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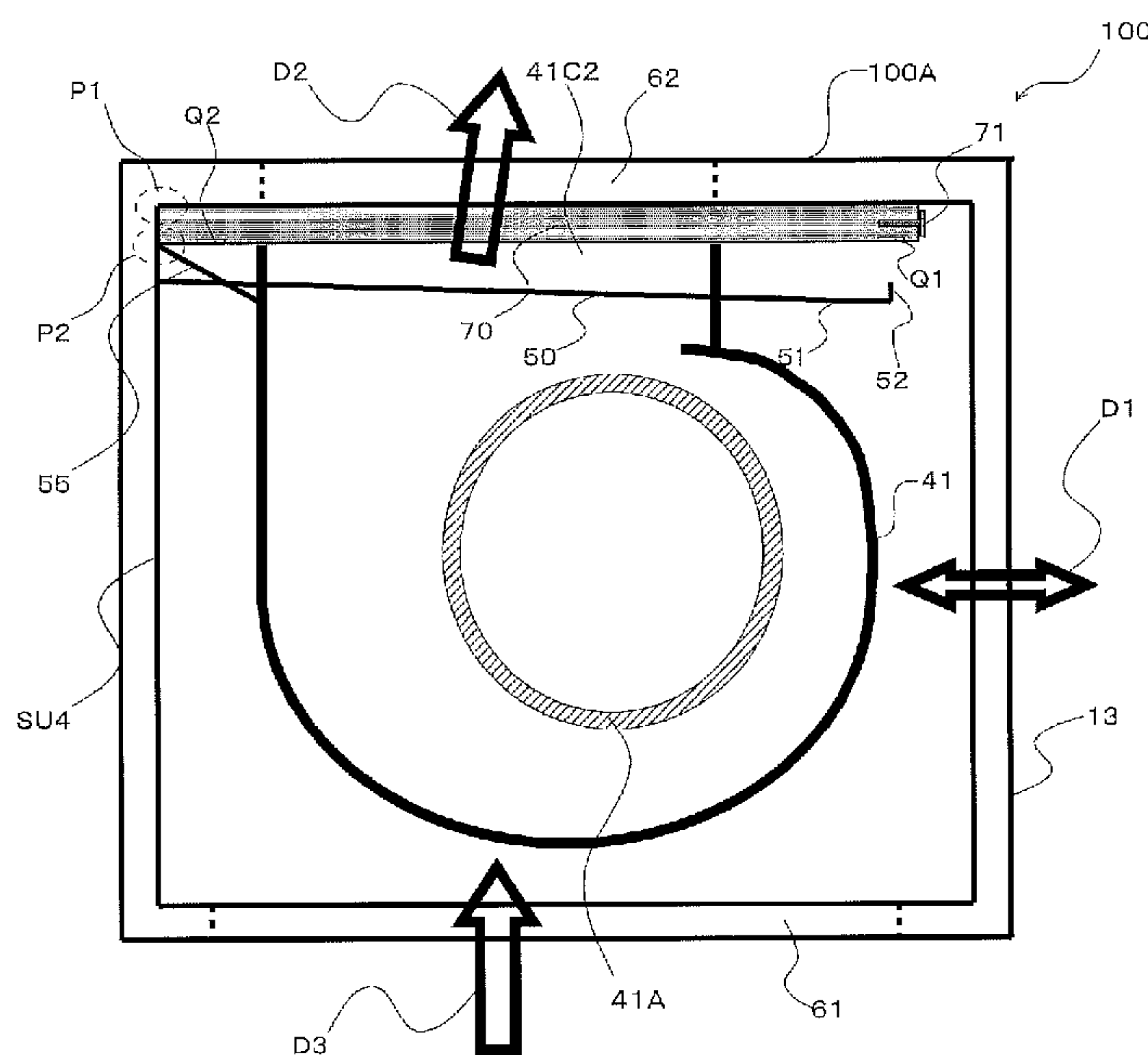
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(54) Title: INDOOR UNIT FOR AIR CONDITIONING DEVICE



(57) Abrégé/Abstract:

An indoor unit for an air conditioning device is provided with: a blower unit having a blower unit housing in which a blower is received and in which a suction opening is formed; and a heat exchanger unit having a heat exchanger unit housing in which an indoor heat exchanger is received, in which a discharge opening is formed, and which is connected to the blower unit housing. The blower has: a rotating fan; an electric motor for driving the fan; and casing having mounted therein the fan and the electric motor, the casing having formed therein an air inlet for taking in air into the casing, the casing also having formed therein an air outlet for discharging air. The blower unit housing has formed therein an opening in communication with the heat exchanger unit housing, the opening being formed at the position where the blower unit housing and the heat exchanger unit housing are connected. The blower unit housing is provided with first rail sections respectively provided on: a second side surface which is perpendicular to a first side face having the opening formed therein; and a third side surface which faces the second side surface. The blower unit housing is further provided with a slide member affixed to the air outlet of the casing of the blower and provided movable on the first rail sections. The above configuration prevents an increase in a workload when changing the direction of the blower in order to change the direction of air discharge.

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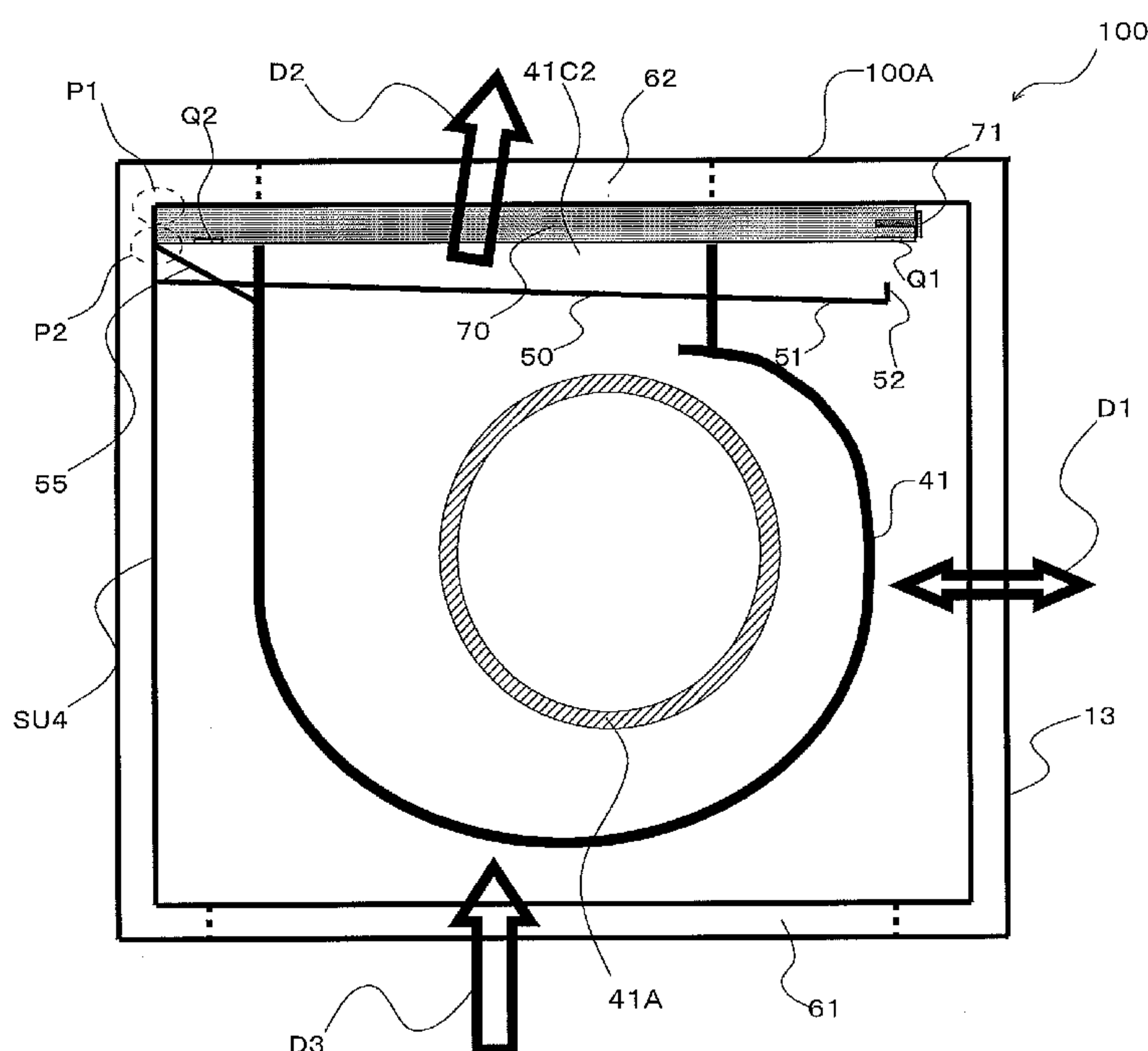
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(54) Title: INDOOR UNIT FOR AIR CONDITIONING DEVICE

(54) 発明の名称：空気調和装置の室内機



(57) Abstract: An indoor unit for an air conditioning device is provided with: a blower unit having a blower unit housing in which a blower is received and in which a suction opening is formed; and a heat exchanger unit having a heat exchanger unit housing in which an indoor heat exchanger is received, in which a discharge opening is formed, and which is connected to the blower unit housing. The blower has: a rotating fan; an electric motor for driving the fan; and casing having mounted therein the fan and the electric motor, the casing having formed therein an air inlet for taking in air into the casing, the casing also having formed therein an air outlet for discharging air. The blower unit housing has formed therein an opening in communication with the heat exchanger unit housing, the opening being formed at the position where the blower unit housing and the heat exchanger unit housing are connected. The blower unit housing is provided with first rail sections respectively provided on: a second side surface which is perpendicular to a first side face having the opening formed therein; and a third side surface which faces the second side surface. The blower unit housing is further provided with a slide member affixed to the air outlet of the casing of the blower and provided movable on the first rail sections. The

above configuration prevents an increase in a workload when changing the direction of the blower in order to change the direction of air discharge.

(57) 要約:

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送風機が収納され、吸込口が形成された送風機ユニット筐体を有する送風機ユニットと、室内熱交換器が収容され、吹出口が形成され、送風機ユニット筐体に連結される熱交換器ユニット筐体を有する熱交換器ユニットと、を備え、送風機は、回転するファンと、ファンを駆動する電動機と、空気を内部に取り込む空気流入部及び空気を吹き出す空気流出部が形成され、ファン及び電動機が搭載されているケーシングとを有し、送風機ユニット筐体には、熱交換器ユニット筐体との連結位置に、熱交換器ユニット筐体に連通する開口部が形成され、開口部が形成された第1の側面に直交する第2の側面と第2の側面に対向する第3の側面とにそれぞれ設けられた第1のレール部と、送風機のケーシングの空気流出部に固定され、第1のレール部上を移動自在に設けられたスライド部材とが設けられているものである。上記の構成により、空気の吹き出し方向を変更するため、送風機の向きを変更する際の作業負担が増大してしまうことを抑制することができる。

INDOOR UNIT FOR AIR CONDITIONING DEVICE

Technical Field

[0001]

The present invention relates to an indoor unit of an air-conditioning apparatus,
5 and more particularly, to an attachment/detachment structure of an air-sending device
mounted on the indoor unit of the air-conditioning apparatus.

Background Art

[0002]

Among indoor units of an air-conditioning apparatus, an indoor unit containing an
10 air-sending device unit equipped with a sirocco fan and a heat exchanger unit equipped
with an indoor heat exchanger has been proposed (see, for example, Patent Literature
1).

[0003]

With the indoor unit of an air-conditioning apparatus described in Patent
15 Literature 1, which is equipped with a sirocco fan, a direction of air blowing out of an air
outlet of the indoor unit is not perpendicular to a formation surface of the air outlet, but
inclined with respect to the formation surface of the air outlet. In this manner, by
changing an attitude of the indoor unit in up, down, left, and right directions, the indoor
unit equipped with a sirocco fan, can change an airflow direction to upward, rightward,
20 leftward, and downward directions.

Citation List

Patent Literature

[0004]

Patent Literature 1: Japanese Unexamined Patent Application Publication No.
25 2009-41836

Summary of Invention

Technical Problem

[0005]

5 In the indoor unit of an air-conditioning apparatus described in Patent Literature 1, an air-sending device provided on the air-sending device unit is fixed to a housing of the air-sending device unit, for example, with screws. Consequently, to change the direction of the air blowing out of the indoor unit, it is necessary to change the attitude of the air-sending device unit including the entire housing. Here, the indoor unit of an air-conditioning apparatus described in Patent Literature 1 is fixed, for example, by being
10 concealed in a ceiling. Therefore, a serviceman needs to perform a task of unfixing the air-sending device unit and heat exchanger unit fixed in the ceiling and changing the attitudes of the air-sending device unit and heat exchanger unit.

[0006]

15 Means of changing the direction of the air blowing out of the indoor unit includes means of changing the attitude of the air-sending device alone by releasing screw fastening of the air-sending device in the air-sending device unit. However, the air-sending device itself has considerable weight, and there is a problem in that changing the attitude of the air-sending device increases a work load on the serviceman.

[0007]

20 The present invention has been made to solve the above problems and has an object to provide an indoor unit of an air-conditioning apparatus, the indoor unit curbs increase in a workload of changing a direction of the air-sending device in changing an airflow direction.

Solution to Problem

25 [0008]

An indoor unit of an air-conditioning apparatus according to one embodiment of

the present invention comprises: an air-sending device unit having an air-sending device unit housing configured to house an air-sending device and provided with an air inlet; and a heat exchanger unit having a heat exchanger unit housing configured to house an indoor heat exchanger, provided with an air outlet, and configured to be coupled to the air-sending device unit housing, wherein the air-sending device includes: a rotating fan, an electric motor configured to drive the fan, and a casing provided with an air inflow port and an air outflow port and equipped with the fan and the electric motor, the air inflow port being configured to take in air and the air outflow port being configured to blow out air, and the air-sending device unit housing includes: an opening port formed at a position of coupling to the heat exchanger unit housing and communicated with the heat exchanger unit housing, a first rail unit provided on each of a second side face orthogonal to a first side face in which the opening port is formed and a third side face opposed to the second side face, and a slide member fixed to the air outflow port of the casing of the air-sending device and configured to be movable on the first rail units.

Advantageous Effects of Invention

[0009]

Being configured as described above, the indoor unit of an air-conditioning apparatus according to one embodiment of the present invention curbs increase in a workload of changing a direction of the air-sending device in changing an airflow direction.

Brief Description of Drawings

[0010]

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

[Fig. 2] Fig. 2 is a longitudinal sectional view of the indoor unit 1 shown in Fig. 1

when installed in such a manner as to blow out upward.

[Fig. 3] Fig. 3 is a sectional view of the indoor unit 1 shown in Fig. 2 taken along line A-A.

[Fig. 4] Fig. 4 is a diagram schematically illustrating the air-sending device unit
5 100 shown in Fig. 3.

[Fig. 5] Fig. 5 is a perspective view of an air-sending device unit housing 100A of the air-sending device unit 100 shown in Fig. 4.

[Fig. 6] Figs. 6(a) and 6(b) are explanatory diagrams of an air-sending device 41
10 mounted on the air-sending device unit 100 and a slide member 70 fixed to the air-sending device 41.

[Fig. 7] Fig. 7 is an explanatory diagram of a claw portion 52 formed on each of first rail units 50 of the indoor unit 1 of the air-conditioning apparatus according to the embodiment of the present invention.

[Fig. 8] Figs. 8(a) to 8(e) are operation explanation diagrams of the slide member
15 70.

[Fig. 9] Fig. 9 is an explanatory diagram of positional relationship between an indoor heat exchanger 21 and the air-sending device 41 mounted on the indoor unit 1 of the air-conditioning apparatus according to the embodiment of the present invention.

[Fig. 10] Figs. 10(a) to 10(d) are explanatory diagrams of four patterns of the
20 positional relationship between the indoor heat exchanger 21 and air-sending device 41.

[Fig. 11] Fig. 11 is a perspective view of an indoor unit 1 of an air-conditioning apparatus according to Embodiment 2 of the present invention.

[Fig. 12] Fig. 12 is a longitudinal sectional view of the indoor unit 1 shown in Fig.
11.

[Fig. 13] Fig. 13 is a perspective view of an indoor unit 1 of an air-conditioning
25 apparatus according to Embodiment 3 of the present invention.

[Fig. 14] Fig. 14 is a longitudinal sectional view of the indoor unit 1 shown in Fig. 13.

[Fig. 15] Fig. 15 is a perspective view of an indoor unit 1 of an air-conditioning apparatus according to Embodiment 4 of the present invention.

5 [Fig. 16] Fig. 16 is a longitudinal sectional view of the indoor unit 1 shown in Fig. 15.

[Fig. 17] Fig. 17 is a sectional view of the indoor unit 1 shown in Fig. 16 taken along line B-B.

Description of Embodiments

10 [0011]

An embodiment of an indoor unit of an air-conditioning apparatus according to the present invention will be described below with reference to the drawings. Note that the present invention is not limited by the embodiment described below. Also, in the following drawings including Fig. 1, components may not be shown in their real size relations.

15 [0012]

Embodiment.

Fig. 1 is a perspective view of an indoor unit 1 of an air-conditioning apparatus according to the present embodiment. Fig. 2 is a longitudinal sectional view of the indoor unit 1 shown in Fig. 1 when installed in such a manner as to blow out upward. Fig. 3 is a sectional view of the indoor unit 1 shown in Fig. 2 taken along line A-A. A configuration and the like of the indoor unit 1 will be described with reference to Figs. 1 to 3.

[0013]

25 [Description of configuration]

The indoor unit 1 includes an air-sending device unit 100 and a heat exchanger

unit 200, where the air-sending device unit 100 is provided with an air-sending device 41 configured to take air into the indoor unit 1 and then release air from the indoor unit 1 and the heat exchanger unit 200 is provided with an indoor heat exchanger 21 configured to serve as an evaporator and condenser. Note that although Figs. 1 to 3 illustrate conditions in which the heat exchanger unit 200 and air-sending device unit 100 of the indoor unit 1 are coupled together, the heat exchanger unit 200 and air-sending device unit 100 are designed to be separable from each other. The indoor unit 1 is installed, for example, above a ceiling.

[0014]

The indoor unit 1 includes a panel 11, panel 12, panel 13, and panel 14 making up an outer shell. The panel 11 and panel 12 are provided on a heat exchanger unit housing 200A. The panel 13 and panel 14 are provided on an air-sending device unit housing 100A. Note that when the panel 13 is removed, the air-sending device unit housing 100A is opened, allowing the air-sending device 41 to be carried in and out. Also, when the panel 14 is removed, a filter 120 (see Fig. 15) can be attached to the air-sending device unit housing 100A.

[0015]

The indoor unit 1 includes a panel 16 and panel 17 making up an outer shell. The panel 16 and panel 17 are provided across both the air-sending device unit housing 100A and heat exchanger unit housing 200A. An inside surface of the panel 16 and inside surface of the panel 17 correspond to a second side face SU2 and third side face SU3 described later.

[0016]

(Air-sending device unit 100)

The air-sending device unit 100 includes the air-sending device unit housing 100A serving as an outer shell of the air-sending device unit 100, and the air-sending

device 41 provided in the air-sending device unit housing 100A, and is designed to take air into the air-sending device unit housing 100A and then supply the air to the heat exchanger unit 200. The air-sending device unit 100 is configured to be detachable from the air-sending device unit 100.

5 [0017]

The air-sending device unit housing 100A is a box-shaped member in which the air-sending device 41 is housed and an air inlet 61 is formed. An opening port 60 communicated with the heat exchanger unit housing 200A of the heat exchanger unit 200 described later is formed in the air-sending device unit housing 100A. The air-sending device unit housing 100A is coupled to the heat exchanger unit housing 200A on a formation surface of the opening port 60. A configuration and the like of the air-sending device unit 100 are described in more detail in Figs. 4 to 7.

[0018]

(Heat exchanger unit 200)

15 The heat exchanger unit 200 is coupled with the air-sending device unit 100 such that air is supplied from the air-sending device unit 100. The heat exchanger unit 200 has the heat exchanger unit housing 200A, which, being shaped substantially as a rectangular parallelepiped, serves as an outer shell and whose two opposing faces are open.

20 Also, the heat exchanger unit 200 is equipped with the indoor heat exchanger 21 configured to exchange heat between air supplied from the air-sending device unit 100 and refrigerant supplied from a non-illustrated outdoor unit. The heat exchanger unit 200 is also equipped with a drain pan 31 configured to accumulate condensed water (drain water) produced by the indoor heat exchanger 21.

25 [0019]

The heat exchanger unit housing 200A includes a first opening port (not

illustrated) located on the side of the opening port 60 of the air-sending device unit housing 100A and an air outlet 62, which is a second opening port formed on a side opposite the first opening port.

[0020]

5 The indoor heat exchanger 21 is designed to exchange heat between air taken into the heat exchanger unit housing 200A and the refrigerant supplied from the non-illustrated outdoor unit. It is advisable that the indoor heat exchanger 21 is, for example, a finned-tube heat exchanger made up of plural fins erected upright in parallel and a tube connected to the fins and supplied with refrigerant. The drain pan 31 is
10 placed below the indoor heat exchanger 21.

[0021]

 The indoor heat exchanger 21 is made up, for example, of a first heat exchanger 21a and a second heat exchanger 21b. The first heat exchanger 21a and second heat exchanger 21b are placed close to each other at one end, and parted from each other
15 at an other end. That is, one end of the first heat exchanger 21a and one end of second heat exchanger 21b are placed by being brought close to a center of the heat exchanger unit housing 200A in a width direction. Also, the other end of the first heat exchanger 21a is placed close to an inside surface of the heat exchanger unit housing 200A and the other end of the second heat exchanger 21b is placed close to an inside
20 surface on an opposite side. Therefore, the indoor heat exchanger 21 is shaped in cross section like a letter A.

[0022]

 The drain pan 31 is designed to accumulate drain water dropping from the indoor heat exchanger 21 and constructed, for example, by forming resin into a predetermined
25 shape. The present embodiment is a manner in which the indoor unit 1 is installed in such a manner as to blow out upward. Consequently, the drain pan 31 is placed on

that side face of the heat exchanger unit housing 200A that is coupled to the air-sending device unit housing 100A. Note that the drain pan 31 is placed in such a manner as not to block the first opening port (not illustrated) of the heat exchanger unit housing 200A communicated with the opening port 60 to allow air to flow from the air-sending device unit housing 100A into the heat exchanger unit housing 200A.

[0023]

The heat exchanger unit 200 is provided with an electrical component box 80. The electrical component box 80 is exposed when the panel 11 is opened. The electrical component box 80 is provided with a controller 81 configured to control rotation speed of the air-sending device 41 and the like. The controller 81 is electrically connected to an electric motor 41B of the air-sending device 41.

[0024]

[Attachment/detachment structure of air-sending device 41]

Fig. 4 is a diagram schematically illustrating the air-sending device unit 100 shown in Fig. 3. Fig. 5 is a perspective view of the air-sending device unit housing 100A of the air-sending device unit 100 shown in Fig. 4. Note that the panel 13 has been removed in Fig. 5, and an internal structure of the air-sending device unit housing 100A is visible. Figs. 6(a) and 6(b) are explanatory diagrams of the air-sending device 41 mounted on the air-sending device unit 100 and a slide member 70 fixed to the air-sending device 41, where Fig. 6(a) is a diagram of the air-sending device 41 and slide member 70 as viewed from a front side of the slide member 70 and Fig. 6(b) is a diagram of the air-sending device 41 and slide member 70 as viewed from a lateral side of the slide member 70. The air-sending device 41, air-sending device unit housing 100A, slide member 70, and the like will be described with reference to Figs. 4 to 6.

[0025]

Note that arrow D1 shown in Fig. 4 indicates a sliding direction

(attachment/detachment direction) of the slide member 70 and the air-sending device 41 to which the slide member 70 is fixed. Thus, a near side refers to the side of the panel 13 while a back side refers to the side of a fourth side face SU4 described later.

Also, arrow D2 shown in Fig. 4 indicates a flow of air blowing out of the air-sending device 41. Furthermore, arrow D3 shown in Fig. 4 indicates a flow of air taken into the air-sending device unit housing 100A through the air inlet 61.

[0026]

(Air-sending device 41)

The air-sending device 41 is made up of a sirocco fan. The air-sending device 41 includes a rotating fan 41A and an electric motor 41B configured to drive the fan 41A. Also, the air-sending device 41 includes a casing 41C provided with an air inflow port 41C1 and an air outflow port 41C2 and equipped with the fan 41A and the electric motor 41B, where the air inflow port 41C1 takes in air and the air outflow port 41C2 blows out air. Note that the electric motor 41B is connected to the controller 81 and the like provided in the electrical component box 80. In the air-sending device 41, when the fan 41A is rotated by the electric motor 41B, air is taken into the casing 41C through the air inflow port 41C1 and air in the casing 41C is released through the air outflow port 41C2.

[0027]

As indicated by arrow D2 in Fig. 4, the casing 41C causes the air blowing out of the air outflow port 41C2 to veer to one side rather than blowing out straightly. This is because the air-sending device 41 is made up of a sirocco fan.

[0028]

(Air-sending device unit housing 100A)

In the air-sending device unit housing 100A, an opening port 60 communicated with the heat exchanger unit housing 200A is formed at a position of coupling to the

heat exchanger unit housing 200A. Besides, in the air-sending device unit housing 100A, a first rail unit 50 is provided on a second side face SU2 orthogonal to a first side face SU1 in which the opening port 60 is formed and a first rail unit 50 is also provided on a third side face SU3 opposed to the second side face SU2. Also, the air-sending device unit housing 100A includes a slide member 70 fixed to the air outflow port 41C2 of the casing 41C of the air-sending device 41 and configured to be movable on the first rail units 50.

[0029]

Each of the first rail unit 50 includes a rail unit main body 51 installed at an angle such that an opposing distance from the first side face SU1 decreases toward the back side and a claw portion 52 formed at an end of the rail unit main body 51. Here, one of the side faces of the air-sending device unit housing 100A that locates at a position opposite the panel 13 is referred to as the fourth side face SU4. That is, the fourth side face SU4 is orthogonal to the first side face SU1, second side face SU2, and third side face SU3 and is located on the back side in the attachment/detachment direction of the air-sending device 41.

[0030]

The rail unit main body 51 is installed, extending from the side of the inside surface of the panel 13 to the side of the fourth side face SU4. Since the rail unit main body 51 is provided, when attaching and detaching the air-sending device 41 to and from the air-sending device unit housing 100A, a serviceman can load the slide member 70 fixed to the air-sending device 41 on the rail unit main body 51, slidably move the slide member 70, and thereby slidably move the air-sending device 41. Consequently, the indoor unit 1 can reduce a workload on the serviceman in attaching and detaching the air-sending device 41 to and from the air-sending device unit housing 100A.

[0031]

The air-sending device unit housing 100A includes a second rail unit 55 provided on the fourth side face SU4. The second rail unit 55 is configured to be separate from the first rail units 50 described above. Also, the second rail unit 55 is installed, extending from the side of the first rail unit 50 provided on the second side face SU2 to the side of the second rail unit 55 provided on the third side face SU3.

[0032]

The second rail unit 55 is placed in such a manner as to intersect the first rail units 50 when the first rail units 50 and second rail unit 55 are viewed from a direction perpendicular to the second side face SU2 and third side face SU3. Therefore, the second rail unit 55 is placed spanning between the first rail units 50 while extending above and below the first rail units 50. That is, as shown in Figs. 4 and 5, between the opposite edges of the rail unit main bodies 51, the second rail unit 55 includes a portion located below the rail unit main bodies 51 and a portion located above the rail unit main bodies 51. Accordingly, by being placed in such a manner as to intersect the first rail units 50, the second rail unit 55 allows the slide member 70 to move smoothly from the first rail units 50 to the second rail unit 55 and from the second rail unit 55 to the first rail units 50.

[0033]

Assuming that a manner in which the second rail unit 55 has only a portion located above the rail unit main bodies 51 with reference to the rail unit main bodies 51. In this manner, a height difference may occur between the first rail units 50 and second rail unit 55. Therefore, the slide member 70 may not move smoothly from the first rail units 50 to the second rail unit 55 or from the second rail unit 55 to the first rail units 50.

[0034]

Also, the second rail unit 55 is inclined more steeply than the rail unit main bodies 51 of the first rail units 50. That is, in a mounting direction of the air-sending device 41

the second rail unit 55 is installed at an angle such that the opposing distance from the first side face SU1 decreases toward the back side. Accordingly, the air-sending device unit housing 100A, which has the first rail units 50 and second rail unit 55, is structured such that the slide member 70 and air-sending device 41 will move in two stages. Detailed description of how the slide member 70 moves will be given in Fig. 8.

[0035]

The air-sending device unit housing 100A is configured such that with the slide member 70 being mounted in the air-sending device unit housing 100A, the slide member 70 will be fitted between a back side portion of the second rail unit 55 and the first side face SU1 by being sandwiched therebetween. That is, in terms of thickness of the slide member 70, the slide member 70 is nearly equal to the opposing distance between the back side portion of the second rail unit 55 and the first side face SU1.

(1) Specifically, as shown in Fig. 4, lower part of a back side portion of the slide member 70 is placed in contact with the back side portion (upper end) of the second rail unit 55 (see point P1 in Fig. 4) while upper part of the back side portion of the slide member 70 is placed in contact with the first side face SU1. Accordingly, the back side of the slide member 70 is sandwiched between the back side portion of the second rail unit 55 and the first side face SU1.

(2) Also, as shown in Figs. 4 and 5, an end face of the slide member 70 on the back side is placed in contact with the fourth side face SU4.

(3) Furthermore, as shown in Fig. 4, the near-side portion of the slide member is fastened, for example, by a fixing member 71 such as a screw or bolt to the first side face SU1 or the like. The slide member 70 is fixed in the air-sending device unit housing 100A through processes described in (1) to (3).

[0036]

(Slide member 70)

The slide member 70 is designed to be fixed to the air-sending device 41 and is a flat-plate member in which an opening port 70A is formed to pass air supplied from the air-sending device 41. One end 70B1 of the slide member 70 slides over one of the first rail units 50 and an other end 70B2 slides over the other of the first rail units 50.

5 One face of the slide member 70 is placed opposing the first side face SU1 and an other face is fixed to the air-sending device 41. Fall prevention holes Q1 for the air-sending device 41 are opened in near-side corners of the slide member 70 and fall prevention holes Q2 for the air-sending device 41 are opened in back side corners (see Fig. 6(a)). Also, ends 70B1 and 70B2 of the slide member 70 are cut and raised by bending. Similarly, a front-side end and rear-side end of the slide member 70 are also cut and raised by bending. The raised front-side end of the slide member 70 is fastened to a fixing portion SU11 formed on the first side face SU1 with a fixing member 71 inserted (see Fig. 7 and Fig. 8(e) described later).

[0037]

15 [About claw portion 52]

Fig. 7 is an explanatory diagram of a claw portion 52 formed on each of the first rail units 50 of the indoor unit 1 of the air-conditioning apparatus according to the present embodiment. Note that the panel 13 has been removed in Fig. 7.

The claw portion 52 is formed at a near-side end of the rail unit main body 51.

20 The claw portions 52 prevent the slide member 70 as well as the air-sending device 41 to which the slide member 70 is fixed from falling when the serviceman is attaching or detaching the air-sending device 41 to/from the air-sending device unit 100.

When the fixing member 71 is removed, the claw portions 52 not illustrated in Fig. 7 engage with prevention holes Q1. This can prevent the air-sending device 41 from falling down by sliding the slide member 70 off the first rail units 50. Note that the fall prevention holes Q2 can also prevent the air-sending device 41 from falling down

accidentally just before the slide member 70 leaves the first rail units 50 when the slide member 70 is being drawn out of the first rail units 50.

[0038]

[About operation of the slide member 70]

5 Figs. 8(a) to 8(e) are operation explanation diagrams of the slide member 70.

Fig. 8(a) shows how the slide member 70 is slid over the rail unit main bodies 51 of the first rail units 50. Fig. 8(b) shows how the slide member 70 abuts the second rail unit 55 after being moved to the back side of the rail unit main body 51. Fig. 8(c) shows how the slide member 70 is being moved to the back side of the second rail unit 55.

10 Fig. 8(d) shows how the slide member 70 is fitted among the first side face SU1, fourth side face SU4, and second rail unit 55 by being moved to the rear end of the second rail unit 55. Fig. 8(e) shows how the near-side portion of the slide member 70 is fastened to the fixing portion SU11 of the first side face SU1 with the fixing member 71. Note that the air-sending device 41 is not illustrated in Figs. 8(a) to 8(e) for convenience of
15 explanation.

[0039]

When mounting the air-sending device 41 in the air-sending device unit housing 100A, the serviceman will move the slide member 70 in the order: Fig. 8(a) to Fig. 8(e). When removing the air-sending device 41 from the air-sending device unit housing
20 100A, the order is reversed. Accordingly, since the air-sending device unit 100 is provided with the first rail units 50 and second rail unit 55 each having different inclinations and structured such that the slide member 70 and air-sending device 41 move in two stages, it is possible to reduce a load on the serviceman in attaching and detaching the air-sending device 41 to and from the air-sending device unit housing
25 100A.

[0040]

A form in which the second rail unit 55 is not provided is also possible, but the effect of reducing the workload on the serviceman is greater when the second rail unit 55 is provided. If a form in which the second rail unit 55 is not provided is used, means of increasing an inclination of the whole first rail units 50 can be adopted.

5 Here, the workload on the serviceman is greater when the slide member 70 is located on the near side of the first rail units 50. This is because when the slide member 70 has been inserted until reaching the back side of the first rail unit, most part of the air-sending device 41 has been carried into the air-sending device unit housing 100A and an attitude of the air-sending device 41 is stable.

10 Therefore, when the inclination of the whole first rail units 50 is increased, the inclination of the first rail units 50 on the near side is increased as well, consequently increasing a burden on the serviceman as well.

As the second rail unit 55 with a large inclination is installed on the back side of the first rail units 50, the air-sending device unit housing 100A of the indoor unit 1 according to the present embodiment curbs increases in the burden on the serviceman.
15 [0041]

[About positional relationship between indoor heat exchanger 21 and air-sending device 41]

Fig. 9 is an explanatory diagram of positional relationship between the indoor
20 heat exchanger 21 and air-sending device 41 mounted on the indoor unit 1 of the air-conditioning apparatus according to the present embodiment. Note that Fig. 9 corresponds to Fig. 10(d). Figs. 10(a) to 10(d) are explanatory diagrams of four patterns of the positional relationship between the indoor heat exchanger 21 and air-sending device 41. Figs. 10(a) and 10(b) show positional relationships under
25 conditions of poor heat exchange efficiency while Figs. 10(c) and 10(d) show positional relationships under conditions of good heat exchange efficiency.

[0042]

In Figs. 10(a) to 10(d), a contact portion T between the first heat exchanger 21a and second heat exchanger 21b is placed on a side opposite the air-sending device 41.

[0043]

5 The heat exchange efficiency varies with the positional relationship between the indoor heat exchanger 21 and air-sending device 41. As shown in Fig. 10(a), the heat exchange efficiency is reduced when the indoor heat exchanger 21 and air-sending device 41 are placed such that an airflow direction of the air-sending device 41 is oriented along the first heat exchanger 21a. Most of the air blown out of the air-sending device 41 passes through the first heat exchanger 21a, but only a little of the air
10 passes through the second heat exchanger 21b, and thus the heat exchange efficiency of the indoor heat exchanger 21 as a whole is reduced.

Fig. 10(b) is a manner in which the air-sending device 41 is placed bilaterally symmetrically to the air-sending device 41 in Fig. 10(a). In this manner, most of the air
15 blown out of the air-sending device 41 passes through the second heat exchanger 21b, but only a little of the air passes through the second heat exchanger 21b, and thus the heat exchange efficiency of the indoor heat exchanger 21 as a whole is reduced.

[0044]

In the manners shown in Figs. 10(c) and 10(d), the indoor heat exchanger 21 in
20 Figs. 10(a) and 10(b) has been turned 90 degrees. In Figs. 10(c) and 10(d), the air blown out of the air-sending device 41 flows into a space L (see Figs. 10(a) and 10(b)) between the first heat exchanger 21a and second heat exchanger 21b, and thus air flows uniformly into both the first heat exchanger 21a and second heat exchanger 21b, making it possible to curb reductions in the heat exchange efficiency.

25 [0045]

Note that although not illustrated, if the contact portion T is set to be located on

the side of the air-sending device 41 in Figs. 10(c) and 10(d), air also flows uniformly into both the first heat exchanger 21a and second heat exchanger 21b, making it possible to curb reductions in the heat exchange efficiency.

[0046]

5 [Advantageous effects of indoor unit 1 according to present embodiment]

The indoor unit 1 of the air-conditioning apparatus according to the embodiment includes the first rail units 50 and slide member 70. Consequently, the serviceman can attach and detach the air-sending device 41 by sliding the slide member 70 over the first rail units 50. This makes it possible to curb increases in the workload of changing the
10 direction of the indoor unit when changing the airflow direction.

[0047]

Note that although a manner in which the first rail units 50 and second rail unit 55 are configured to be separate bodies has been described, the present embodiment is not limited thereto. For example, a wedge-shaped member having an inclination
15 corresponding to that of the second rail unit 55 may be formed at a back side end of the rail unit main body 51. This manner also offers effects similar to those of the present embodiment.

[0048]

Although a manner in which the rail unit main body 51 is linear has been
20 described as an example, the present embodiment is not limited thereto and the rail unit main body 51 may be formed into a wavelike shape or bent shape. This manner also offers effects similar to those of the present embodiment.

[0049]

Although a manner in which the second rail unit 55 is shaped like a flat plate has
25 been described as an example, the present embodiment is not limited thereto and the second rail unit 55 may be formed into a wavelike shape or bent shape. Also, although

a manner in which the second rail unit 55 is installed, extending continuously from the side of the inside surface of the panel 13 to the side of the fourth side face SU4 has been described, the present embodiment is not limited thereto and the second rail unit 55 may be intermittent with notches formed therein. This form also offers effects similar to those of the present embodiment.

[0050]

[Modification 1]

Fig. 11 is a perspective view of an indoor unit 1 of an air-conditioning apparatus according to Modification 1 of the present invention. Fig. 12 is a longitudinal sectional view of the indoor unit 1 shown in Fig. 11. Whereas a manner in which the indoor unit 1 blows out upward has been described in the embodiment, the present modification shows a case in which the indoor unit 1 is installed in such a manner as to blow out sideways (from left to right in the drawing). In the present modification, a drain pan 32 is placed below the indoor heat exchanger 21. Specifically, the drain pan 32 is placed on the panel 17. The indoor unit 1 of the air-conditioning apparatus according to the present modification achieves effects similar to those of the indoor unit 1 of the air-conditioning apparatus according to the embodiment.

[0051]

[Modification 2]

Fig. 13 is a perspective view of an indoor unit 1 of an air-conditioning apparatus according to Modification 2. Fig. 14 is a longitudinal sectional view of the indoor unit 1 shown in Fig. 13. The present modification shows a case in which the indoor unit 1 is installed in such a manner as to blow out sideways (from right to left in the drawing). Also, in the indoor unit 1 of the air-conditioning apparatus according to the present modification, the indoor heat exchanger 21 is placed such that the contact portion T between the first heat exchanger 21a and second heat exchanger 21b is to be on the

side of the air outlet 62 (on the side opposite the air-sending device 41). In the present modification, the drain pan 32 is placed below the indoor heat exchanger 21.

Specifically, the drain pan 32 is placed on the panel 16. Furthermore, in the present modification, an installation direction of the air-sending device 41 has been turned 180
5 degrees from that of Modification 1. That is, the present modification differs from Modification 1 in that an installation direction of the indoor heat exchanger 21 is turned 180 degrees, that the drain pan 32 is placed on the panel 16 rather than the panel 17, and that the installation direction of the air-sending device 41 is turned 180 degrees.

The indoor unit 1 of the air-conditioning apparatus according to the present modification
10 achieves effects similar to those of the indoor unit 1 of the air-conditioning apparatus according to Embodiment 2.

[0052]

[Modification 3]

Fig. 15 is a perspective view of an indoor unit 1 of an air-conditioning apparatus
15 according to Modification 3. Fig. 16 is a longitudinal sectional view of the indoor unit 1 shown in Fig. 15. Fig. 17 is a sectional view of the indoor unit 1 shown in Fig. 16 taken along line B-B. The present modification shows a case in which the indoor unit 1 is installed in such a manner as to blow out downward. In the indoor unit 1 of the air-conditioning apparatus according to the present modification, the indoor heat exchanger
20 21 is placed such that the contact portion T between the first heat exchanger 21a and second heat exchanger 21b is to be on the side of the air-sending device 41 as with Modification 1.

[0053]

In the present modification, the drain pan 31 is placed below the indoor heat
25 exchanger 21. The drain pan 31 is placed, for example, on the side of the air outlet 62 in the heat exchanger unit housing 200A.

[0054]

Furthermore, in the present modification, a filter 120 is attached to the air-sending device unit 100. When the indoor unit 1 blows out downward, dust in the air is prone to enter the indoor unit 1, and thus it is advisable to attach the filter 120. The indoor unit 1 of the air-conditioning apparatus according to the present modification achieves effects similar to those of the indoor unit 1 of the air-conditioning apparatus according to Embodiment 2.

Reference Signs List

- [0055]
- 1 indoor unit 11 panel 12 panel 13 panel 14 panel 16 panel
17 panel 21 indoor heat exchanger 21a first heat exchanger 21b
second heat exchanger 31 drain pan 32 drain pan 41A fan 42 air-
sending device 41B electric motor 41C casing 41C1 air inflow port
41C2 air outflow port 50 first rail unit 51 rail unit main body 52 claw
portion 55 second rail unit 60 opening port 61 air inlet 62 air outlet
70 slide member 70A opening port 70B1 end 70B2 end 71 fixing
member 80 electrical component box 81 controller 100 air-sending
device unit 100A air-sending device unit housing 120 filter 200 heat
exchanger unit 200A heat exchanger unit housing D1 arrow D2 arrow D3
arrow L space SU1 first side face SU11 fixing portion SU2 second
side face SU3 third side face SU4 fourth side face T contact portion Q1
fall prevention hole Q2 fall prevention hole

CLAIMS**[Claim 1]**

An indoor unit of an air-conditioning apparatus comprising:

an air-sending device unit having an air-sending device unit housing configured to
 5 house an air-sending device, the air-sending device unit housing being provided with an
 air inlet; and

a heat exchanger unit having a heat exchanger unit housing configured to house
 an indoor heat exchanger, the heat exchanger unit housing being provided with an air
 outlet and configured to be coupled to the air-sending device unit housing,

10 the air-sending device including

a fan configured to rotate,

an electric motor configured to drive the fan, and

a casing provided with an air inflow port from which air is sucked and an air
 outflow port from which the air is blown, the casing being equipped with the fan and the
 15 electric motor,

the air-sending device unit housing being provided with

an opening port formed at a position of coupling to the heat exchanger unit
 housing and communicating with the heat exchanger unit housing,

first rail units each provided on a second side face orthogonal to a first side
 20 face in which the opening port is formed and a third side face orthogonal to a first face,

a slide member fixed to the air outflow port of the casing of the air-sending
 device and configured to be movable on the first rail units.

[Claim 2]

The indoor unit of an air-conditioning apparatus of claim 1, wherein the first rail
 25 units are installed at an angle such that an opposing distance from the first side face
 decreases toward a back side.

[Claim 3]

The indoor unit of an air-conditioning apparatus of claim 2, wherein

the air-sending device unit housing includes a second rail unit provided on a fourth surface located on the back side in an attachment-detachment direction of the air-sending device, the fourth face being orthogonal to the first side face, the second side face, and the third side face, and

the second rail unit is installed at a larger angle than an angle of the first rail units, and installed such that an opposing distance from the first side face decreases toward the back side.

[Claim 4]

The indoor unit of an air-conditioning apparatus of claim 3, wherein, in a state in which the slide member is mounted in the air-sending device unit housing, the air-sending device unit housing is configured such that the slide member is fitted between a back side portion of the second rail unit and the first side face by being sandwiched therebetween.

[Claim 5]

The indoor unit of an air-conditioning apparatus of claim 3 or 4, wherein when the first rail units and the second rail unit are viewed from a direction perpendicular to the second side face and the third side face, the second rail unit is placed intersecting the first rail units.

[Claim 6]

The indoor unit of an air-conditioning apparatus of any one of claims 3 to 5, wherein the second rail unit is installed such that the second rail unit extends from one of the first rail units to an other of the first rail units.

[Claim 7]

The indoor unit of an air-conditioning apparatus of any one of claims 1 to 6,

wherein claw portions configured to prevent the slide member from falling are provided at near-side ends of the first rail units.

[Claim 8]

5 The indoor unit of an air-conditioning apparatus of any one of claims 1 to 7,
wherein

the indoor heat exchanger includes a first heat exchanger and a second heat exchanger, and

the first heat exchanger and the second heat exchanger are placed close to each other at one end, and away from each other at an other end.

10

FIG. 1

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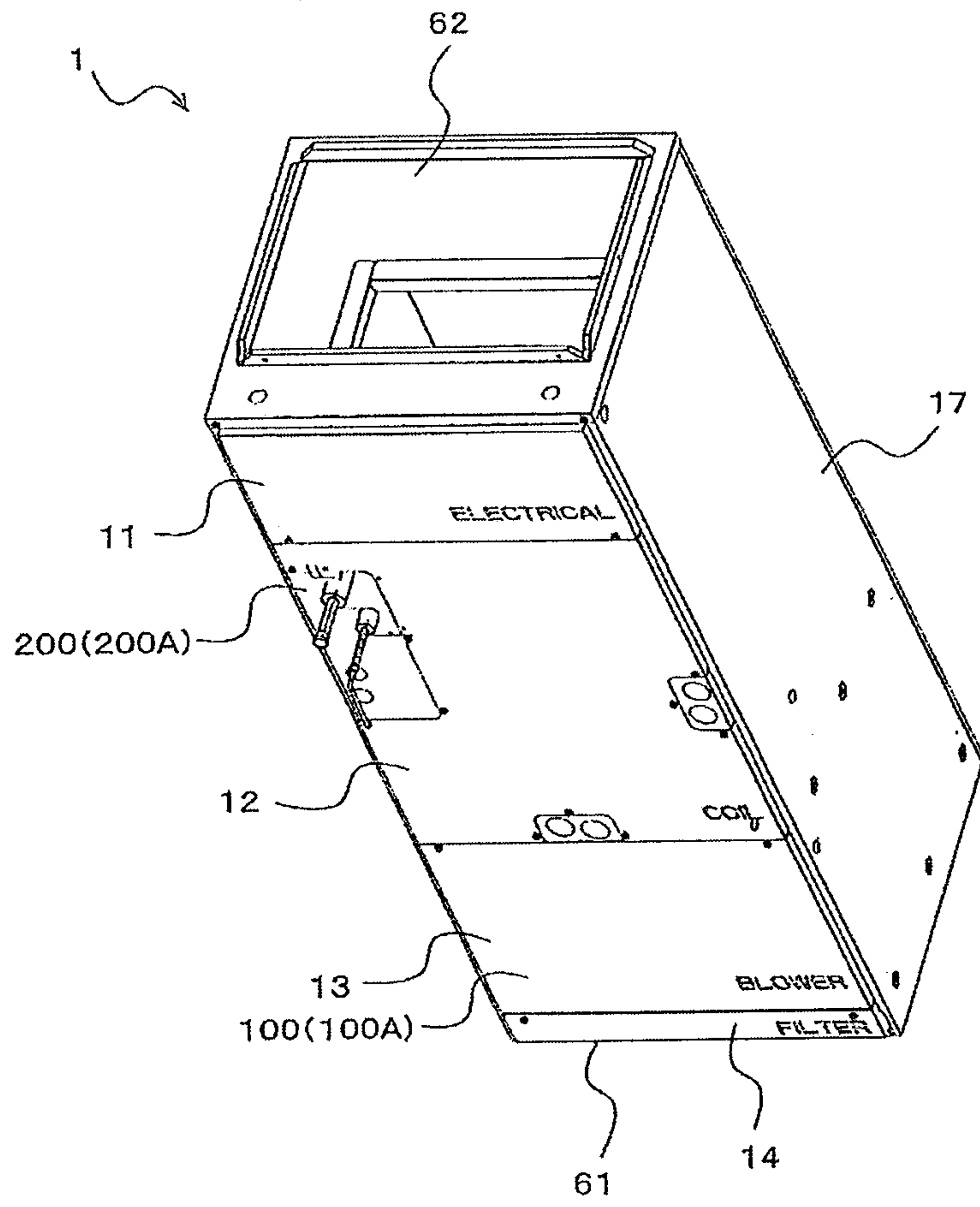


FIG. 2

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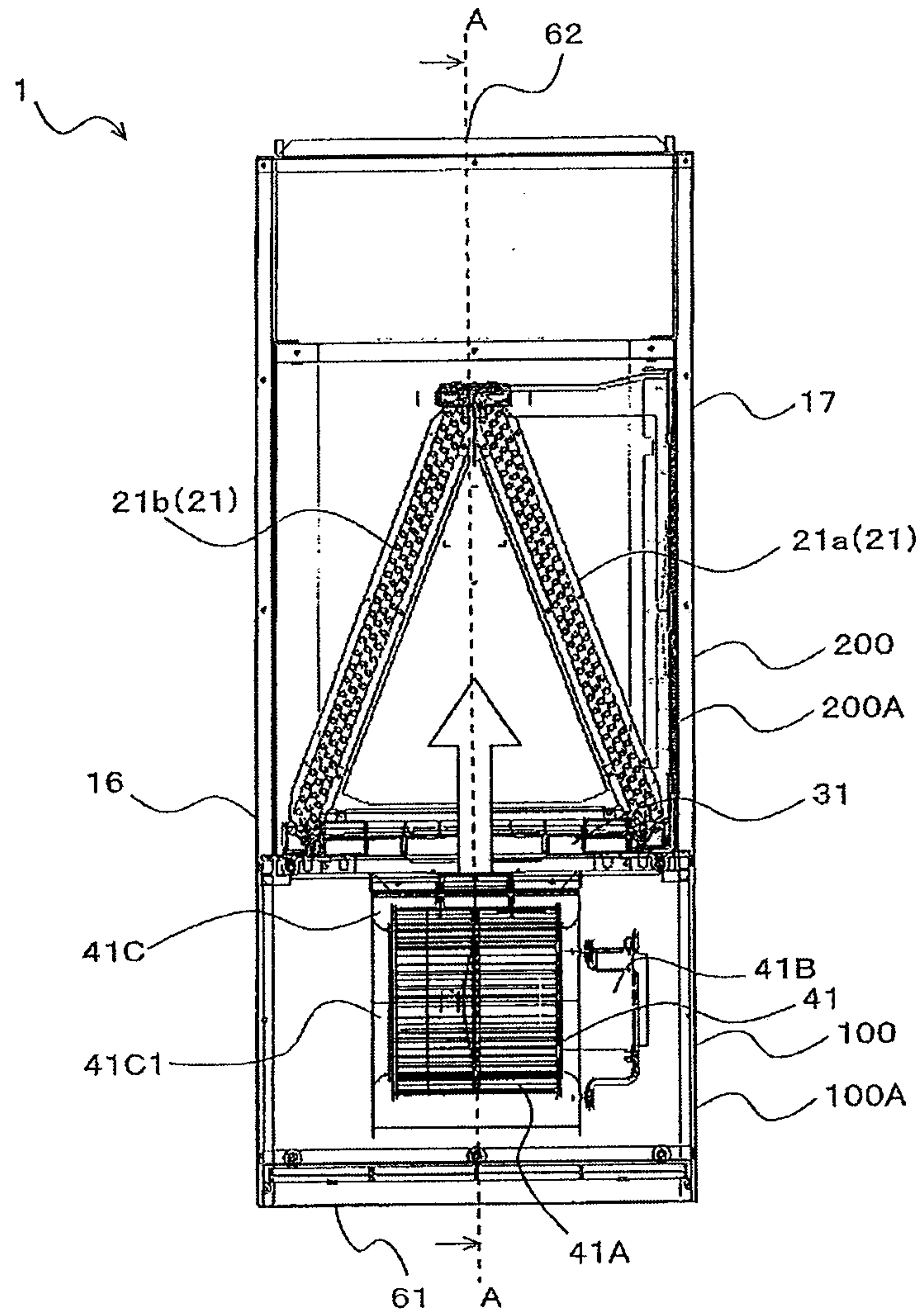


FIG. 3

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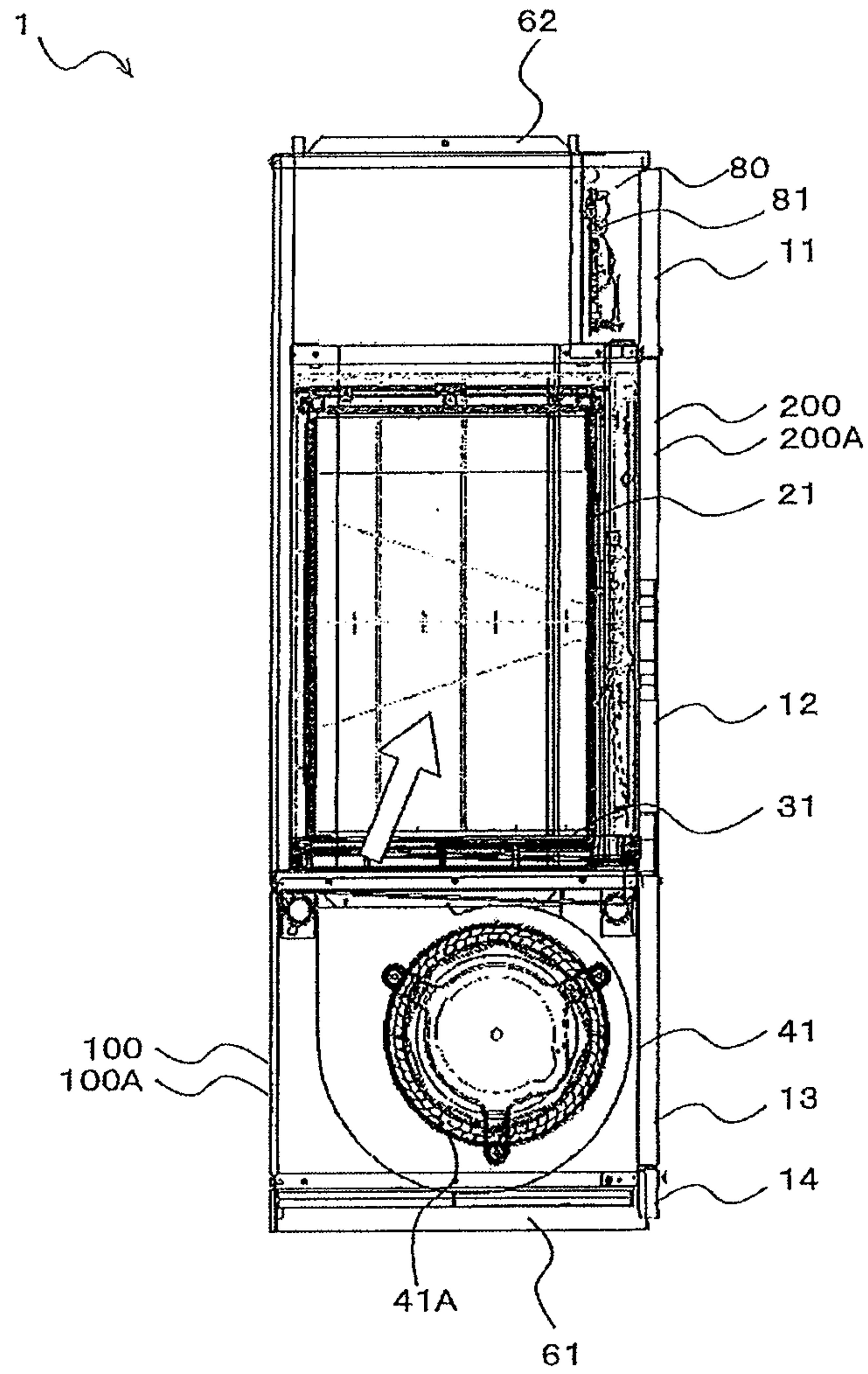


FIG. 4

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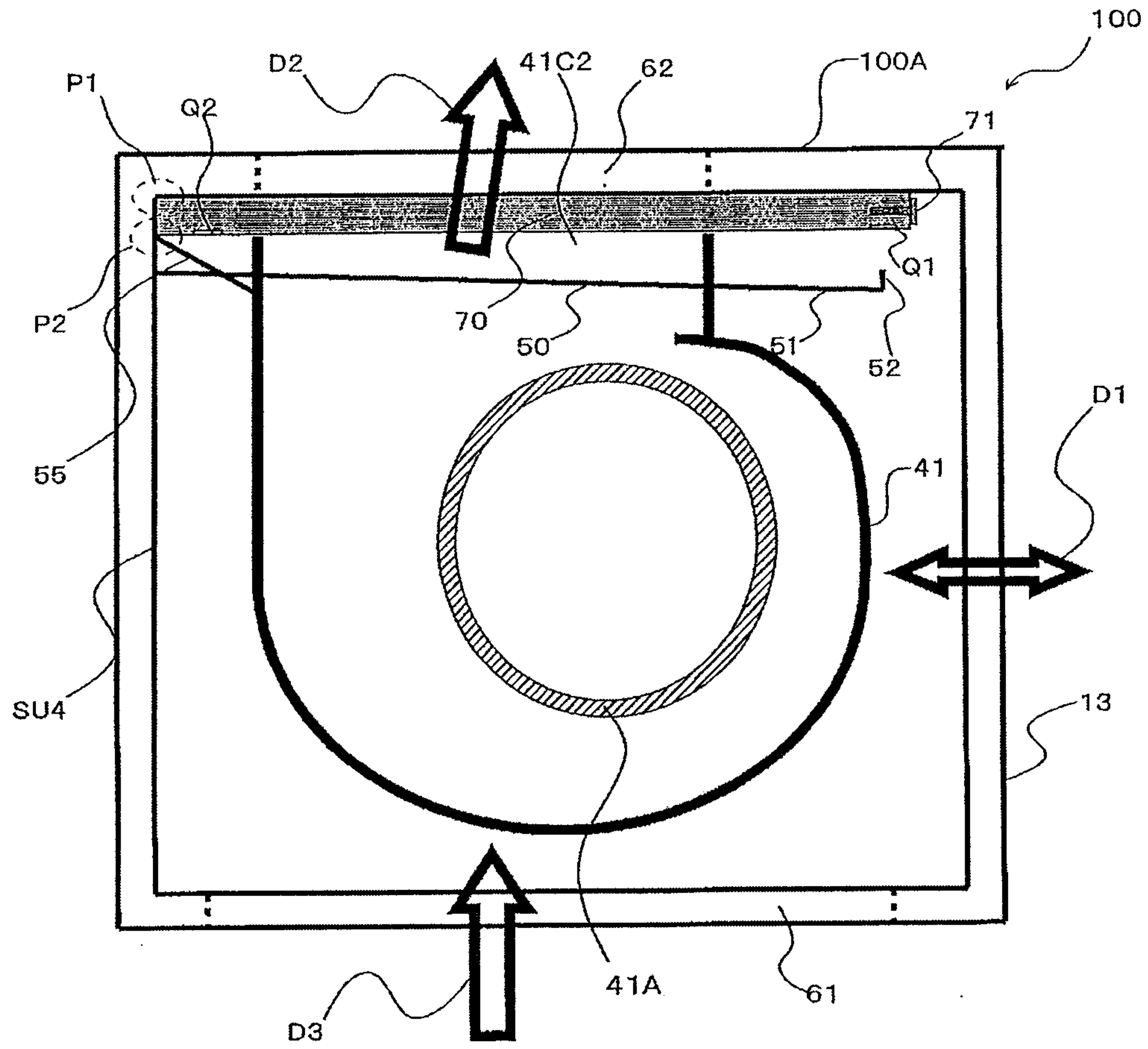


FIG. 5

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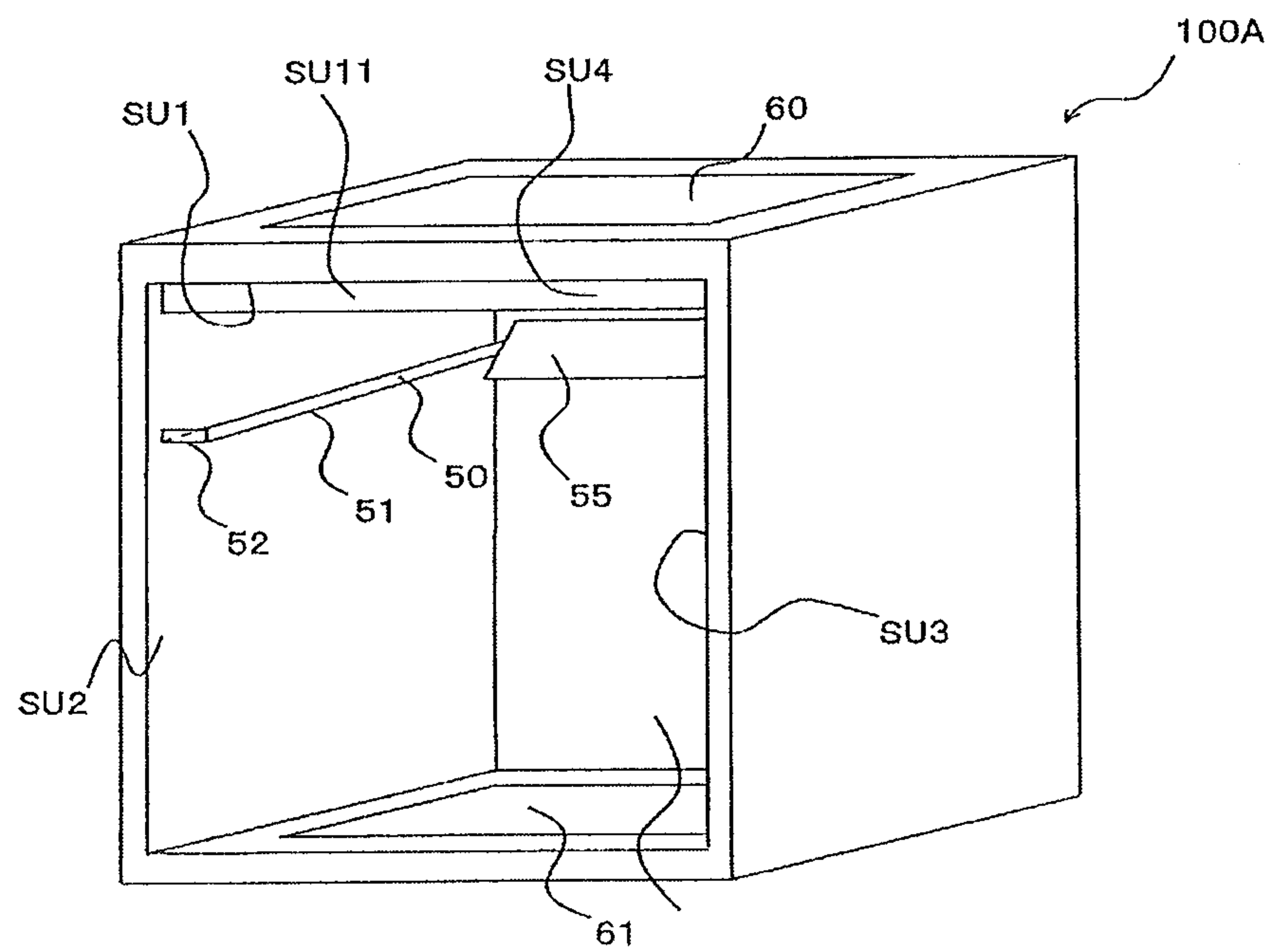


FIG. 6

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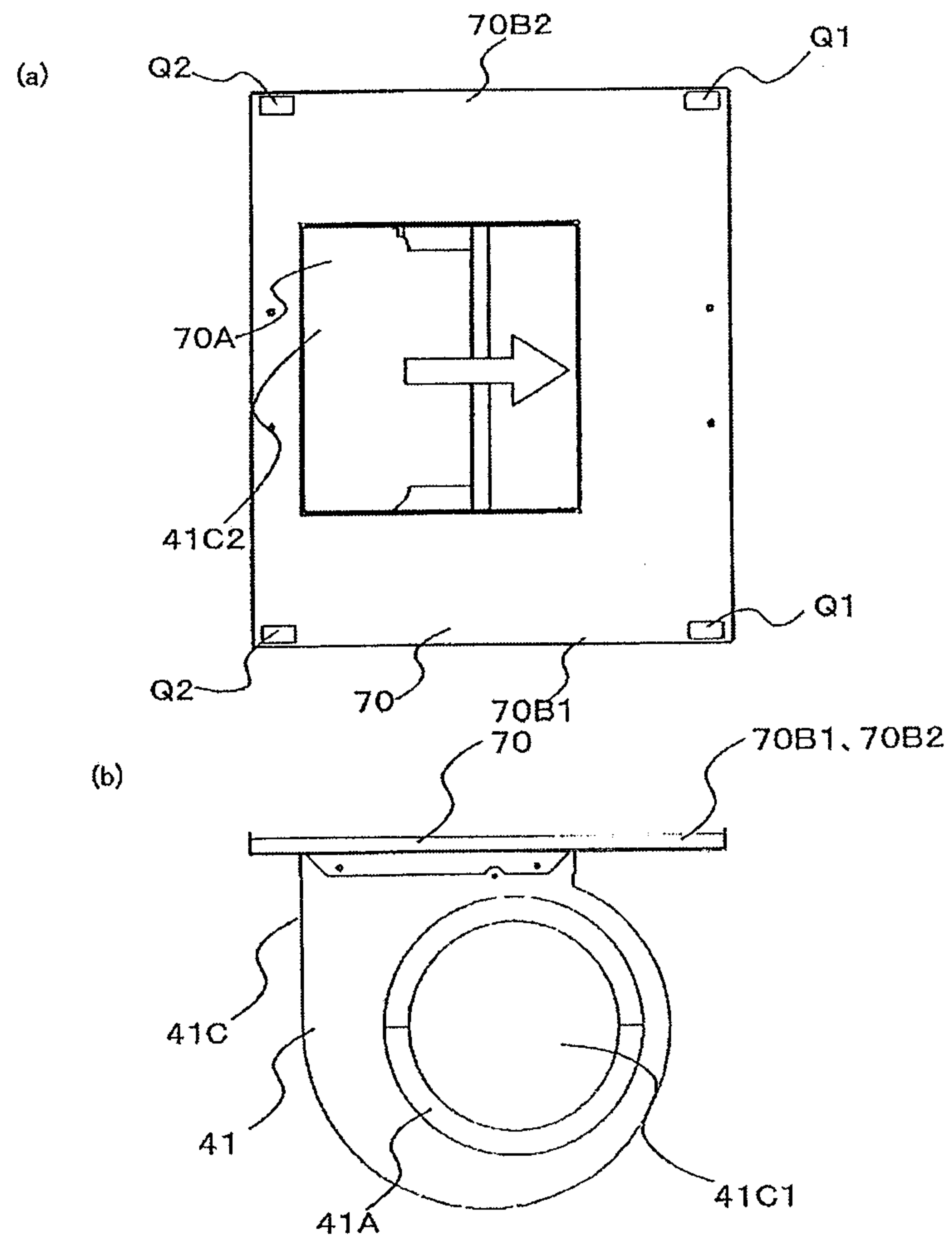


FIG. 8

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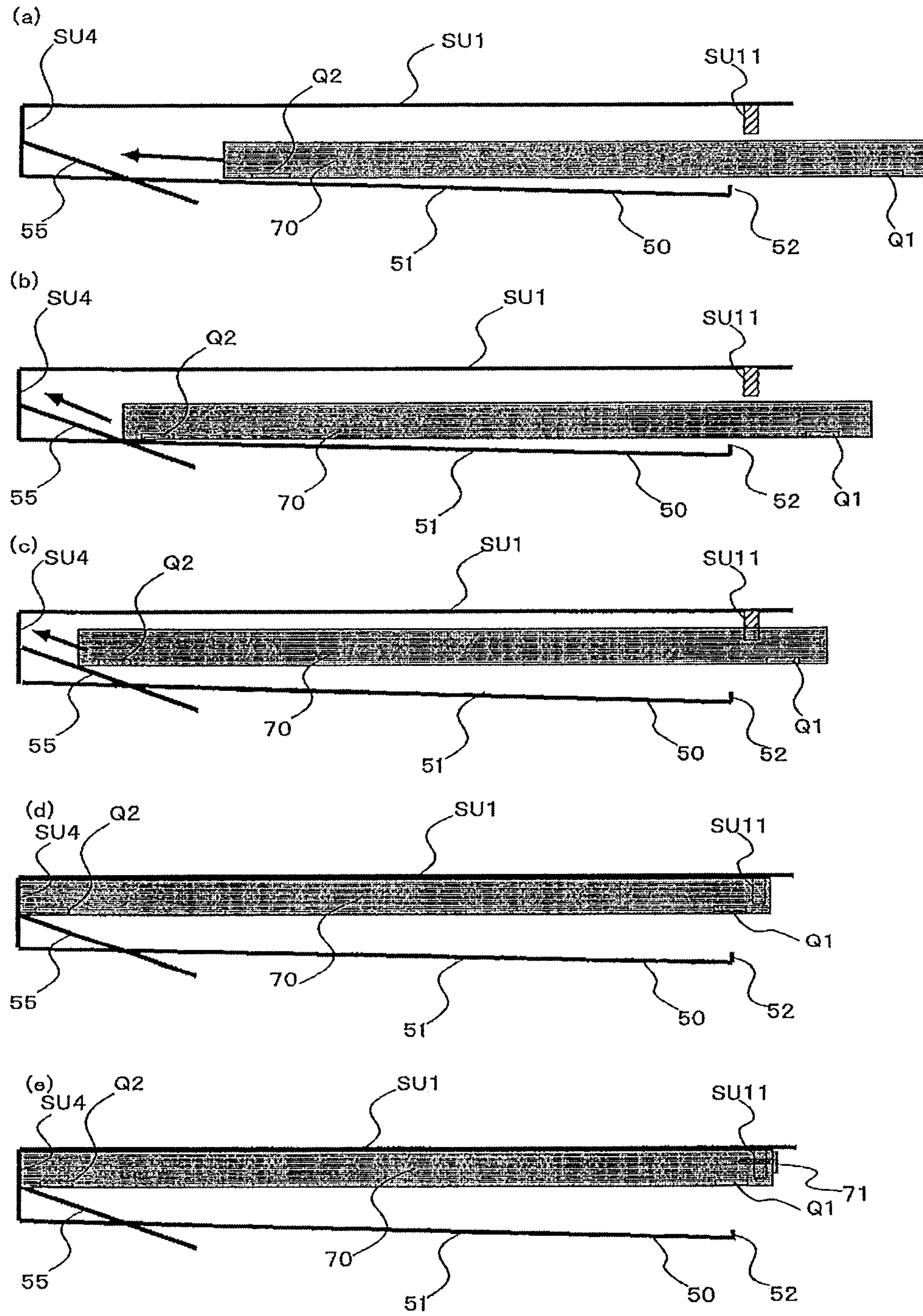


FIG. 9

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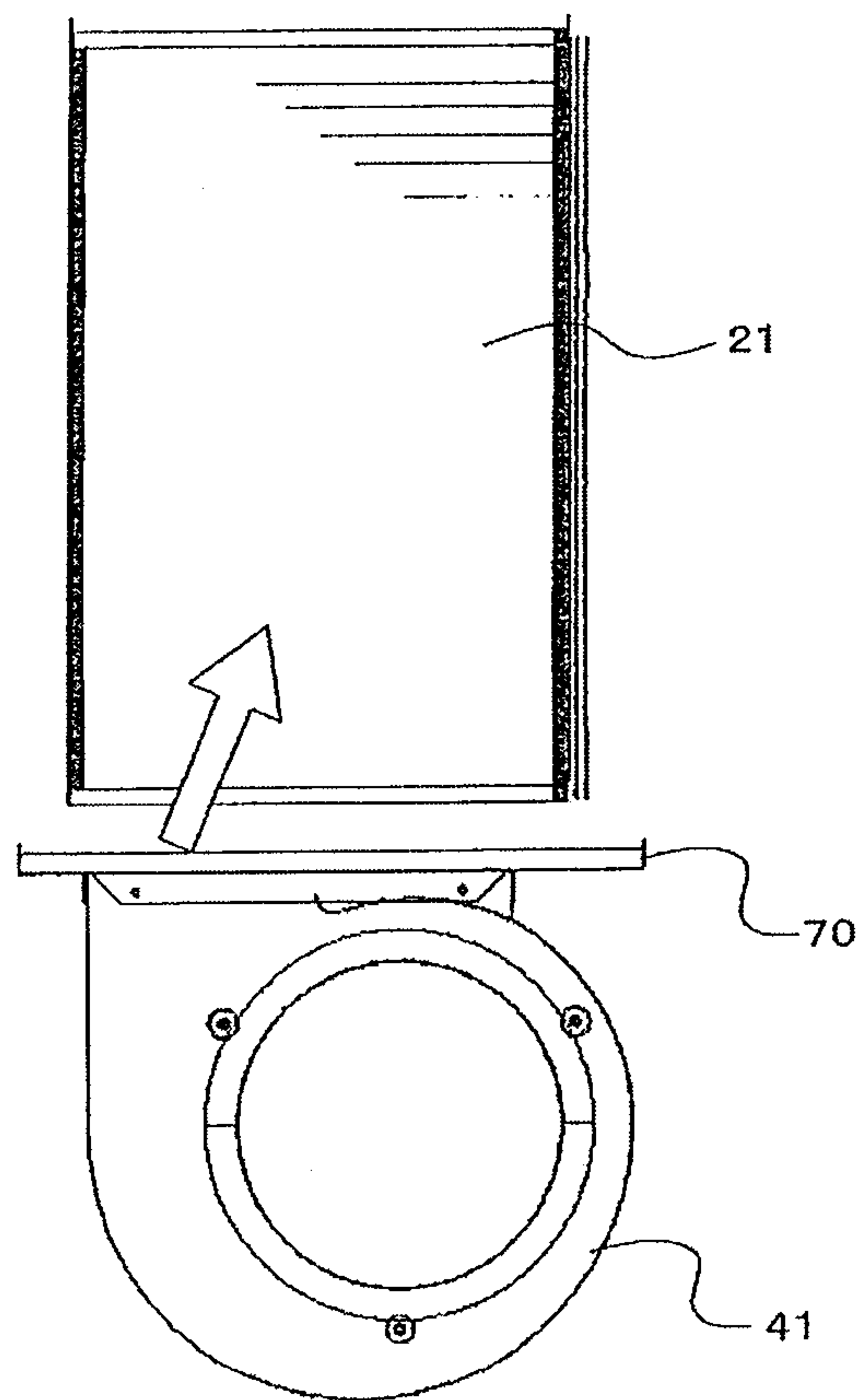


FIG. 10

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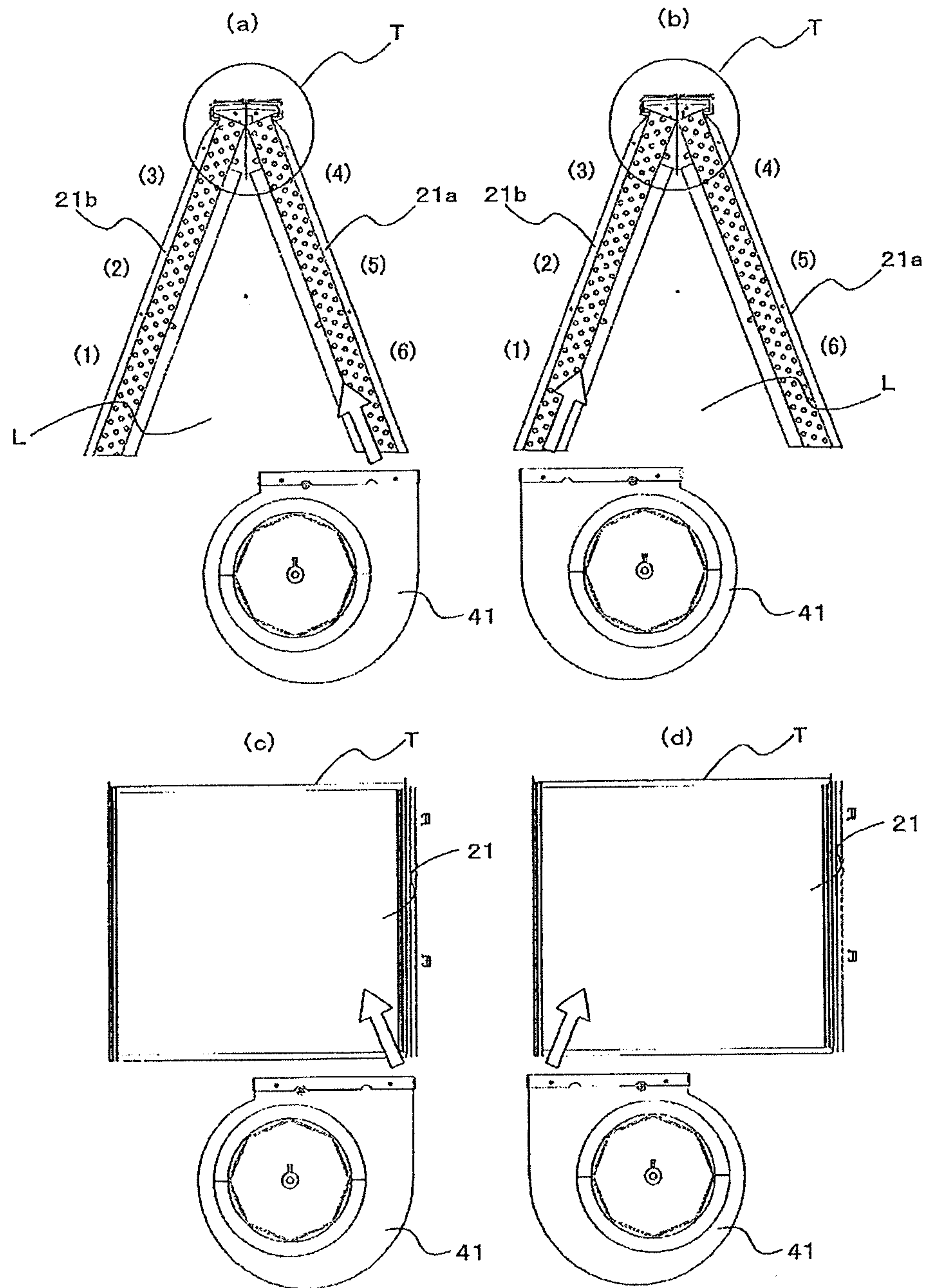


FIG. 11

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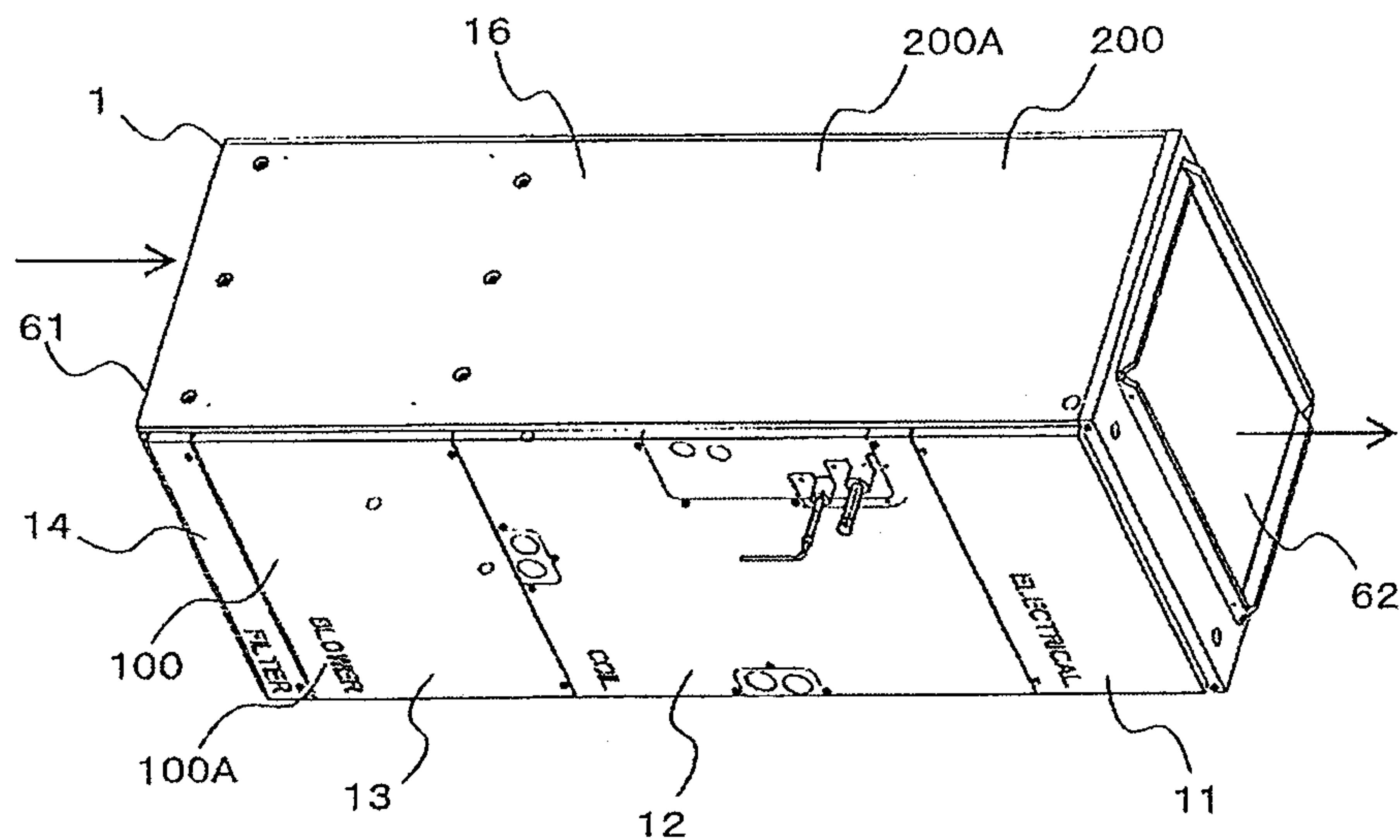


FIG. 12

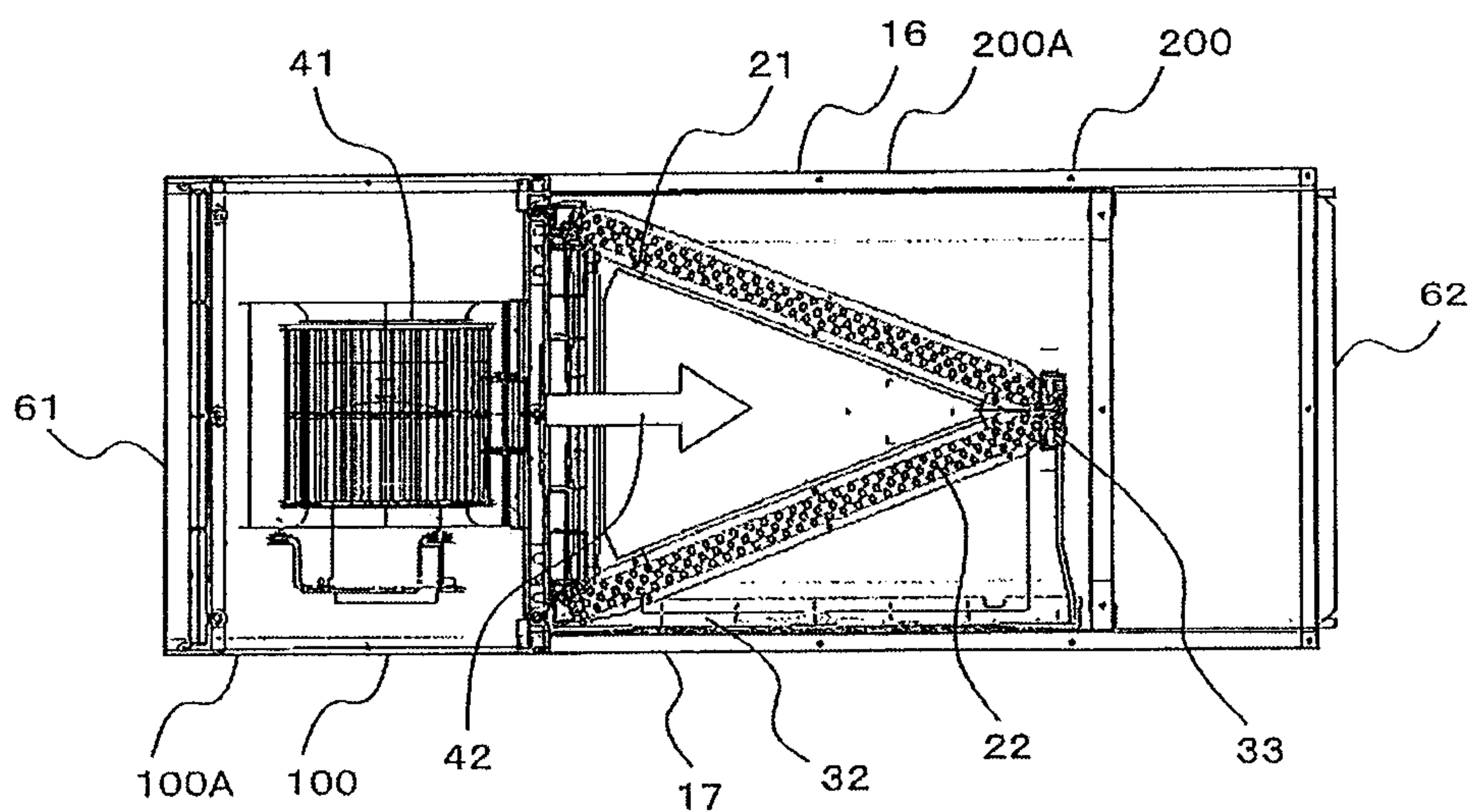


FIG. 13

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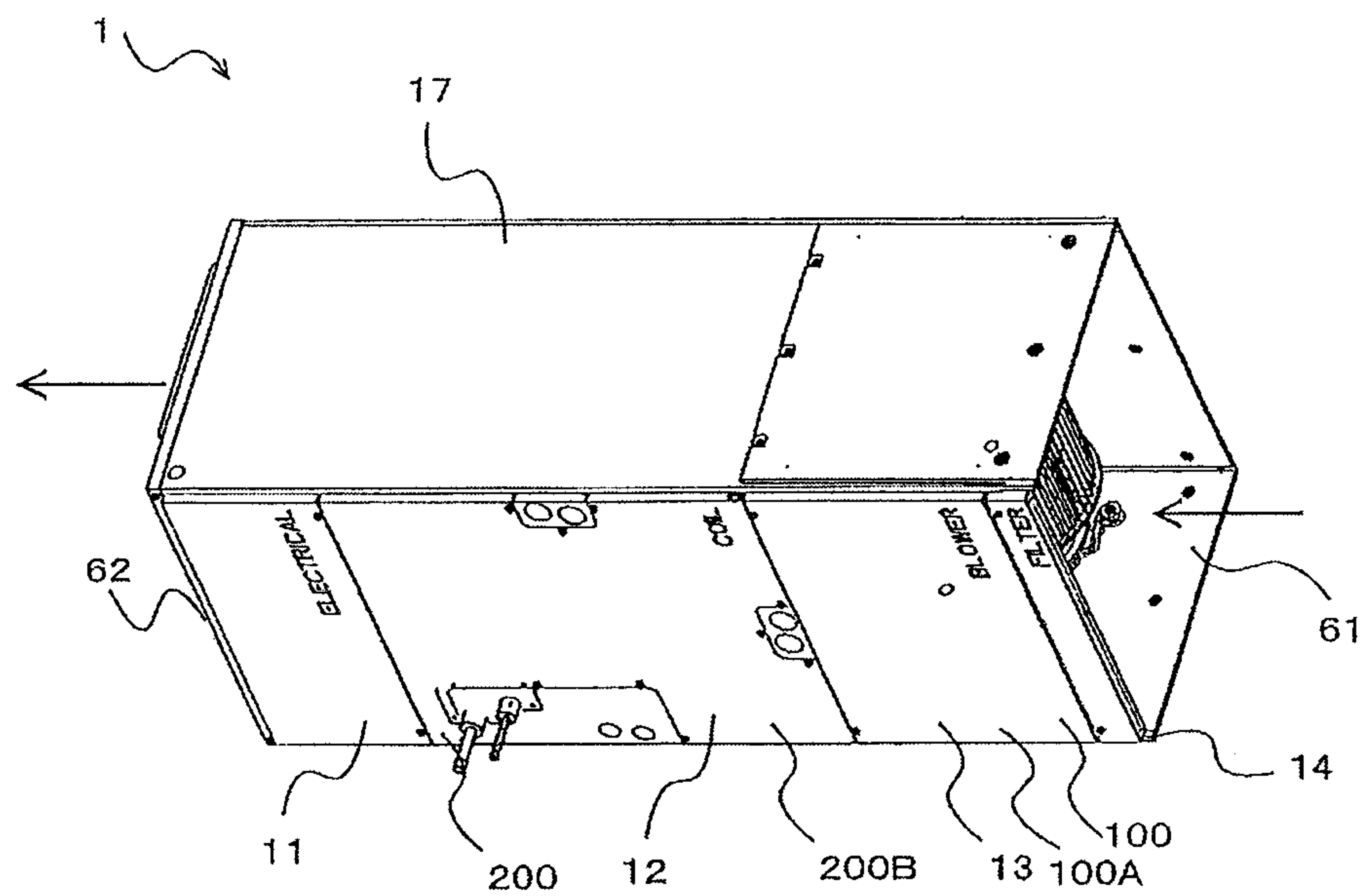


FIG. 14

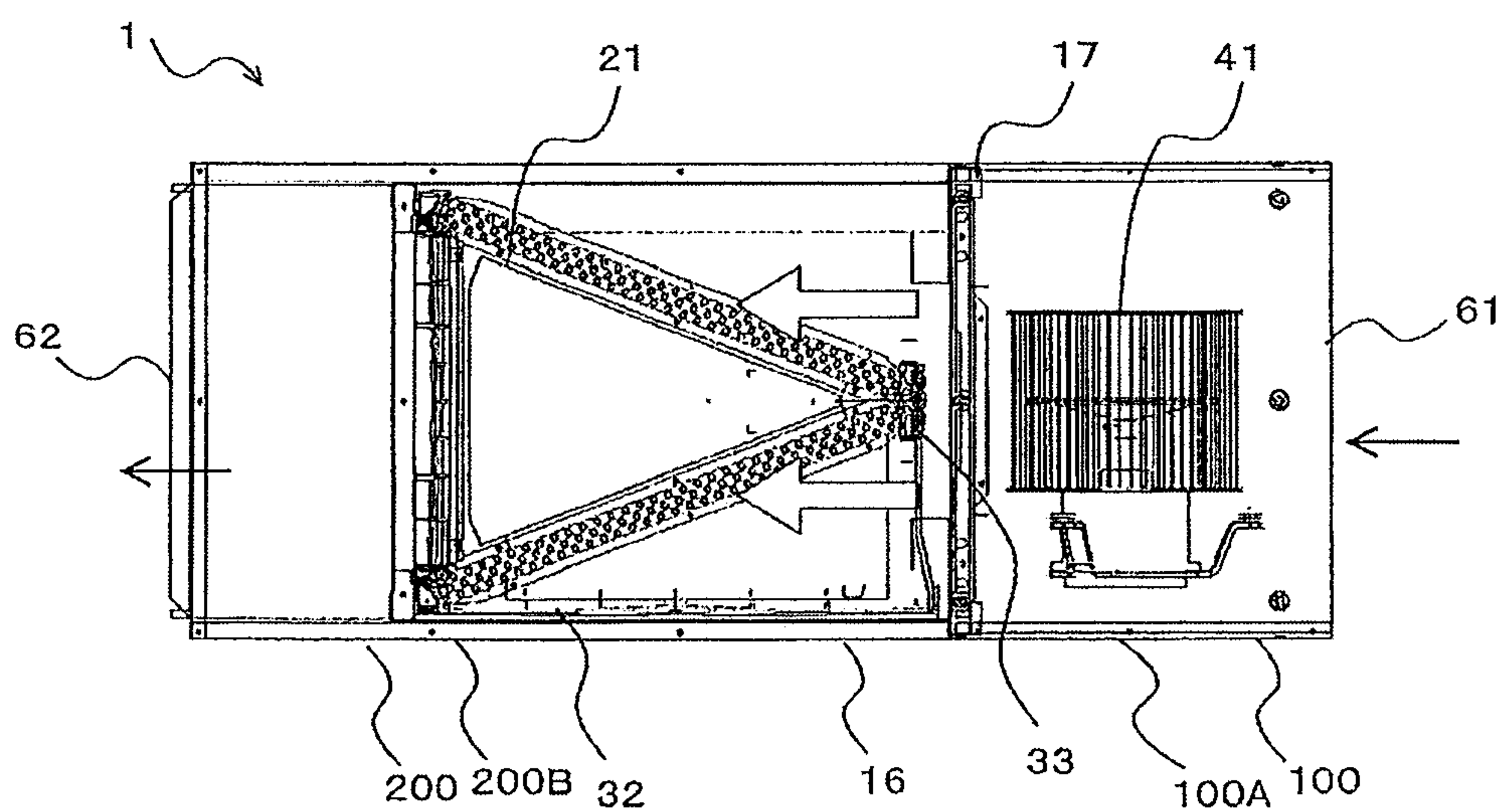


FIG. 15

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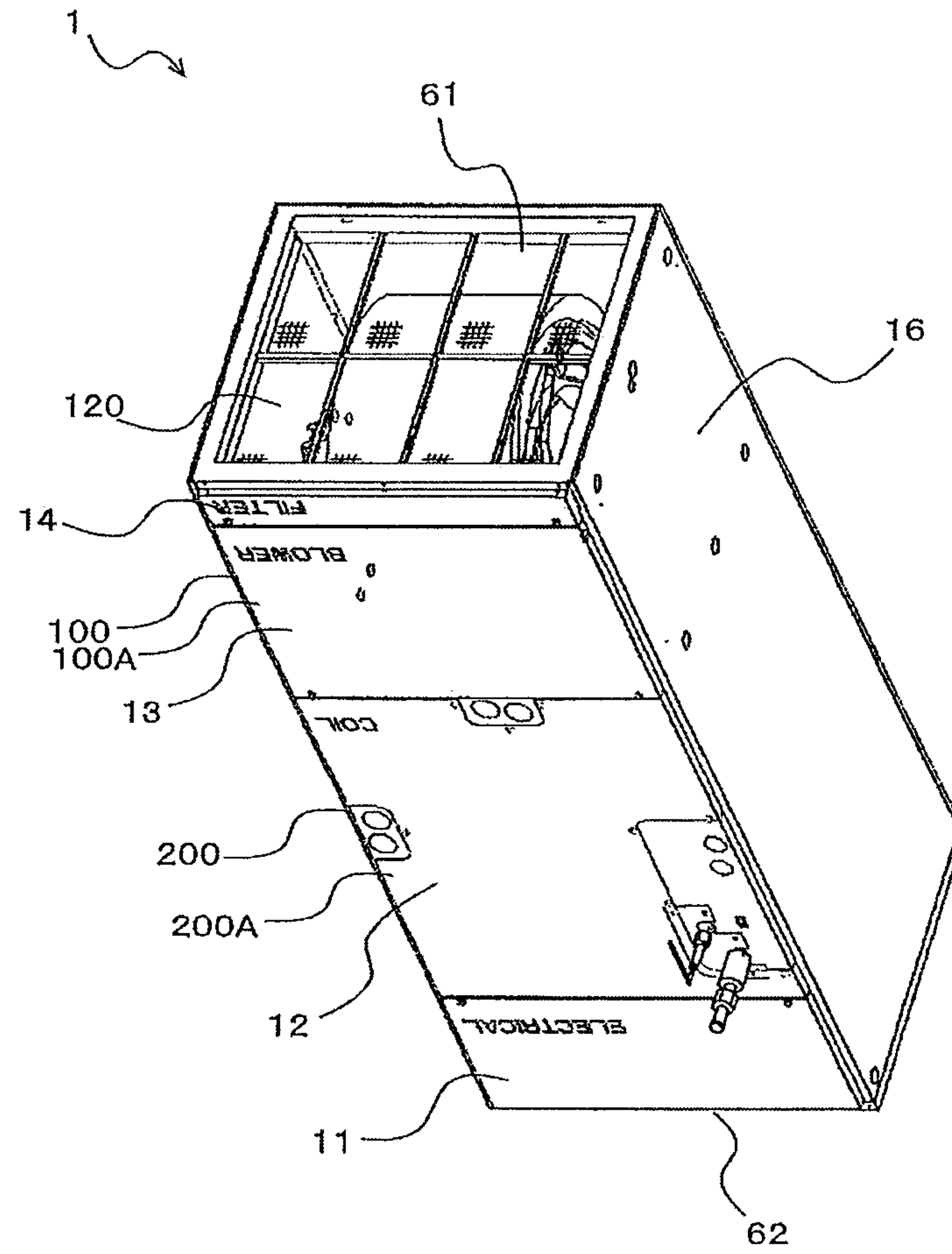


FIG. 16

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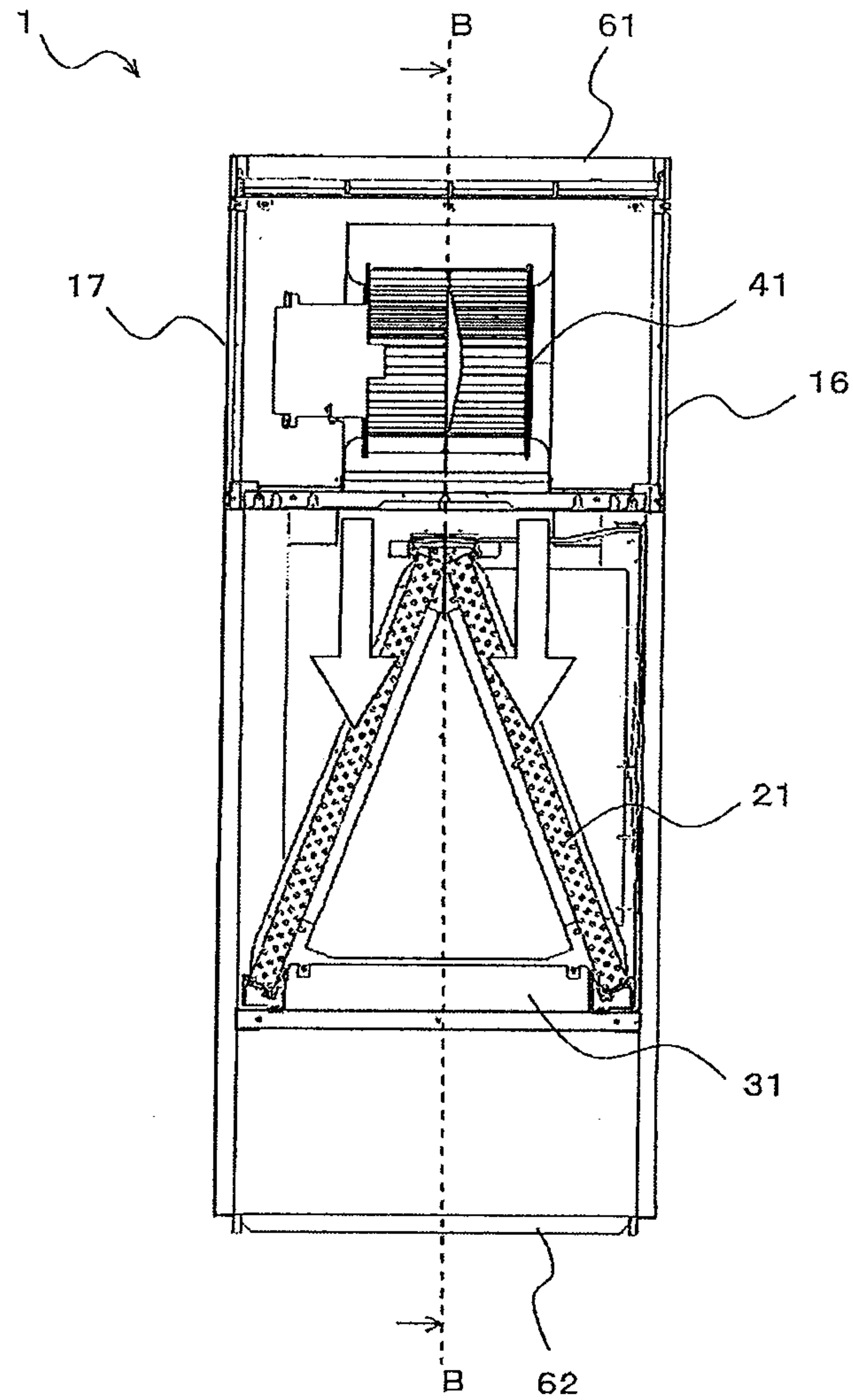


FIG. 17

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