a projection electrode.

[0034] The counter electrode 15 is fabricated by cutting and bending a plate-like metal member. The counter electrode 15 is preferably made of tungsten, copper, nickel, stainless, zinc, iron, molybdenum, or the like. The counter electrode 15 may be made of alloys mainly consisting of the above described metal, or the above described metal plated with noble metal such as silver, gold, or platinum.

[0035] For example, the counter electrode 15 includes electrode portions, horizontal portions, and folded portions.

[0036] The electrode portions are formed of a plurality of plates having a width larger than that of the opening portion of the upper frame 12. The electrode portions are arranged in parallel at regular intervals in an x-axis direction. Each electrode portion is tilted by a predetermined angle with respect to an opening surface of the

upper frame 12 (and an opening surface of the lower frame 13). In this embodiment, the electrode portion has an inclination angle of 45° to 60° with respect to the opening surface of the upper frame 12.

[0037] One edge of the horizontal portion is connected to a lower portion of an end of the electrode portion. The horizontal portion is formed of a flat plate. The horizontal portion is placed in parallel with the opening surface of the upper frame 12.

[0038] One edge of the folded portion is connected to the other edge of the horizontal portion. The folded portion is formed of a triangular plate folded to protrude toward the upper frame 12.

[0039] The horizontal portion and the folded portion do not face the opening surface of the upper frame 12 (and the opening surface of the lower frame 13). Specifically, the horizontal portion and the folded portion are not exposed to a portion where air flows in the air cleaning device 10. Thus, an airflow in the air cleaning device 10 is not blocked by the horizontal portion and the folded portion.

[0040] Ends of adjacent electrode portions are connected by the folded portions and the horizontal portions. Specifically, at the end of the counter electrode 15, the folded portions and the horizontal portions are alternately placed in corrugated manner.

[0041] The counter electrode 15 is formed of a metal plate, and thus the electrode portion is more precisely formed than in a counter electrode formed by resin molding. Changes in tilt with time of the electrode portion are also more significantly prevented.

[0042] In a lower surface of the first support unit 16, recesses and plane portions are alternately formed. The recess is formed into a triangular shape corresponding to the folded portion of the counter electrode 15. The plane portion is formed into a planer shape corresponding to the horizontal portion of the counter electrode 15. The first support unit 16 together with the lower frame 13 holds one end of the counter electrode 15 from a z-axis direction.

[0043] In a lower surface of the second support unit 17, recesses and plane portions are alternately formed. The recess is formed into a triangular shape corresponding to the folded portion of the counter electrode 15. The plane portion is formed into a planer shape corresponding to the horizontal portion of the counter electrode 15. The second support unit 17 together with the lower frame 13 holds the other end of the counter electrode 15 from the z-axis direction.

[0044] The first power feeding terminal 18 is formed of a metal member. The first power feeding terminal 18 is provided to come into contact with the counter electrode 15. The first power feeding terminal 18 is formed so that the counter electrode 15 can be grounded.

[0045] The second power feeding terminal 19 is formed of a metal member. The second power feeding terminal 19 is formed to draw the discharge electrode 14 in a longitudinal direction via a spring. The second power feeding

terminal 19 is formed to be connectable to a power supply (not shown) for supplying a voltage of 4 to 7 kV to the discharge electrode 14 (between the discharge electrode 14 and the counter electrode 15).

[0046] Next, with reference to Figures 4 to 6, a temporary placement method before complete placement of the air cleaning device 10 will be described.

[0047] Figure 4 is a perspective view of the securing frame of the air conditioner according to Embodiment 1 of the present invention. Figure 5 is a sectional view taken in an xy plane of the first power feeding unit provided on the securing frame of the air conditioner according to Embodiment 1 of the present invention. Figure 6 is a sectional view taken in a yz plane of the second power feeding unit provided on the securing frame of the air conditioner according to Embodiment 1 of the present invention.

[0048] As shown in Figure 4, a surface (front surface) of the securing frame 9 on a positive side in the z-axis direction is a surface on which the air cleaning device 10 is placed. On the front surface of the securing frame 9, a pair of support portions 9a, a pair of lock portions 9b, a first power feeding unit 9c, and a second power feeding unit 9d are provided. The pair of support portions 9a are formed to have a space equal to a width of the air cleaning device 10 in the y direction. The support portion 9a has a height larger than a thickness of the air cleaning device 10 in the z direction. The pair of lock portions 9b are formed to secure the other edge of the air cleaning device 10. The first power feeding unit 9c is formed to fit the first power feeding terminal 18 of the air cleaning device 10. The second power feeding unit 9d is formed to fit the second power feeding terminal 19 of the air cleaning device 10.

[0049] A plurality of securing portions 9e are formed on a rear surface of the securing frame 9. Each securing portion 9e is formed to match a diameter of a refrigerant including pipe of the heat exchanger 7. The securing portion 9e is secured to the refrigerant including pipe so that a user cannot remove the securing frame 9 from the heat exchanger 7. Each securing portion 9e has a proper space from a fin of the heat exchanger 7. The space prevents discharge from the discharge electrode 14 to the heat exchanger 7.

[0050] A lock portion 9f is formed on one of long edges of the securing frame 9. The lock portion 9f is formed to fit the lock portion 13b formed on the lower frame 13 of the air cleaning device 10.

[0051] As shown in Figure 5, the first power feeding unit 9c is made of resin having a high insulating property. A first terminal 20 made of metal is placed in the first power feeding unit 9c. The first power feeding unit 9c opens in the x direction so that the first power feeding terminal 18 of the air cleaning device 10 can be inserted from the x direction.

[0052] As shown in Figure 6, the second power feeding unit 9d is made of resin having a high insulating property. A second terminal 21 made of metal is placed in the sec-

ond power feeding unit 9d. The second power feeding unit 9d opens in the z direction so that the second power feeding terminal 19 of the air cleaning device 10 can be inserted from the z direction.

[0053] When the air cleaning device 10 is temporarily placed, the air cleaning device 10 is inserted between the support portions 9a of the securing frame 9 until it hits the lock portions 9b. At this time, the first power feeding terminal 18 of the air cleaning device 10 completely fits the first power feeding unit 9c of the securing frame 9. Thus, the other edge of the air cleaning device 10 is secured.

[0054] At this time, the second power feeding unit 9d of the securing frame 9 supports the air cleaning device 10 on a side closer to the handle 11 than the center of gravity along the short edge. This prevents the air cleaning device 10 from falling. Then, the handle 11 is brought close to the securing frame 9 around the other edge of the air cleaning device 10. Thus, the second power feeding terminal 19 of the air cleaning device 10 fits the second power feeding unit 9d of the securing frame 9. If he body lid 5 is closed and the air cleaning device 10 is completely placed in this state, the second power feeding terminal 19 of the air cleaning device 10 completely fits the second power feeding unit 9d of the securing frame 9.

[0055] According to Embodiment 1 described above, when the body lid 5 is closed, the handle 11 of the air cleaning device 10 is pressed up by the contact portion 8a of the filter 8 pressed up by the press-up portion 5a of the body lid 5. Thus, the air cleaning device 10 is completely placed. Specifically, the air cleaning device 10 can be easily and reliably secured simply by closing the body lid 5 without a visual check. Thus, a gap between the first power feeding unit 9c of the securing frame 9 and the first power feeding terminal 18 of the air cleaning device 10 can be reliably eliminated. A gap between the second power feeding unit 9d of the securing frame 9 and the second power feeding terminal 19 of the air cleaning device 10 can be reliably eliminated. This can prevent the air cleaning device 10 from generating an abnormal discharge or uncomfortable discharge noise.

[0056] When the air cleaning device 10 is temporarily placed, the second power feeding unit 9d of the securing frame 9 supports the air cleaning device 10 on the side closer to the handle 11 than the center of gravity along the short edge with the first power feeding terminal 18 of the air cleaning device 10 fitting the first power feeding unit 9c of the securing frame 9. This can prevent the air cleaning device 10 from falling before being completely placed.

[0057] The air cleaning device 10 is detachable from the securing frame 9. Thus, the air cleaning device 10 can be removed and easily washed with running water.

[0058] A limit switch may be provided in the body 1 or the body lid 5. In this case, when the limit switch does not mechanically detect the body lid 5 being closed, power feeding to the air cleaning device 10 may be blocked by control with a control unit provided in the body 1. This

can reliably prevent the air cleaning device 10 that is not completely placed from generating an abnormal discharge or uncomfortable discharge noise.

Industrial Applicability

[0059] The air cleaning device in the air conditioner according to the present invention can be provided in products such as a room air conditioner, a package air conditioner, a cleaner, a hand drier, an air cleaner, a humidifier, a dehumidifier, or a refrigerator.

Description of symbols

[0060] 1 body, 2 inlet port, 3 air blowing port, 4 flap, 5 body lid, 5a press-up portion, 6 blast fan, 7 heat exchanger, 8 filter, 8a contact portion, 9 securing frame, 9a support portion, 9b lock portion, 9c first power feeding unit, 9d second power feeding unit, 9e securing portion, 9f lock portion, 10 air cleaning device, 11 handle, 12 upper frame, 12a fitting portion, 13 lower frame, 13a fitting portion, 13b lock portion, 14 discharge electrode, 15 counter electrode, 16 first support unit, 17 second support unit, 18 first power feeding terminal, 19 second power feeding terminal, 20 first terminal, 21 second terminal

Claims

1. An air conditioner comprising:

a body including an inlet port in an upper portion and an air blowing port in a lower portion;
a lid provided in a front portion of the body;
a fan that is provided in the body, takes air from the inlet port and supplies the air to the air blowing port;
a heat exchanger provided between the inlet port and the fan;
a filter provided so as to cover the heat exchanger from a side of the lid;
a securing frame provided between the filter and the heat exchanger; and
an air cleaning device placed on the securing frame on a side of the filter,
wherein only when the air cleaning device placed on the securing frame on the side of the filter is incompletely placed, the air cleaning device is pressed by the filter pressed by the lid that is closed and thus secured to the securing frame.

2. The air conditioner according to claim 1, wherein the lid has a press-up portion on the side of the filter, the heat exchanger has an inclined surface with a lower portion closer to the lid, the filter has a contact portion that comes into contact with the press-up portion when the lid is closed,

the securing frame is secured to the inclined surface on the heat exchanger, and
the air cleaning device is pressed up by the contact portion pressed up by the press-up portion when the lid is closed.

3. The air conditioner according to claim 2, wherein the air cleaning device is secured on the heat exchanger detachably from the securing frame, and has, on a long edge, a handle that serves as a grip for detachment, and

the handle is placed to extend from the air cleaning device to the vicinity of the filter, in a state where the air cleaning device is not inserted into a power feeding terminal provided on the securing frame, the press-up portion formed on the lid abuts against the filter, the press-up portion presses up the handle of the air cleaning device via the filter, and the air cleaning device is completely placed on the securing frame.

4. The air conditioner according to claim 3, wherein the securing frame includes support portion that supports the air cleaning device on opposite short edges of the air cleaning device when the air cleaning device is placed between the filter and the securing frame,

lock portion that locks the other edges of the air cleaning device when the air cleaning device is placed between the filter and the securing frame, a first power feeding unit that faces a first power feeding terminal when the air cleaning device is placed between the filter and the securing frame, and a second power feeding unit that faces a second power feeding terminal when the air cleaning device is placed between the filter and the securing frame.

5. The air conditioner according to any one of claims 1 to 4, wherein the air cleaning device is formed detachably from the securing frame.

6. The air conditioner according to any one of claims 1 to 5, wherein the lid presses up the filter and the air cleaning device from the air blowing port toward the inlet port against gravity.

7. The air conditioner according to any one of claims 1 to 6, further comprising:

a switch that is provided on the body or the lid, and mechanically detects the lid being closed; and
a control unit that blocks power feeding to the air cleaning device when the switch does not detect the lid being closed.

FIG. 1

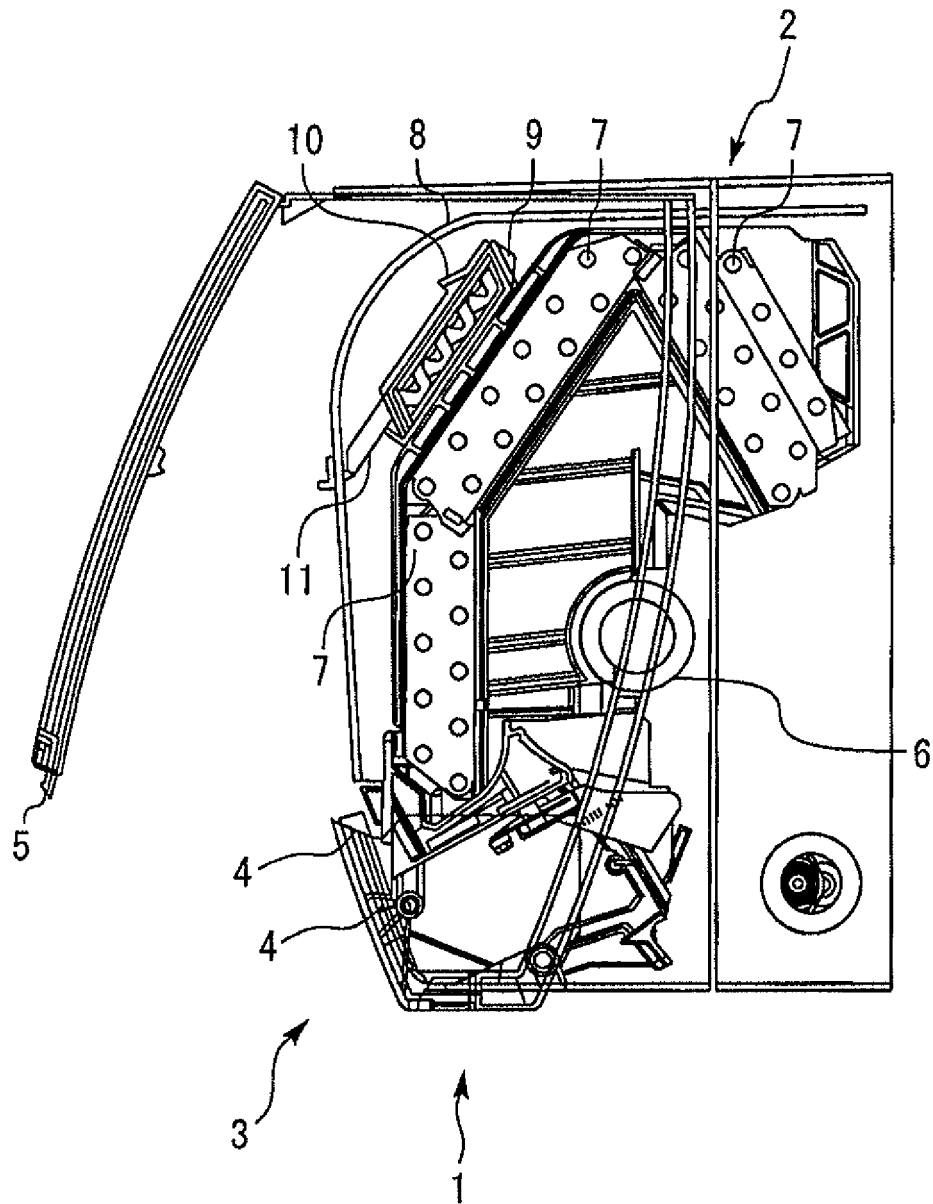


FIG. 2

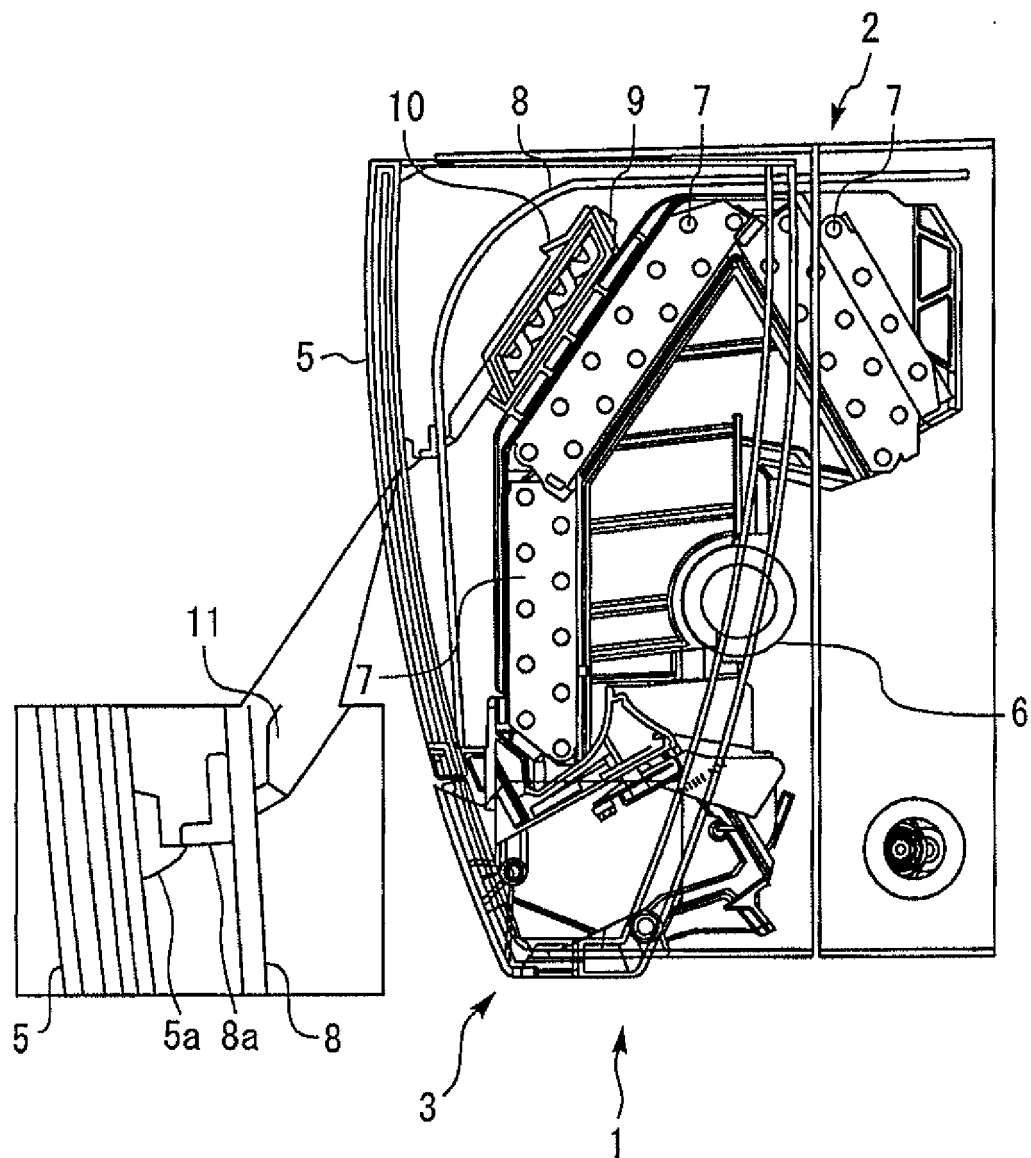


FIG. 3

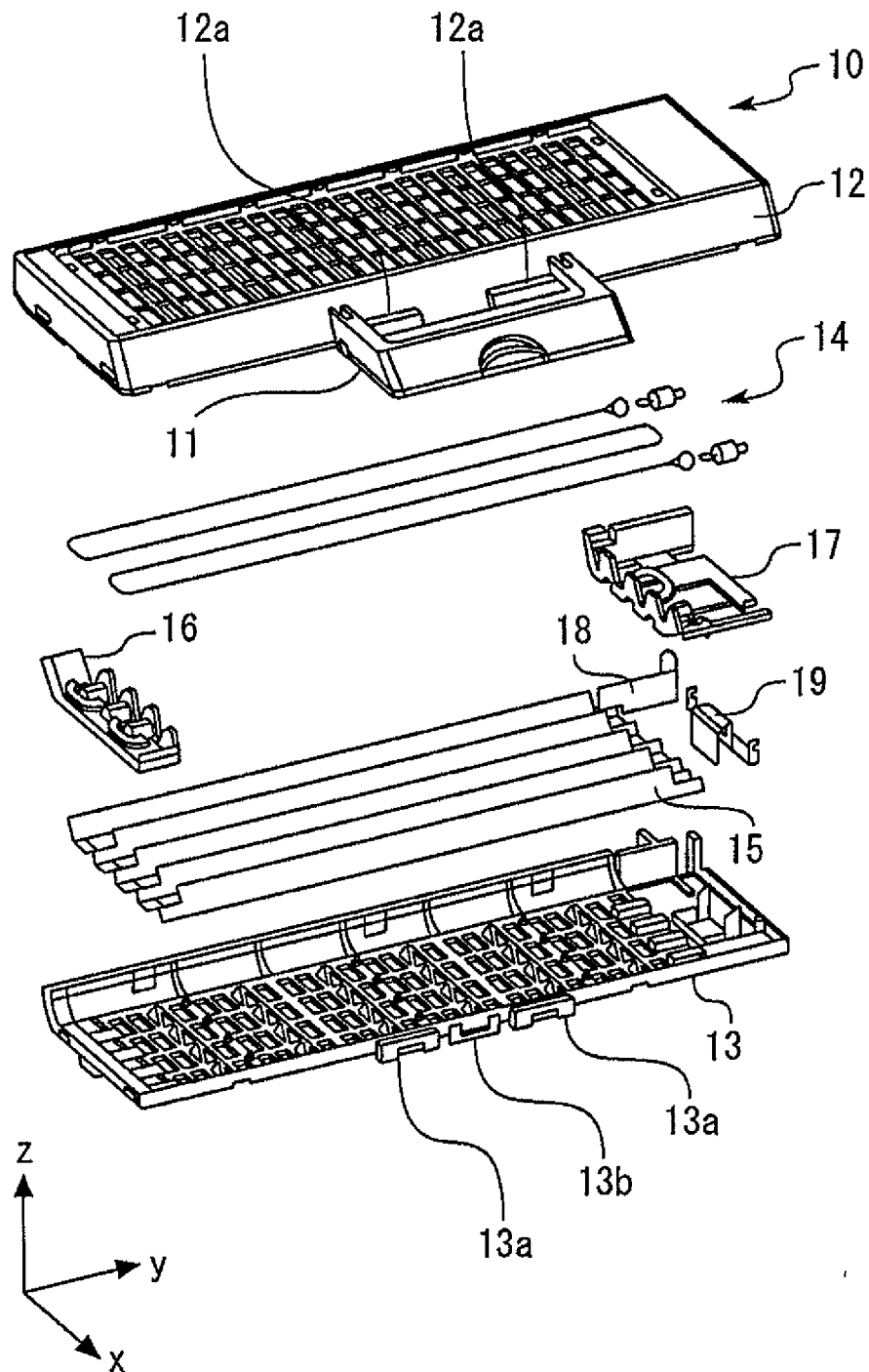


FIG. 4

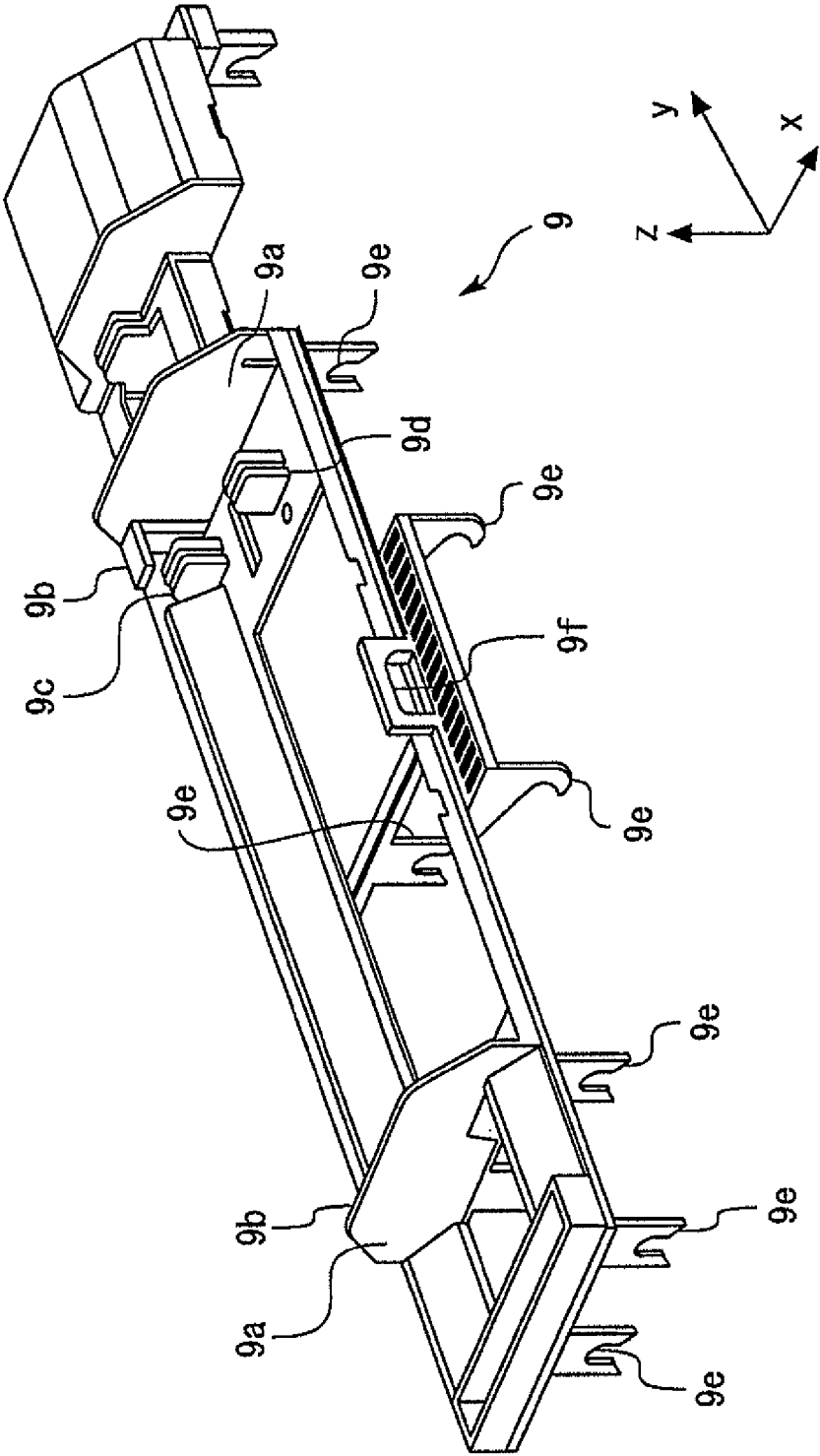


FIG. 5

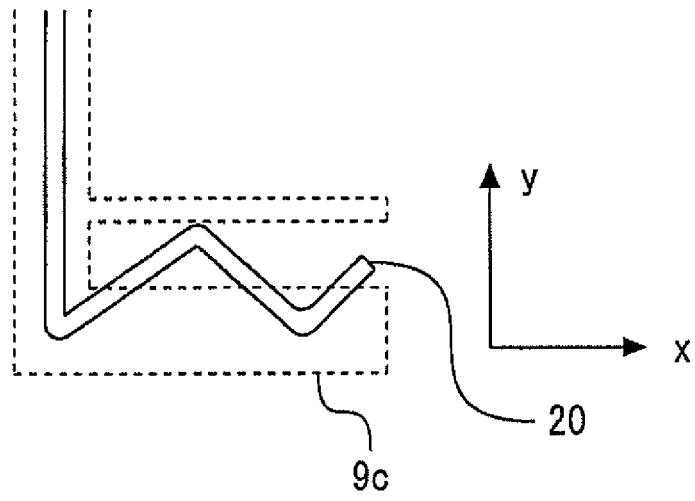
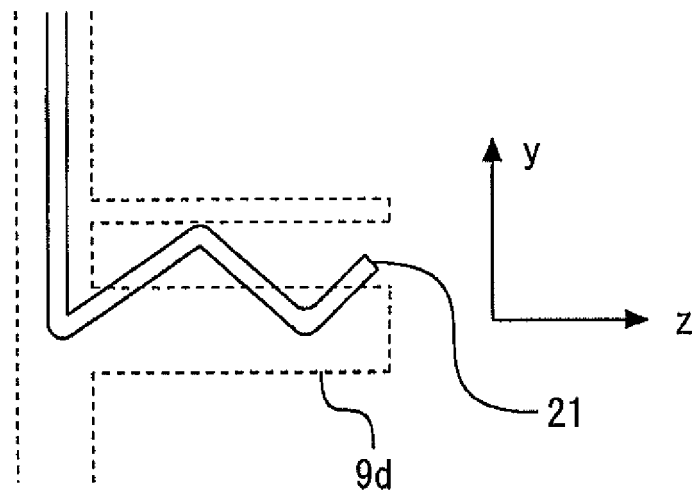


FIG. 6



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2012/066127

A. CLASSIFICATION OF SUBJECT MATTER

F24F1/00 (2011.01) 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)

F24F1/00

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 1996-2012

Kokai Jitsuyo Shinan Koho 1971-2012 Toroku Jitsuyo Shinan Koho 1994-2012

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	JP 2001-65903 A (Toshiba Carrier Corp.), 16 March 2001 (16.03.2001), entire text (Family: none)	1-7
A	JP 6-23850 Y2 (Daikin Industries, Ltd.), 22 June 1994 (22.06.1994), entire text (Family: none)	1-7
A	JP 2010-197014 A (Mitsubishi Electric Corp.), 09 September 2010 (09.09.2010), claim 2; paragraph [0030] (Family: none)	1-7

☒ Further documents are listed in the continuation of Box C.☐ See patent family annex.

* Special categories of cited documents:

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Date of the actual completion of the international search
13 September, 2012 (13.09.12)Date of mailing of the international search report
25 September, 2012 (25.09.12)Name and mailing address of the ISA/
Japanese Patent Office

Authorized officer

Facsimile No.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2012/066127

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 3-59327 A (Sanyo Electric Co., Ltd.), 14 March 1991 (14.03.1991), page 2, lower left column, lines 7 to 11 (Family: none)	1-7

Form PCT/ISA/210 (continuation of second sheet) (July 2009)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2001065903 A [0005]
- JP 6023850 A [0005]