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(54) **BLOWER**

(57) This blower (16) is provided with: a fan (17) having a first fan (17A) and a second fan (17B) provided in parallel with the first fan (17A); an electric motor (18) having a first motor (18A) for driving the first fan (17A) and a second motor (18B) for driving the second fan (17B); a bell mouth (20) formed integrally from a plastic material and having a first mouth (21A) for surrounding the periphery of the first fan (17A), a second mouth (21B) for surrounding the periphery of the second fan (17B), and a central dividing band (24) for creating a division between the first mouth (21A) and the second mouth (21B); and a rectifier (30) having a first region (35A) corresponding from the first motor (18A) to the first fan (17A) and a second region (35B) corresponding from the second motor (18B) to the second fan (17B), the first region (35A) and the second region (35B) being in contact via a partition (33). In the bell mouth (20), the central dividing band (24) is supported by the partition (33) of the rectifier (30).

FIG. 1A

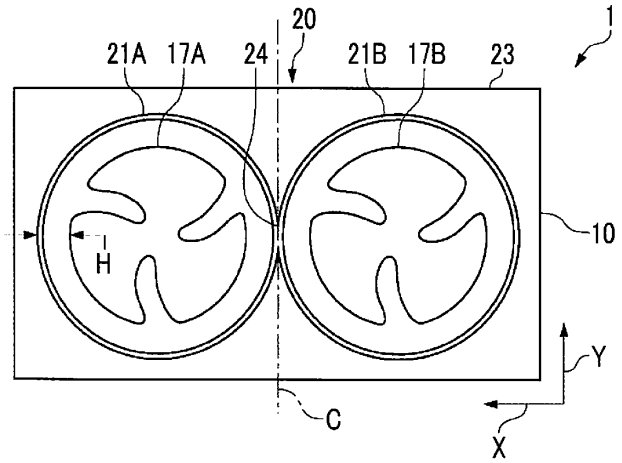


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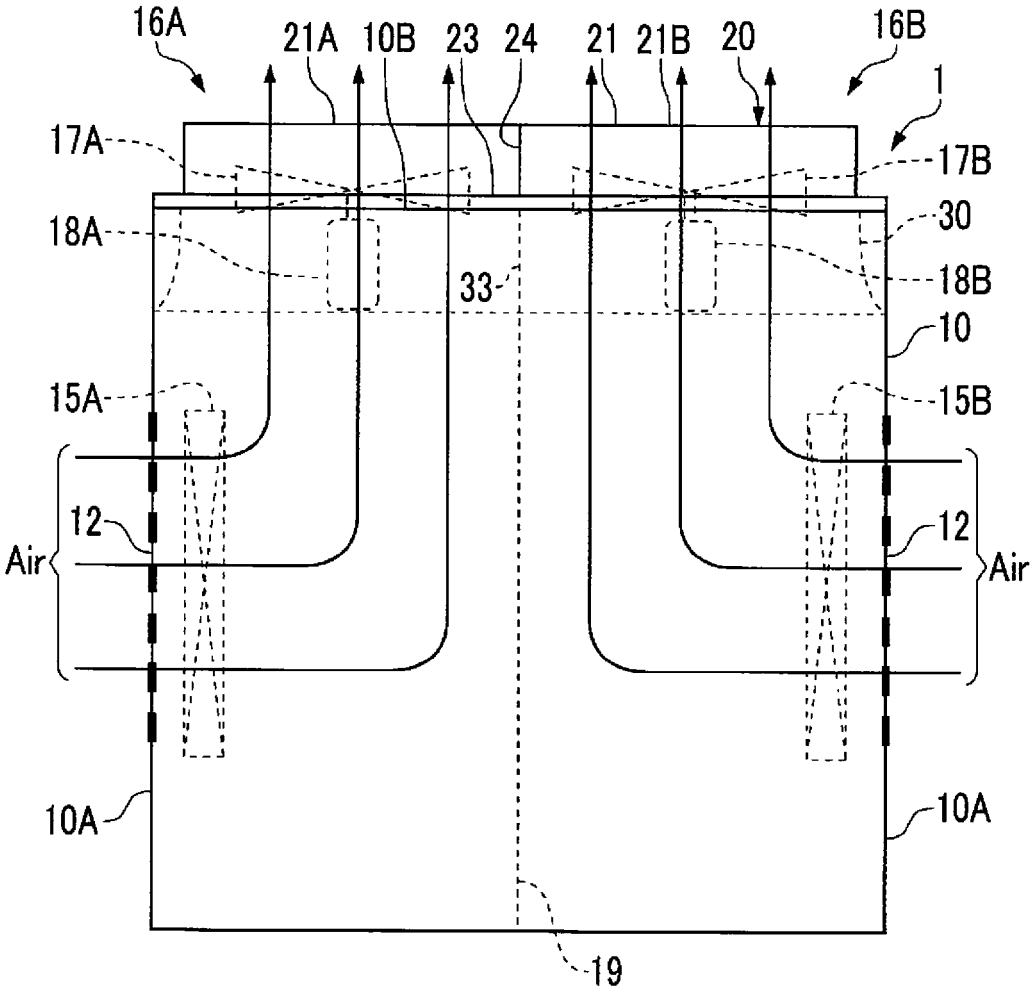
FIG. 1B


16A
21A
10B
23
24
21
21B
20
16B
1
17A
17B
18A
30
33
18B
10
15A
15B
12
12
Air
Air
10A
10A
19

## Description

### Technical Field

**[0001]** The present invention relates to a blower and particularly, to a blower which includes a resin bell mouth.

### Background Art

**[0002]** An air conditioner includes an indoor unit which performs heat exchange on indoor air and an outdoor unit which radiates heat to outside air and absorbs heat from outside air and includes a blower. The blower includes a fan and a bell mouth which surrounds a periphery of the fan and blows air.

**[0003]** In the blower, the bell mouth formed of metal or a resin is used.

**[0004]** The metal bell mouth has high rigidity, and thus, the metal bell mouth is less liable to be deformed by an external force such as a snow load or a wind load. However, the metal bell mouth has a low degree of freedom in shape due to processing limitations.

**[0005]** Meanwhile, the resin bell mouth can be formed by injection molding, and thus, has a high degree of freedom in shape. However, compared to the metal bell mouth, the resin bell mouth has low rigidity, and thus, there is a concern that the resin bell mouth is deformed in the direction of gravity if an external force is applied to the resin bell mouth due to accumulation of snow, for example. If the bell mouth is deformed, a clearance between the bell mouth and the fan is changed, and there is a concern that performance of the outdoor unit deteriorates.

**[0006]** Accordingly, in PTL 1, the present inventors suggest a blower which includes a first fan and a second fan disposed in parallel with each other and in which mutually facing portions of a first mouth surrounding a periphery of the first fan and a second mouth surround a periphery of the second fan come into contact with each other if the first mouth and the second mouth receives an external force and are displaced. That is, according to the suggestion of PTL 1, in a resin bell mouth, the mutually facing portions of the first mouth and the second mouth come into contact with each other if the first mouth and the second mouth receive an external and are displaced. Accordingly, it is possible to prevent the first mouth and the second mouth from being displaced, and thus, it is possible to prevent the bell mouth from being deformed.

### Citation List

### Patent Literature

**[0007]** [PTL 1] Japanese Unexamined Patent Application Publication No. 2015-113818

### Summary of Invention

### Technical Problem

**[0008]** By only preventing deformation of the bell mouth, it is not possible to secure performance of an outdoor unit, and it is also necessary to rectify air from a heat exchanger to a fan. Meanwhile, like PTL 1, in an outdoor unit having a plurality of fans, for example, two fans, flows of air caused by the rotation of each fan influence each other. Accordingly, there is a concern that turbulence of air occurs in a region from a motor driving the fan to the fan.

**[0009]** Therefore, an object of the present invention is to provide a blower having a resin bell mouth and two fans provided in parallel with each other, in which deformation of a mouth is prevented when the bell mouth receives a downward external force in a vertical direction and turbulence of air can be prevented in a region from a motor to a fan.

### Solution to Problem

**[0010]** According to an aspect of the present invention, there is provided a blower, including: a fan which includes a first fan and a second fan which is provided in parallel with the first fan; an electric motor which includes a first motor which drives the first fan and the second motor which drives a second fan; a bell mouth which includes a first mouth which surrounds a periphery of the first fan, a second mouth which surrounds a periphery of the second fan, and a central division band which divides a portion between the first mouth and the second mouth, and is integrally formed of a resin material; and a rectifier which includes a first region corresponding to a portion from the first motor to the first fan and a second region corresponding to a portion from the second motor to the second fan, the first region and the second region being in contact with each other via a partition.

**[0011]** In the bell mouth of the present invention, the central division band which divides the portion between the first mouth and the second mouth is supported by the partition of the rectifier.

**[0012]** According to the blower of the present invention, the rectifier having the first region and the second region is provided from the electric motor to the fan. Therefore, it is possible to rectify air flowing from the first motor to the first fan and it is possible to rectify air flowing from the second motor to the second fan. In addition, the first region and the second region are partitioned by the partition, and thus, the first region and the second region can rectify the air flowing through the first and second regions and without being affected by each other.

**[0013]** Moreover, in the blower of the present invention, the central division band between the first mouth and the second mouth is supported by the partition of the rectifier. Here, if an external force is applied to the bell mouth downward in a vertical direction, a portion of the central

division band between the first mouth and the second mouth is most easily deformed downward. However, in the blower of the present invention, the central division band is supported by the partition plate, and thus, for example, the bell mouth is not easily deformed even when snow is accumulated on the bell mouth and a downward external force is applied to the bell mouth.

**[0014]** In the blower of the present invention, preferably, a peripheral edge of the bell mouth is supported by the rectifier in addition to the central division band.

**[0015]** Accordingly, the entireties of the peripheral edge and the central division band are supported by the rectifier, and thus, deformation of the bell mouth can be further prevented.

**[0016]** In the blower of the present invention, preferably, the rectifier is supported by a housing in which the electric motor, the fan, and the rectifier are accommodated.

**[0017]** Accordingly, it is possible to prevent the deformation of the bell mouth by the rectifier without specifically providing a member for supporting the rectifier.

**[0018]** Moreover, the support of the rectifier by the housing includes an indirect support via other members such as a bracket and a direct support via a bolt or the like.

**[0019]** In the blower of the present invention, preferably, the housing includes a rectification plate corresponding to the partition of the rectifier, and the housing is divided into a region corresponding to the first region of the rectifier and a region corresponding to the second region of the rectifier by the rectification plate.

**[0020]** Accordingly, a flow of air is rectified to a certain level when the air is introduced into the rectifier, and thus, effects of the rectification by the rectifier can be improved.

## Advantageous Effects of Invention

**[0021]** According to the present invention, the bell mouth is supported by the rectifier which realizes rectification from the electric motor to the fan, and thus, the rectifier can have a function for preventing the deformation of the bell mouth in addition to a function for realizing the rectification without providing other special members in the rectifier. Accordingly, there is a concern a resin bell mouth is displaced if the bell mouth receives an external force, and thus, a blower having one fan is mainly used. However, in the present invention, deformation of the bell mouth by an external force can be prevented, and thus, the resin bell mouth can be applied to the blower in which two fans are provided in parallel with each other.

## Brief Description of Drawings

**[0022]**

FIG. 1A is a plan view showing a schematic configuration of an outdoor unit of an air conditioner according to the present embodiment and FIG. 1B is a side view thereof.

FIG. 2A shows a bell mouth according to the present embodiment and is a sectional view taken along line IIa-IIa in FIG. 2B, and FIG. 2B shows the bell mouth according to the present embodiment and is a sectional view taken along line IIb-IIb in FIG. 2A.

FIG. 3A shows a rectifier according to the present embodiment and is a sectional view taken along line IIIa-IIIa in FIG. 3B, and FIG. 3B shows the rectifier according to the present embodiment and is a sectional view taken along line IIIb-IIIb in FIG. 3A.

FIG. 4A is a plan view showing the bell mouth and a rectifier according to the present embodiment and FIG. 4B is a sectional view taken along IVb-IVb in FIG. 4A.

FIGS. 5A to 5C are views showing a rectifier and a bell mouth according to a modification example. Description of Embodiments

**[0023]** Hereinafter, an embodiment of the present invention will be described with reference to the accompanying drawings.

**[0024]** As shown FIGS. 1A and 1B, an outdoor unit 1 of an air conditioner according to the embodiment of the present invention includes a housing 10 in which suction ports 12 are formed on side surfaces 10A, a heat exchanger 15 which is provided inside the housing 10, and a blower 16 which discharges air passing through the heat exchanger 15. In addition, although not shown, the heat exchanger 15 is used as a generic term for heat exchangers 15A and 15B in this embodiment. This is similarly applied to the blower 16, a fan 17, an electric motor 18, or the like.

**[0025]** The blower 16 includes the fan 17, the electric motor 18 which drives the fan 17, a bell mouth 20 in which the fan 17 is accommodated, and a rectifier 30 which is provided from the electric motor 18 to the fan 17.

**[0026]** If the electric motor 18 is driven, as shown in FIGS. 1B, air Air sucked from the suction port 12 to the inside of the housing 10 passes through the heat exchanger 15, and thereafter, the air flows upward in a vertical direction (up and down directions in FIG. 1B) and is discharged from the bell mouth 20 to the outside. A rectification plate 19 is provided at a position at which the housing 10 is bisected in a width direction X (FIG. 1A), and the air Air sucked from each suction port 12 is divided and flows toward the blowers 16A and 16B. The rectification plate 19 is provided over the entire region of the housing 10 in a depth direction Y (FIG. 1A).

**[0027]** The fan 17 includes a first fan 17A and a second fan 17B which is provided in parallel with the first fan 17A.

**[0028]** The electric motor 18 includes a first motor 18A which drives the first fan 17A and a second motor 18B which drives the second fan 17B. The first motor 18A and the second motor 18B are supported by the housing 10 at predetermined positions. The support means is arbitrarily selected. For example, the first motor 18A and the second motor 18B can be supported at predetermined positions of the housing 10 by fixing the first and second

motor 18A and 18B to a bracket fixed to the housing 10.

**[0029]** Next, the bell mouth 20 will be described with reference to FIGS. 1A, 1B, 2A, 2B, 4A, and 4B.

**[0030]** The bell mouth 20 is provided so as to cover the upper surface 10B of the housing 10 of the outdoor unit 1. The bell mouth 20 is formed of a resin material, and for example, is integrally formed by injection molding.

**[0031]** The bell mouth 20 includes a base portion 23, a first mouth 21A, and a second mouth 21B.

**[0032]** In the base portion 23, an outer peripheral edge there is formed in a rectangular shape in a plan view, and a portion except for the first mouth 21A and the second mouth 21B is formed in a flat plate shape. The base portion 23 is fixed to the housing 10 by means such as a fastener including a screw.

**[0033]** The first mouth 21A and the second mouth 21B are formed to stand uprightly from the base portion 23 (FIG. 2B) and are provided in parallel to be in contact with each other via a central division band 24 without a gap therebetween in the width direction X (FIG. 2A). The central division band 24 is provided at a position at which the bell mouth 20 is bisected into the first mouth 21A and the second mouth 21B in the width direction X, and at this position, the central division band 24 is continued to the upper end in a vertical direction or a height direction from the base portion 23.

**[0034]** The first mouth 21A is formed in a tubular shape and is provided to surround the periphery of the first fan 17A. The first mouth 21A is provided with a clearance H between the first mouth 21A and an outer peripheral edge of the first fan 17A.

**[0035]** The second mouth 21B is formed in a cylindrical shape having the same dimension and shape as those of the first mouth 21A and is provided to surround the periphery of the second fan 17B. The second mouth 21B is disposed at a position linearly symmetrical to the first mouth 21A with a reference line C bisecting the bell mouth 20 in the width direction X as a symmetrical axis.

**[0036]** In the present embodiment, the first mouth 21A and the second mouth 21B are formed to be in contact with each other at the central division band 24.

**[0037]** As shown in FIG. 2B, the bell mouth 20 includes an upstream end 20A positioned on an upstream side in a direction of air blowing caused by the fan 17 and a downstream end 20B positioned a downstream side in the direction of the air blowing. The bell mouth 20 is formed such that an opening area is constant from the upstream end 20A toward the downstream end 20B.

**[0038]** Next, the rectifier 30 will be described with reference to FIGS. 1A, 1B, 3A, 3B, 4A, and 4B.

**[0039]** The rectifier 30 is provided from the electric motor 18 to the fan 17 and rectifies a flow of air from the electric motor 18 to the fan 17. The rectifier 30 can divide the region into a region corresponding to the first motor 18A and the first fan 17A and a region corresponding to the second motor 18B and the second fan 17B so as to rectify the flow of air. Similarly to the bell mouth 20, the rectifier 30 can be integrally formed by injection molding and can be formed by bending a metal plate or the like.

**[0040]** The rectifier 30 includes a side wall 31 which configures an outer shell and is formed in an elliptical shape in a plan view.

**[0041]** As shown in FIG. 3B, the side wall 31 includes an upstream end 30A which is positioned on the upstream side in the direction of the air blowing caused by the fan 17 and a downstream end 30B which is positioned on the downstream side in the direction of the air blowing. An outer periphery of the side wall 31 is narrowed from the upstream end 30A toward the downstream end 30B, and thus, the side wall 31 is formed such that an opening area thereof continuously decreases from the upstream end 30A toward the downstream end 30B. The side wall 31 has the same dimension as that of the peripheral edge of the base portion 23 of the bell mouth 20 at the downstream end 30B.

**[0042]** As shown in FIG. 3B, the side wall 31 has a height h and covers the periphery of the blower 16 from the electric motor 18 to the fan 17. Accordingly, in the vicinity of the inside of the side wall 31, air flows into the bell mouth 20 from the upstream end 30A toward the downstream end 30B while be rectified according to the rotation of the fan 17.

**[0043]** In the rectifier 30, a plate-shaped partition 33 is provided at a position at which the rectifier is bisected in the width direction X in a plan view.

**[0044]** The partition 33 has the same height h as that of the side wall 31 and divides the inside of the side wall 31 into a first region 35A and a second region 35B. The first fan 17A and the first motor 18A are accommodated in the first region 35A and the second fan 17B and the second motor 18B are accommodated in the second region 35B.

**[0045]** The entire region of the electric motor 18 and the fan 17 in the vertical direction is accommodated in the rectifier 30 and the bell mouth 20. That is, the height h of the rectifier 30 is changed by the height of the bell mouth 20, and in a case where the entire region of the fan 17 is accommodated in the bell mouth 20, it is sufficient if only the electric motor 18 is accommodated in the rectifier 30. In addition, if only a portion of the fan 17 is accommodated in the bell mouth 20, the rectifier 30 is formed such that the electric motor 18 and other portions of the fan 17 are accommodated in the rectifier 30. The first region 35A and the second region 35B in the vertical direction are determined by the above-described guidelines.

**[0046]** The above-described rectification plate 19 of the housing 10 is provided at the position corresponding to the partition 33 of the rectifier 30, and the regions divided by the rectification plate 19 each correspond to the first region 35A and the second region 35B.

**[0047]** The outdoor unit 1 of the present embodiment has characteristics in the dispositions of the bell mouth 20 and the rectifier 30, and particularly, as shown in FIGS. 1B, 4A, and 4B, the bell mouth 20 is placed on the rectifier 30 and is supported by the rectifier 30. That is, the rectifier

30 is supported a predetermined position inside the housing 10, and the bell mouth 20 can be fixed to a bracket in a state where the bell mouth 20 is placed on the rectifier 30. In this case, the rectifier 30 is indirectly supported by the housing 10.

**[0048]** As described above, the dimension of the upstream end 20A of the bell mouth 20 is the same as the dimension of the downstream end 30B of the rectifier 30, and the bisector position of the bell mouth 20 coincides with the bisector position of the rectifier 30. Accordingly, if the bell mouth 20 is placed on the rectifier 30, the side wall 31 of the rectifier 30 is in contact with the peripheral edge portion of the bell mouth 20, and thus, the side wall 31 supports the peripheral edge portion of the bell mouth 20. Moreover, the partition 33 of the rectifier 30 is in contact with the central division band 24 of the bell mouth 20 and the partition 33 supports the central division band 24. That is, the rectifier 30 mechanically supports the entire region of the bell mouth 20 including the central division band 24.

[Action and Effect]

**[0049]** Hereinafter, actions and effects of the outdoor unit 1 according to the present embodiment will be described.

**[0050]** The outdoor unit 1 includes the rectifier 30 from the electric motor 18 to the fan 17. The rectifier 30 includes the first region 35A and the second region 35B, the first region 35A corresponds to the blower 16A, and the second region 35B corresponds to the blower 16B. Accordingly, the rectifier 30 can rectify air flowing through the blower 16A and can rectify air flowing through the blower 16B. In addition, the first region 35A and the second region 35B are partitioned by the partition 33, and thus, the first region 35A and the second region 35B can rectify the air flowing through the regions 35A and 35B without being affected by each other.

**[0051]** Next, in the outdoor unit 1, the bell mouth 20 is placed on the rectifier 30, and particularly, the central division band 24 provided at the position at which the bell mouth 20 is bisected is supported by the partition 33 of the rectifier 30. Here, if snow is accumulated on the bell mouth 20, the portion of the central division band 24 bisecting the bell mouth 20 receives a load generated by the accumulation of snow, and the portion of the central division band 24 is mostly easily deformed downward in the vertical direction. However, in the outdoor unit 1, the central division band 24 is supported by the partition 33, the rectifier 30 including the partition 33 is supported by the housing 10, and thus, the bell mouth 20 is not easily deformed by the accumulation of snow.

**[0052]** In addition, in the rectifier 30, the side wall 31 supports the peripheral edge portion of the bell mouth 20, and thus, deformation of the bell mouth 20 is further prevented.

**[0053]** As described above, in the outdoor unit 1, the bell mouth 20 is supported by the rectifier 30 which realizes rectification from the electric motor 18 to the fan 17, and thus, the rectifier 30 can have a function for preventing the deformation of the bell mouth 20 in addition to a function for realizing the rectification without providing other special members in the rectifier 30.

**[0054]** In the related art, there is a concern a resin bell mouth is displaced if bell mouth receives an external force, and thus, a blower having one fan is mainly used. However, in the present embodiment, deformation of the bell mouth 20 by an external force can be prevented, and thus, the resin bell mouth 20 can be applied to a two-fan blower having two fans.

**[0055]** Next, if the first mouth 21A receives an external force, the first mouth 21A is to be displaced in a direction approaching the second mouth 21B. Meanwhile, if the second mouth 21B receives an external force, the second mouth 21B is to be displaced in a direction approaching the first mouth 21A.

**[0056]** Meanwhile, in the bell mouth 20 of the present embodiment, the first mouth 21A and the second mouth 21B are provided without a gap therebetween, are in contact with each other by the central division band 24, and are integrally formed. Accordingly, if the bell mouth 20 receives a downward external force, the force is applied from the first mouth 21A side to the central division band 24. Similarly, if the bell mouth 20 receives a downward external force, the force is applied from the second mouth 21B side to the central division band 24. The directions of the forces applied to the first and second mouths are opposite to each other, and thus, the forces of both applied to the central division band 24 are canceled. Accordingly, the displacements of the first mouth 21A and the second mouth 21B are prevented.

**[0057]** If the displacements of the mouth 21A and mouth 21B are prevented, the set clearance H can be maintained. Therefore, it is possible to prevent a decrease in performance of the blower 16 or it is possible to prevent damages of the bell mouth 20 and the fans 17A and 17B caused by contacts between the mouth 21A and mouth 21B and the fans 17A and 17B.

**[0058]** Hereinbefore, the present embodiment is described. However, in addition to this, the configurations described in the embodiment can be appropriately selected or can be appropriately changed to other configurations as long as they do not deviate from the gist of the present invention.

**[0059]** For example, in the embodiment, the partition 33 of the rectifier 30 has the same height h as that of the side wall 31. However, the heights of the side wall 31 and the partition 33 may not be the same as each other. That is, as shown in FIG. 5A, the height of the partition 33 may be lower than that of the side wall 31 as long as the support of the central division band 24 by the partition 33 is secured. However, in order to rectify an air flow, it is preferable that the partition 33 has the same height h as that of the side wall 31.

**[0060]** In addition, in the embodiment, the partition 33 of the rectifier 30 has a plate shape. However, the present

invention is not limited to this. For example, as shown in FIG. 5B, the partition 33 can be formed in an arc shape so as to correspond to the embodiment in which the side wall 31 is narrowed. Accordingly, it is possible to improve effects of rectification in each of the first region 35A and the second region 35B. However, in the form of FIG. 5B, it is assumed that a flow path through which air flows is narrowed so as to decrease an air volume. Accordingly, as shown in FIGS. 1A and 1B, if the rectification plate 19 corresponding to the partition 33 is provided inside the housing 10 to rectify the flow of air passing through the housing 10, it is possible to achieve sufficient rectification by only the plate-shaped partition 33.

**[0061]** Next, in the embodiment, the first mouth 21A and the second mouth 21B are in contact with the central division band 24. However, as shown in FIG. 5C, in the present invention, a gap G may be provided between the first mouth 21A and the second mouth 21B.

**[0062]** In this case, when the first mouth 21A and the second mouth 21B receive an external force and are displaced, preferably, the gap G is set such that the first mouth 21A and the second mouth 21B are in contact with each other. Accordingly, similarly to the present embodiment in which the first mouth 21A and the second mouth 21B are in contact with each other from the beginning, the forces applied to the mouth 21A and mouth 21B are canceled, and thus, the mouth 21A and mouth 21B are not displaced.

**[0063]** Therefore, when the first mouth 21A and the second mouth 21B receive the external force, if the maximum displacement amounts thereof in the direction approaching each other are each set to L1 and L2, the gap G is set to satisfy $G < L1 + L2$.

**[0064]** In addition, in this embodiment in which the gap G is provided between the first mouth 21A and the second mouth 21B, the central division band 24 is provided only in the base portion 23.

**[0065]** In addition, a rib may be provided in a circumferential direction of an outer peripheral wall of each of the mouth 21A and mouth 21B. The rib may be integrally formed with the bell mouth 20.

**[0066]** The rib is provided and rigidities of the mouth 21A and mouth 21B increase, and thus, the entireties of the mouth 21A and mouth 21B are not easily deformed by an external force.

**[0067]** Moreover, the present invention is not limited to a case where the ribs are provided in both of the mouth 21A and mouth 21B, and the rib may be provided in any one thereof. In addition, the present invention is not limited to the case where the rib is provided on the outer peripheral side of the mouth, and the rib may be provided on the inner peripheral side.

**[0068]** In addition, in the outdoor unit 1, the entire region of the first mouth 21A, the second mouth 21B, and the central division band 24 of the bell mouth 20 is supported by the rectifier 30. However, the present invention is not limited to this. For example, only the central division band 24 is supported by the rectifier 30, and other portions can be supported by the housing 10.

**[0069]** Moreover, in the present embodiment, the example in which only two fans are provided in parallel with each other is exemplified. However, in a case where three or more fans are provided in parallel with each other, the present invention can be applied to a portion between two fans adjacent to each other.

Reference Signs List

**[0070]**

10: housing
10A: side surface
10B: upper surface
12: suction port
15A, 15B: heat exchanger
16A: blower
16B: blower
17A: first fan
17B: second fan
18A: first motor
18B: second motor
19: rectification plate
20: bell mouth
20A: upstream end
20B: downstream end
21A: first mouth
21B: second mouth
23: base portion
24: central division band
30: rectifier
30A: upstream end
30B: downstream end
31: side wall
33: partition
35A: first region
35B: second region

**Claims**

**1.** A blower, comprising:

a fan which includes a first fan and a second fan which is provided in parallel with the first fan;
an electric motor which includes a first motor which drives the first fan and the second motor which drives a second fan;
a bell mouth which includes a first mouth which surrounds a periphery of the first fan, a second mouth which surrounds a periphery of the second fan, and a central division band which divides a portion between the first mouth and the second mouth, and is integrally formed of a resin material; and
a rectifier which includes a first region corresponding to a portion from the first motor to the

first fan and a second region corresponding to a portion from the second motor to the second fan, the first region and the second region being in contact with each other via a partition,
wherein in the bell mouth, the central division band which divides the portion between the first mouth and the second mouth is supported by the partition of the rectifier.

**2.** The blower according to claim 1,
wherein a peripheral edge of the bell mouth is supported by the rectifier in addition to the central division band.

**3.** The blower according to claim 1 or 2,
wherein the rectifier is supported by a housing in which the rectifier is accommodated.

**4.** The blower according to claim 3,
wherein the housing includes a rectification plate corresponding to the partition of the rectifier, and
wherein the housing is divided into a region corresponding to the first region and a region corresponding to the second region by the rectification plate.

**5.** The blower according to any one of claims 1 to 4,
wherein the rectifier includes a side wall which forms an outer shell of the rectifier and is formed in an elliptical shape in a plan view.

**6.** The blower according to claim 5,
wherein the side wall includes a first end portion which is positioned on an upstream side in a direction of air blowing caused by the fan and a second end portion which is positioned on a downstream side in the direction of the air blowing, and
wherein an opening area of the side wall is formed to be continuously narrowed from the first end portion toward the second end portion.

**7.** The blower according to claim 6,
wherein the side wall has the same dimension as that of a peripheral edge of a base portion of the bell mouth in the second end portion.

**8.** The blower according to any one of claims 1 to 7,
wherein the partition has a plate shape, and
wherein the partition is provided at a position at which the rectifier is bisected in a width direction X when the rectifier is viewed in a plan view.

**9.** The blower according to any one of claims 5 to 8,
wherein the partition and the side wall have the same height as each other.

**10.** The blower according to any one of claims 1 to 9,
wherein the entire region of the electric motor and the fan in a vertical direction is accommodated in the rectifier and the bell mouth.

**11.** The blower according to any one of claims 1 to 10,
wherein the rectifier is integrally formed by injection molding.

**12.** The blower according to any one of claims 1 to 10,
wherein the rectifier is formed of a metal plate.

**13.** An outer unit of an air conditioner, comprising: the blower according to any one of claims 1 to 12.

FIG. 1A

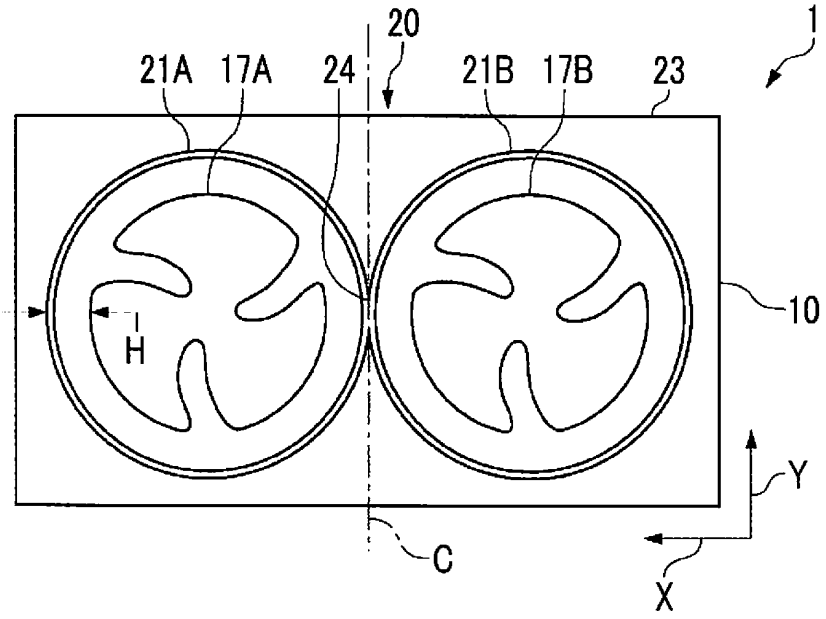

20
1
21A
17A
24
21B
17B
23
H
10
Y
C
X

FIG. 1B

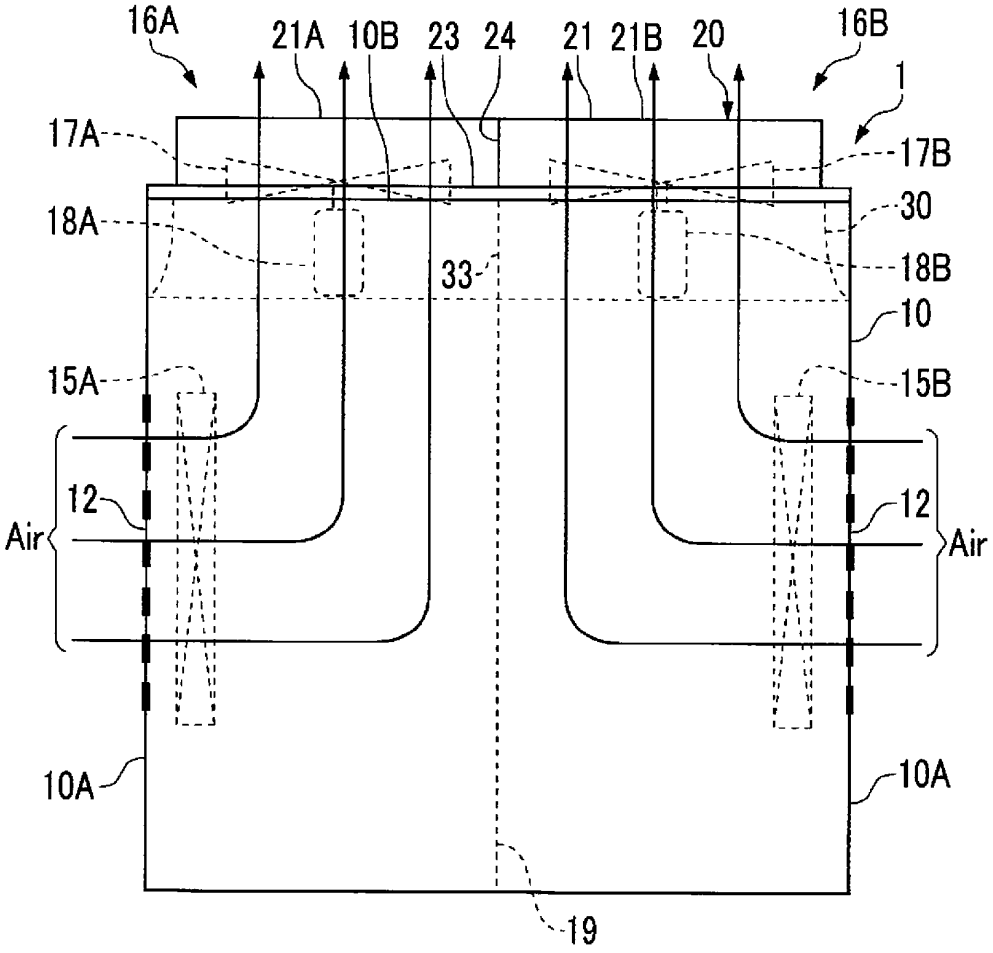

16A
21A
10B
23
24
21
21B
20
16B
1
17A
17B
18A
30
33
18B
10
15A
15B
12
12
Air
Air
10A
10A
19

FIG. 2A

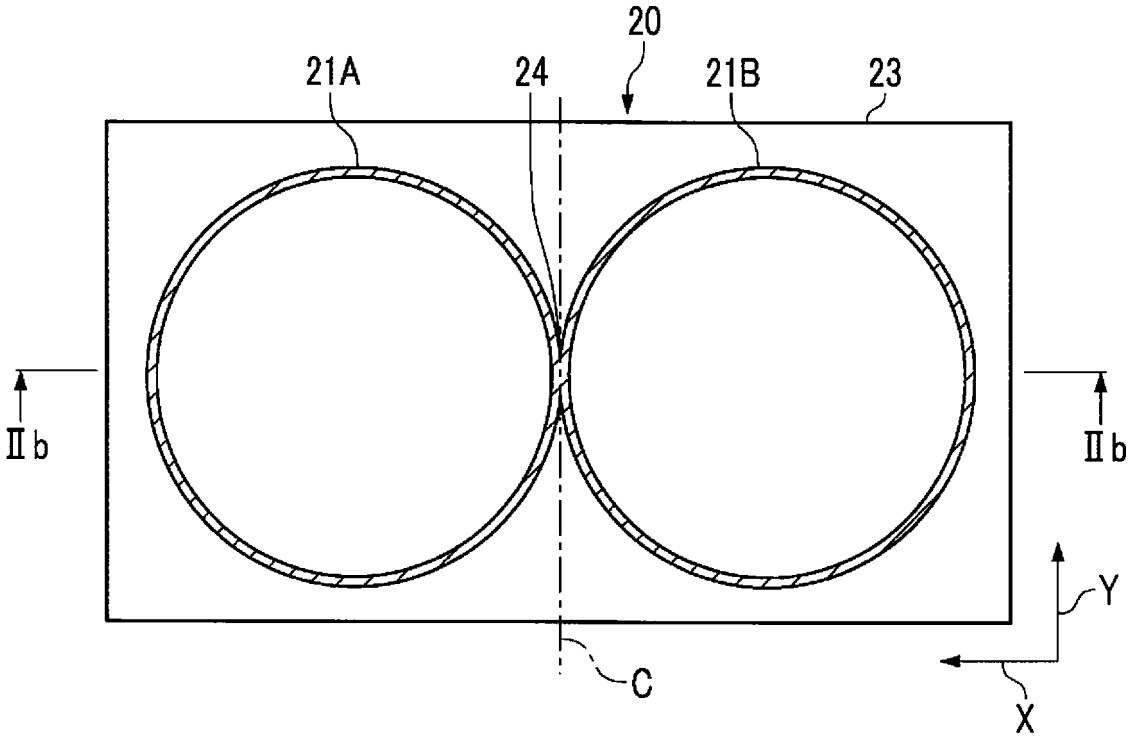



FIG. 2B

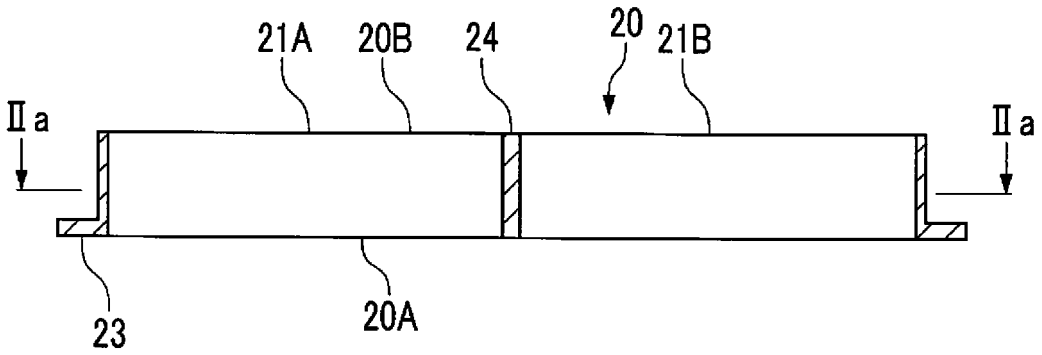


FIG. 3A

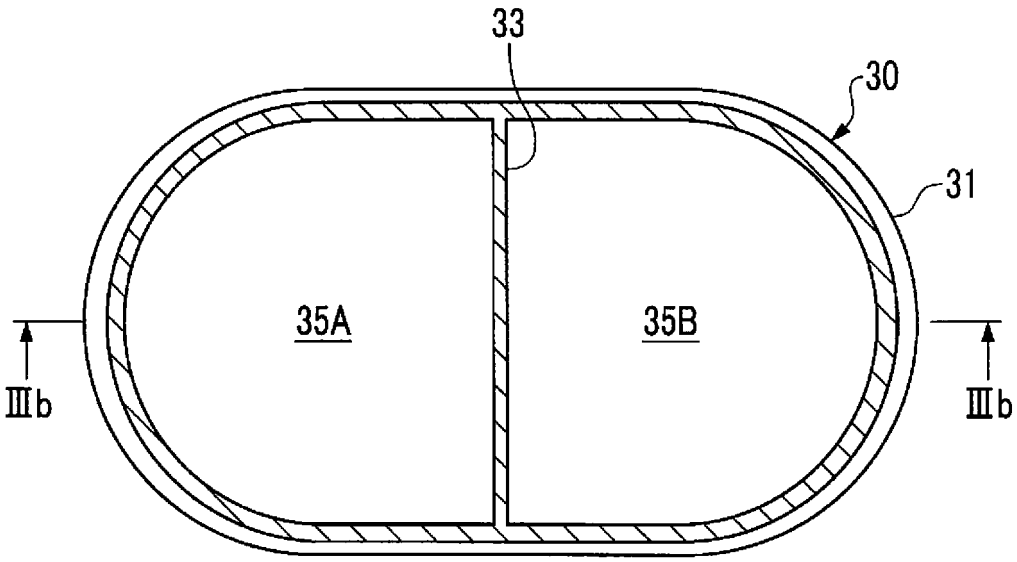



FIG. 3B

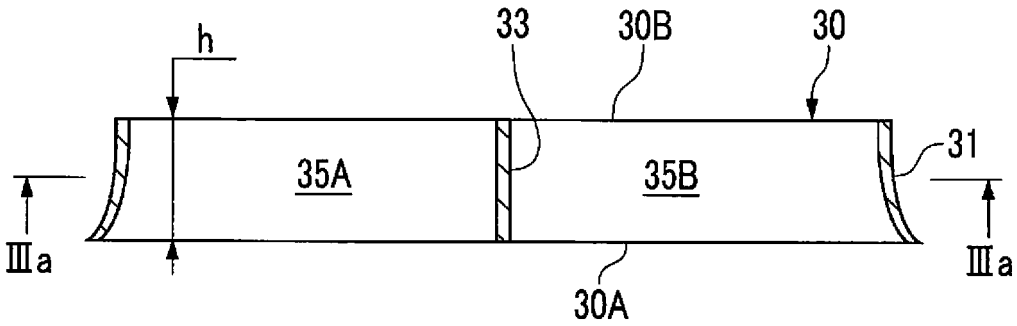
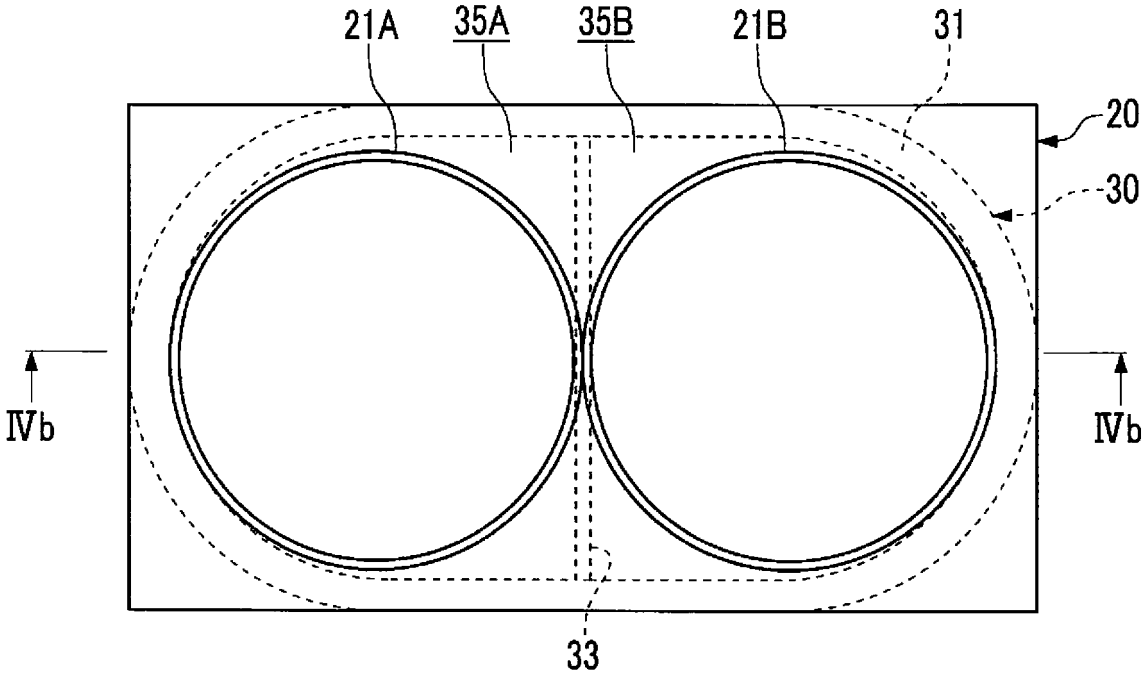


FIG. 4A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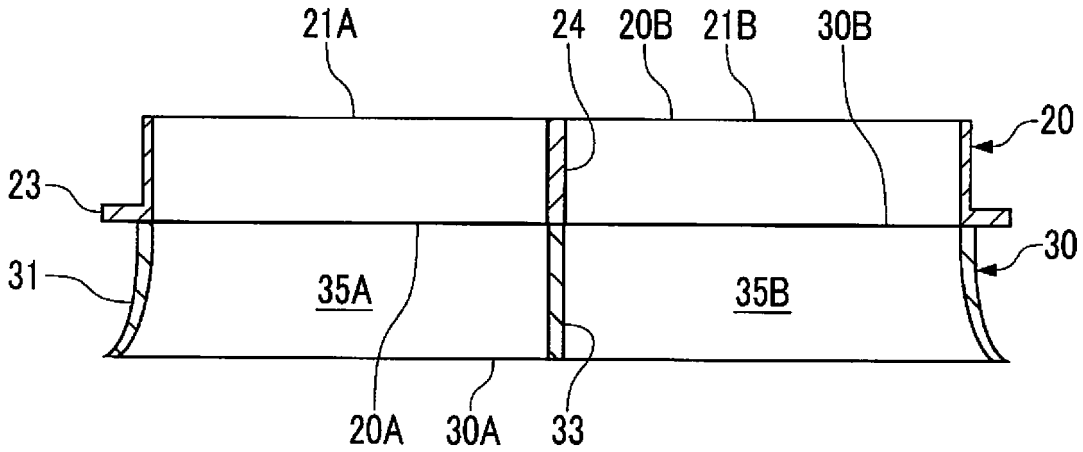
35B
21B
31
20
30
IVb
IVb
33

FIG. 4B


21A
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20B
21B
30B
20
23
31
35A
35B
30
20A
30A
33

FIG. 5A

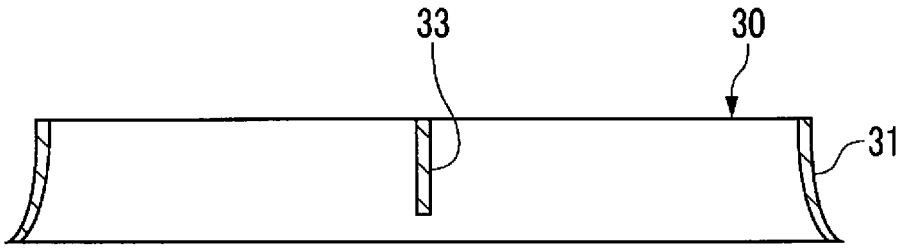



FIG. 5B

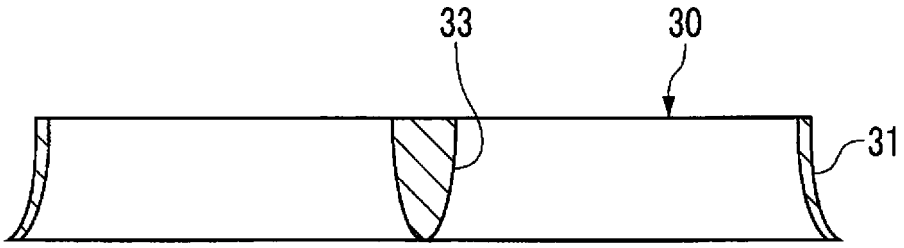
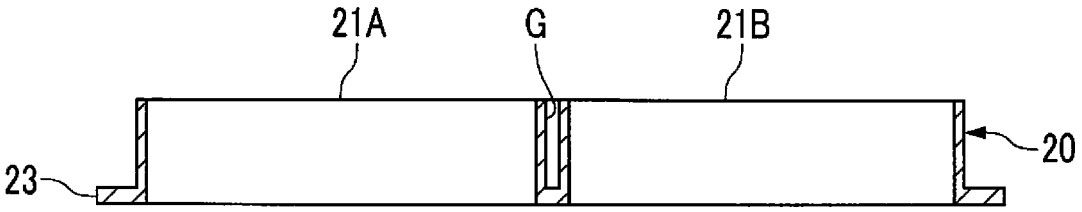



FIG. 5C



**INTERNATIONAL SEARCH REPORT**

International application No.
PCT/JP2016/003991

A. CLASSIFICATION OF SUBJECT MATTER
*F04D29/54*(2006.01)i, *F04D25/16*(2006.01)i, *F24F1/38*(2011.01)i, *F24F1/50*(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)
F04D29/54, F04D25/16, F24F1/38, F24F1/50

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 1996-2016
Kokai Jitsuyo Shinan Koho 1971-2016 Toroku Jitsuyo Shinan Koho 1994-2016

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. |
|---|---|---|
| Y<br>A | JP 2011-252673 A (Mitsubishi Electric Corp.), 15 December 2011 (15.12.2011), paragraphs [0017] to [0018], [0088] to [0097]; fig. 5, 25 to 27 (Family: none) | 1,3-4,8, 10-13<br>2,5-7,9 |
| Y<br>A | JP 2015-113818 A (Mitsubishi Heavy Industries, Ltd.), 22 June 2015 (22.06.2015), paragraphs [0001], [0018] to [0020]; fig. 4 & EP 3034888 A1 paragraphs [0001], [0042] to [0047]; fig. 4 | 1,3-4,8, 10-13<br>2,5-7,9 |
| Y<br>A | JP 2001-289467 A (Daikin Industries, Ltd.), 19 October 2001 (19.10.2001), paragraphs [0014] to [0022]; fig. 1 to 2 (Family: none) | 4,8<br>1-3,5-7,9-13 |

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

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"&" document member of the same patent family

| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
| 22 November 2016 (22.11.16) | 06 December 2016 (06.12.16) |
| Name and mailing address of the ISA/<br>Japan Patent Office<br>3-4-3,Kasumigaseki,Chiyoda-ku,<br>Tokyo 100-8915,Japan | Authorized officer<br><br>Telephone No. |

Form PCT/ISA/210 (second sheet) (January 2015)

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### Patent documents cited in the description


- JP 2015113818 A **[0007]**