



US 20200292204A1

(19) **United States**

(12) **Patent Application Publication**
JANG et al.

(10) **Pub. No.: US 2020/0292204 A1**

(43) **Pub. Date: Sep. 17, 2020**

(54) **AIR CONDITIONER**

Publication Classification

(71) Applicant: **SAMSUNG ELECTRONICS CO., LTD.**, Suwon-si, Gyeonggi-do (KR)

(72) Inventors: **Eomji JANG**, Suwon-si (KR); **Sehoon SHIN**, Suwon-si (KR); **Joonho YOON**, Suwon-si (KR); **Kwonjin KIM**, Suwon-si (KR); **Yeonseob YUN**, Suwon-si (KR)

(51) **Int. Cl.**
F24F 13/20 (2006.01)
F24F 13/30 (2006.01)
F24F 13/02 (2006.01)
(52) **U.S. Cl.**
CPC *F24F 13/20* (2013.01); *F24F 13/30* (2013.01); *F24F 2013/205* (2013.01); *F24F 13/0254* (2013.01); *F24F 13/0209* (2013.01)

(73) Assignee: **SAMSUNG ELECTRONICS CO., LTD.**, Suwon-si, Gyeonggi-do (KR)

(57) **ABSTRACT**

(21) Appl. No.: **16/769,322**
(22) PCT Filed: **Dec. 7, 2018**
(86) PCT No.: **PCT/KR2018/015487**
§ 371 (c)(1),
(2) Date: **Jun. 3, 2020**

An air conditioner is disclosed. The disclosed air conditioner can comprise: a housing having an inflow port and a discharge port; a partition disposed inside the housing so as to divide the inside of the housing into a first space at the inflow port side and a second space at the discharge port side, and having at least one opening for allowing the first space and the second space to communicate; at least one blower unit disposed in the first space, and including a duct, which passes through the opening so as to protrude toward the second space and discharges the air of the first space to the second space; and a heat exchanger disposed in the second space.

(30) **Foreign Application Priority Data**

Dec. 14, 2017 (KR) 10-2017-0172417

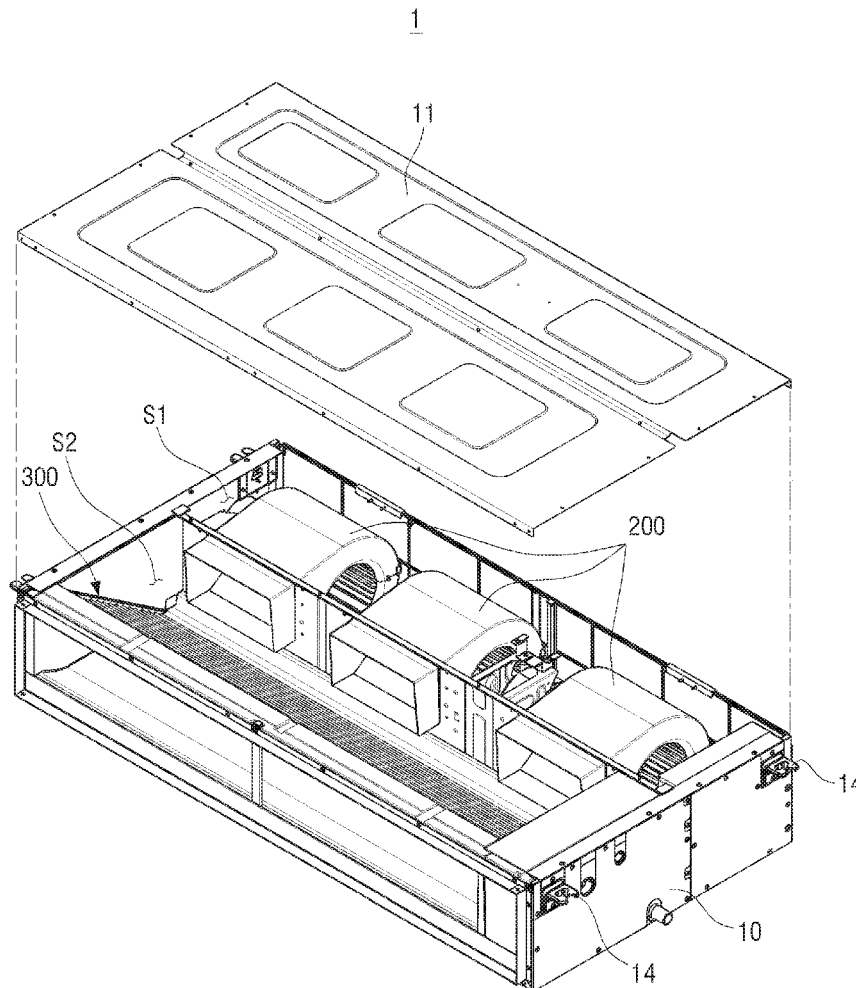


FIG. 1

1

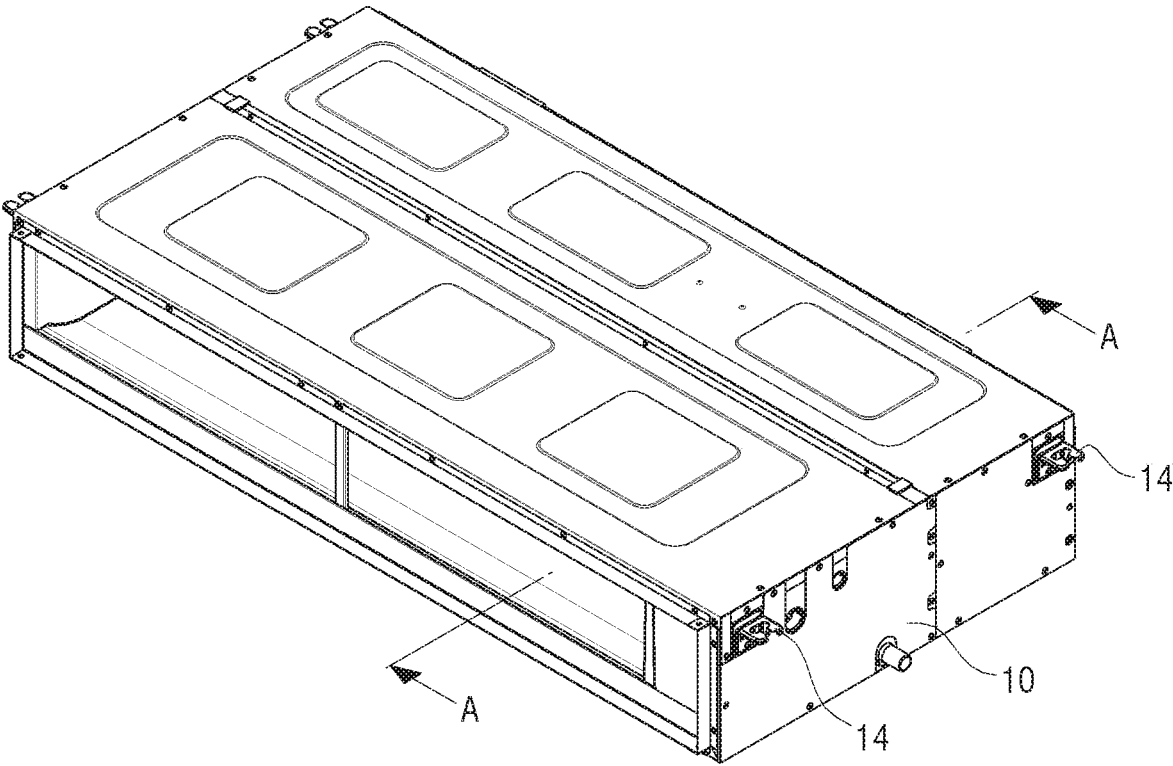


FIG. 2

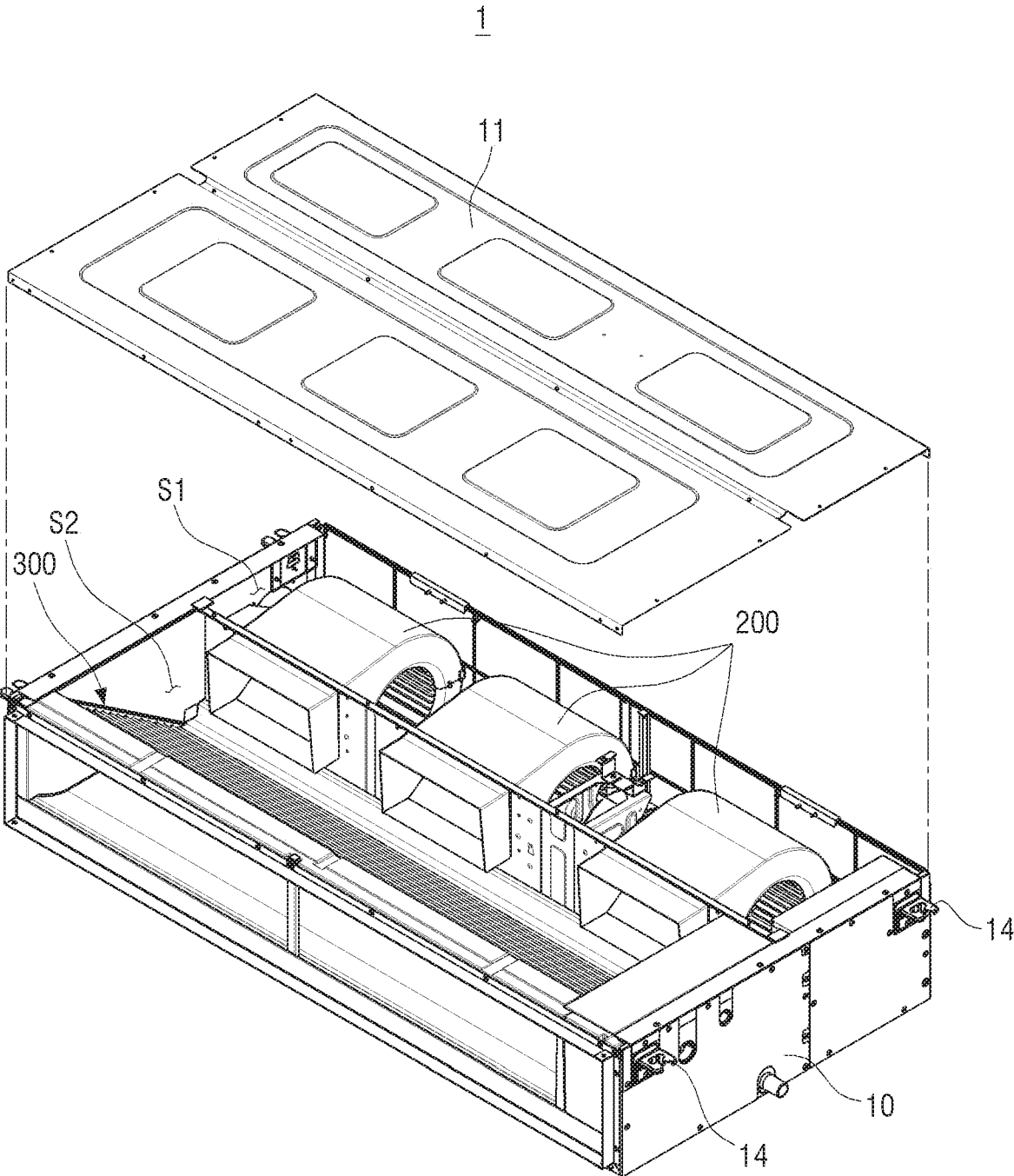


FIG. 3

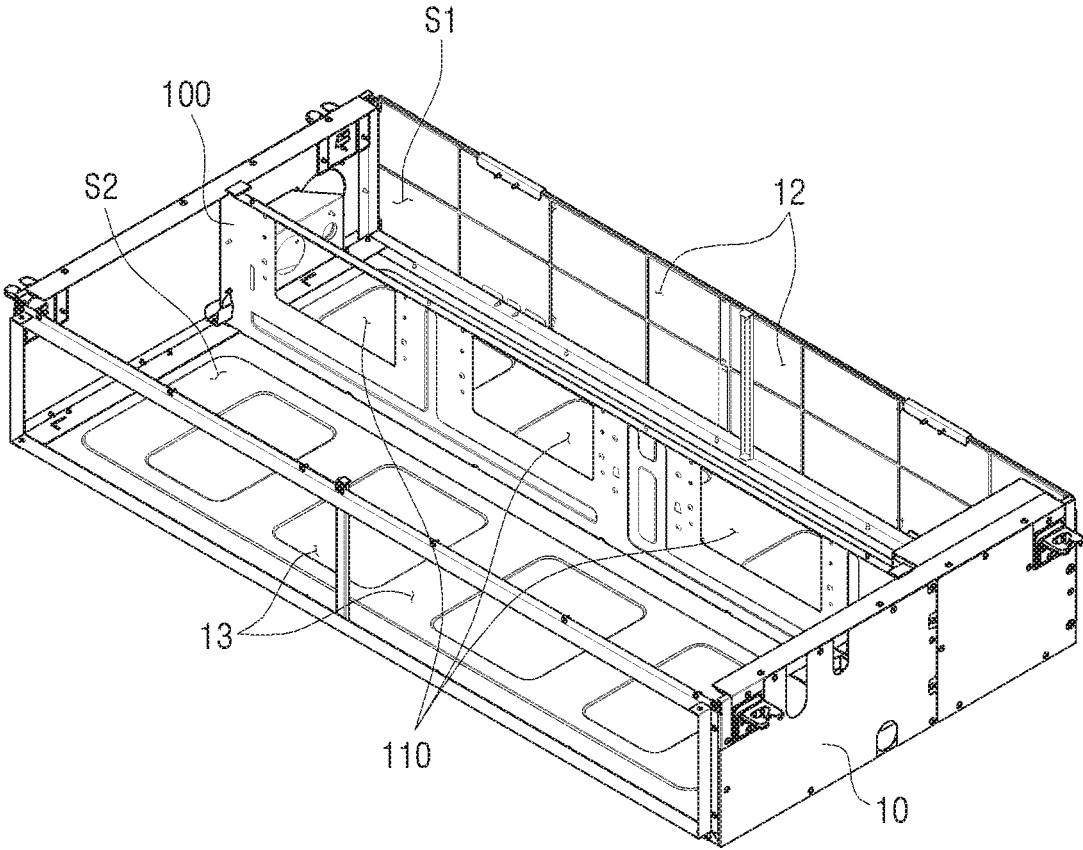


FIG. 4

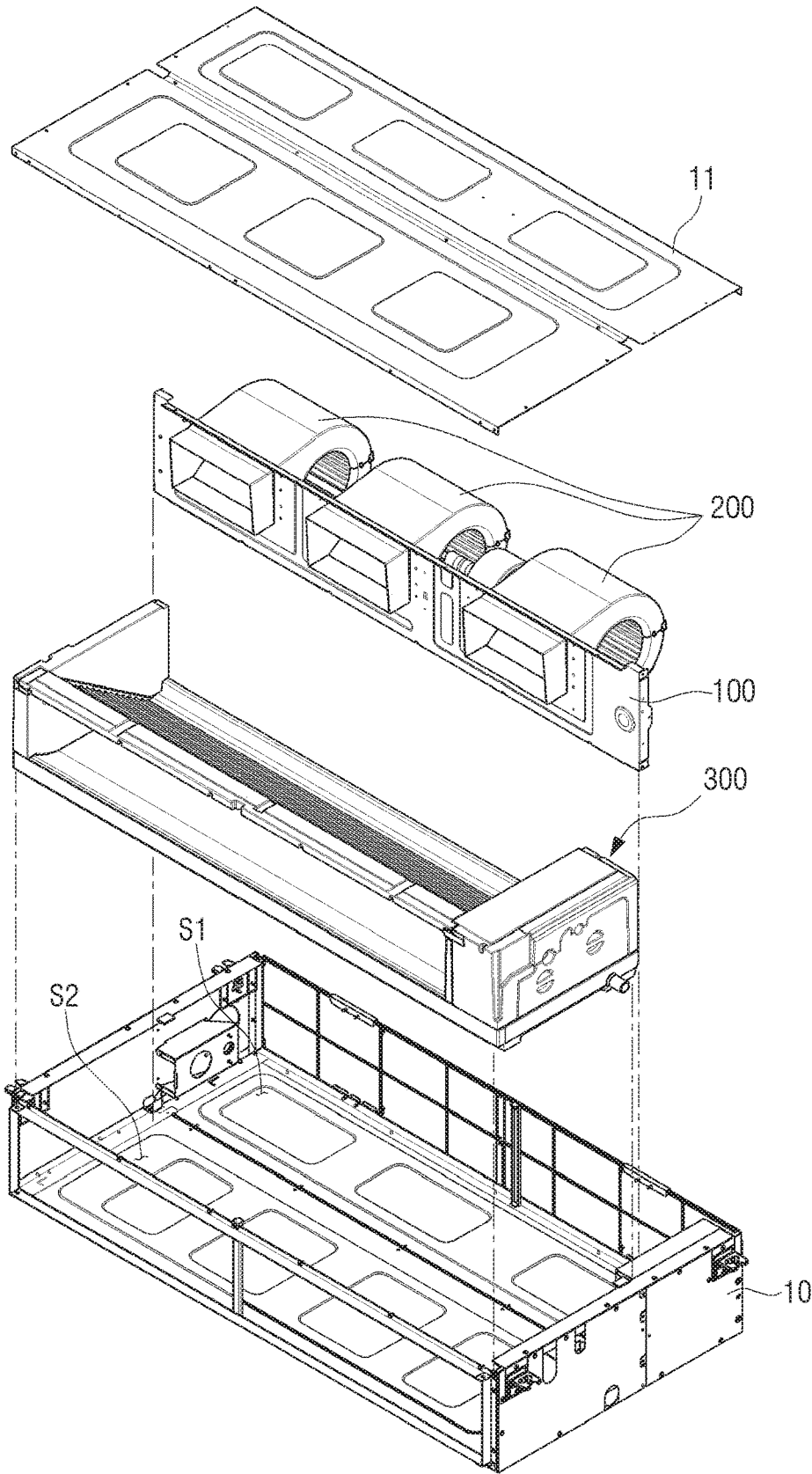


FIG. 5

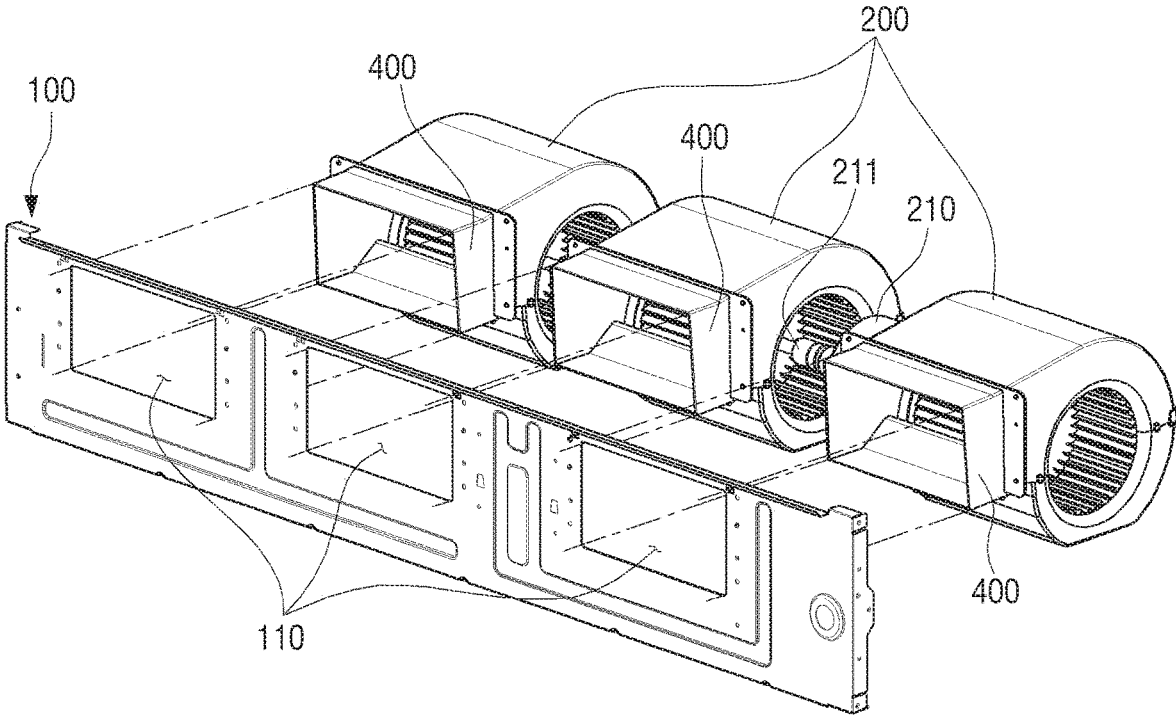


FIG. 6

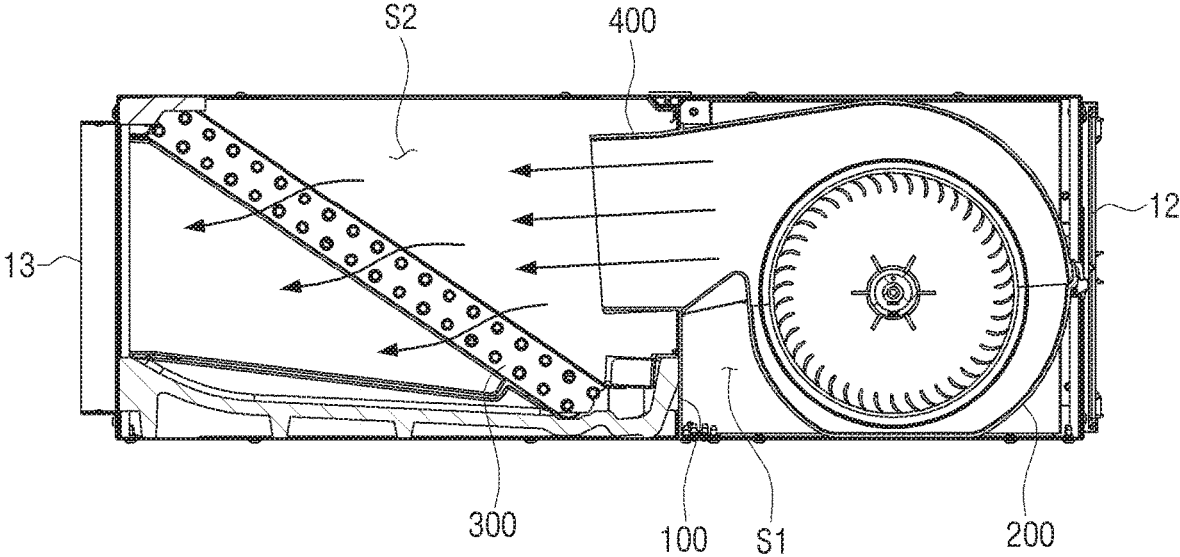


FIG. 7

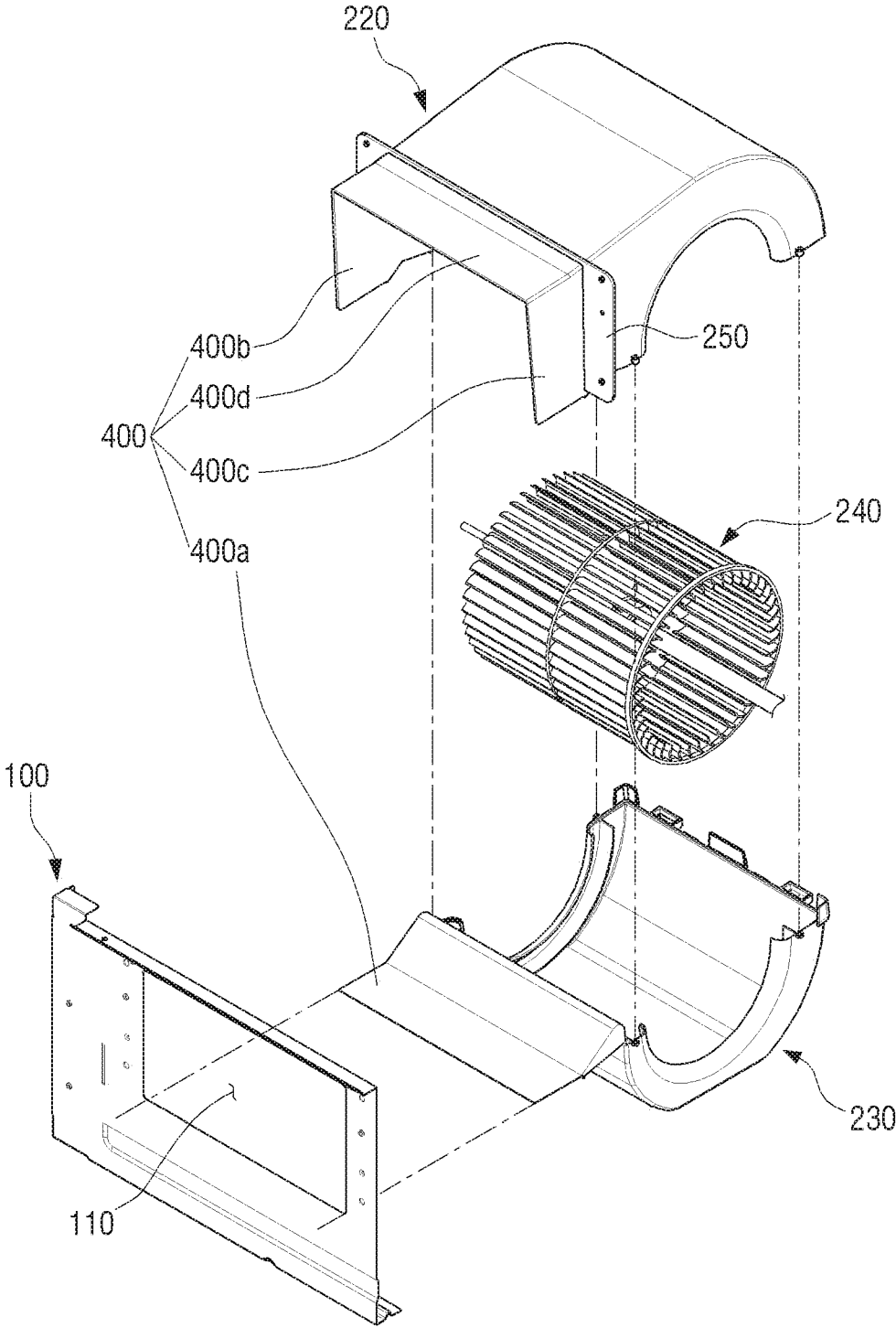


FIG. 8

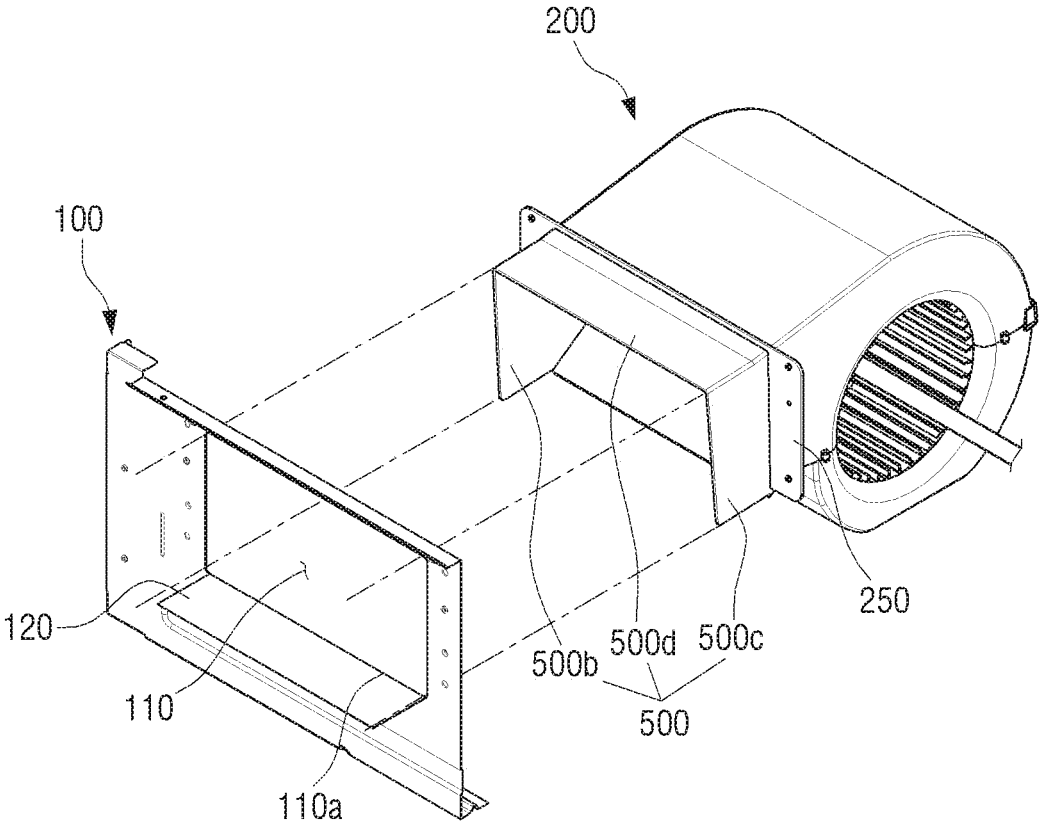


FIG. 9

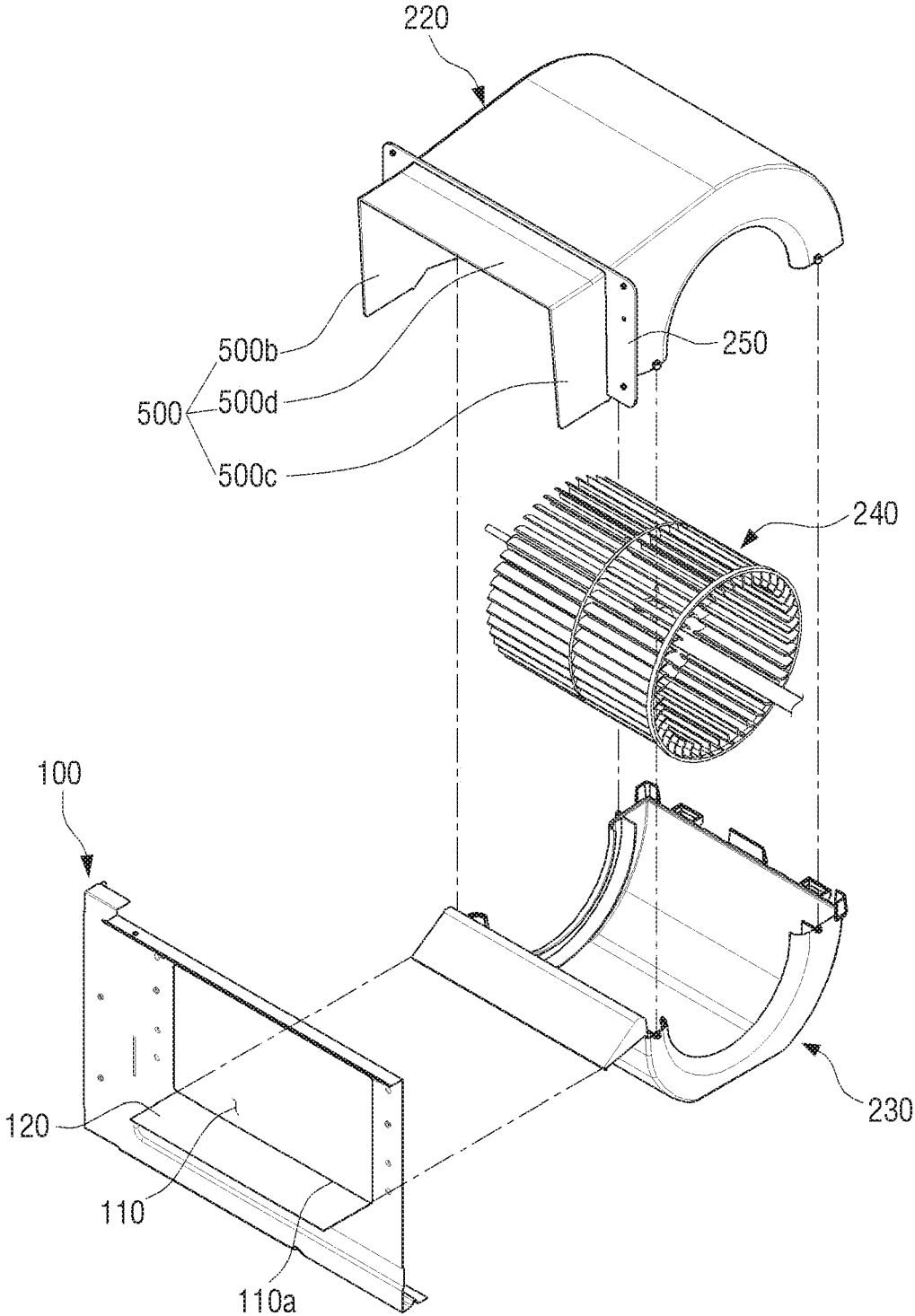


FIG. 10

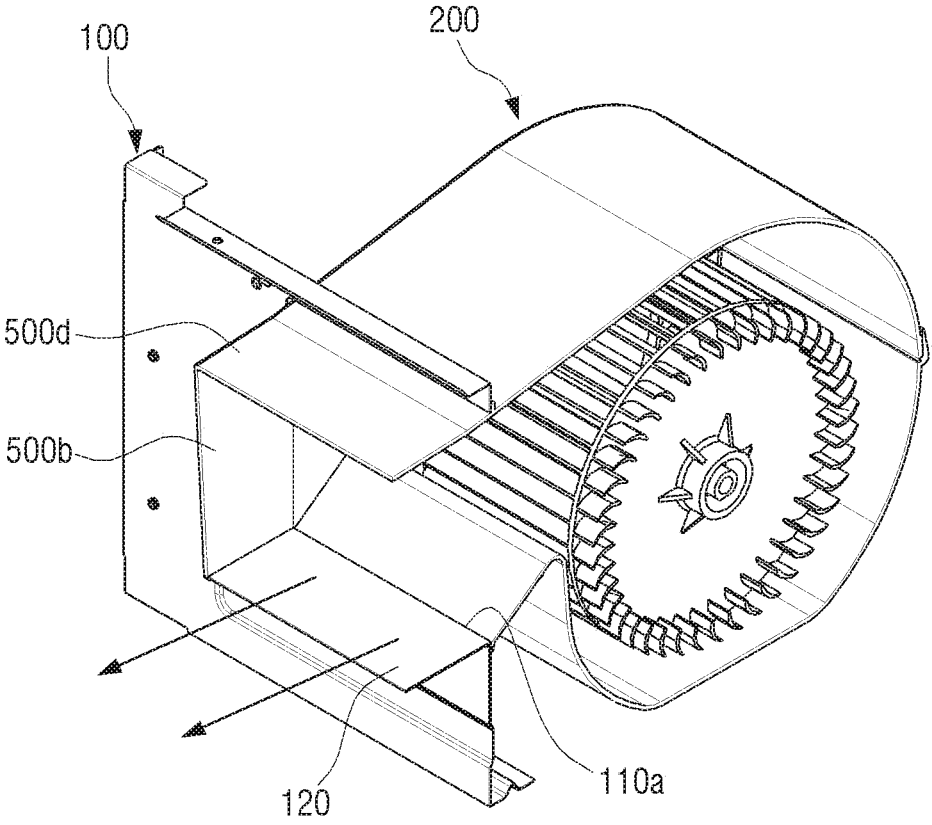


FIG. 11

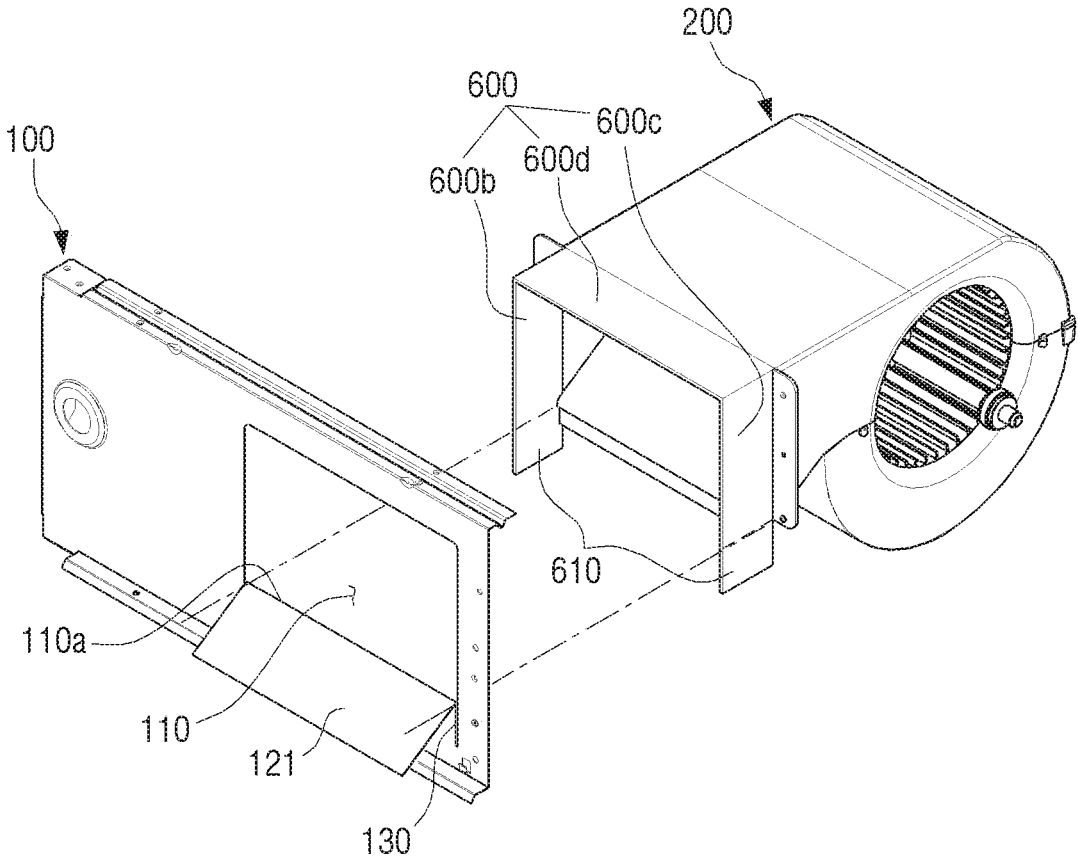


FIG. 12

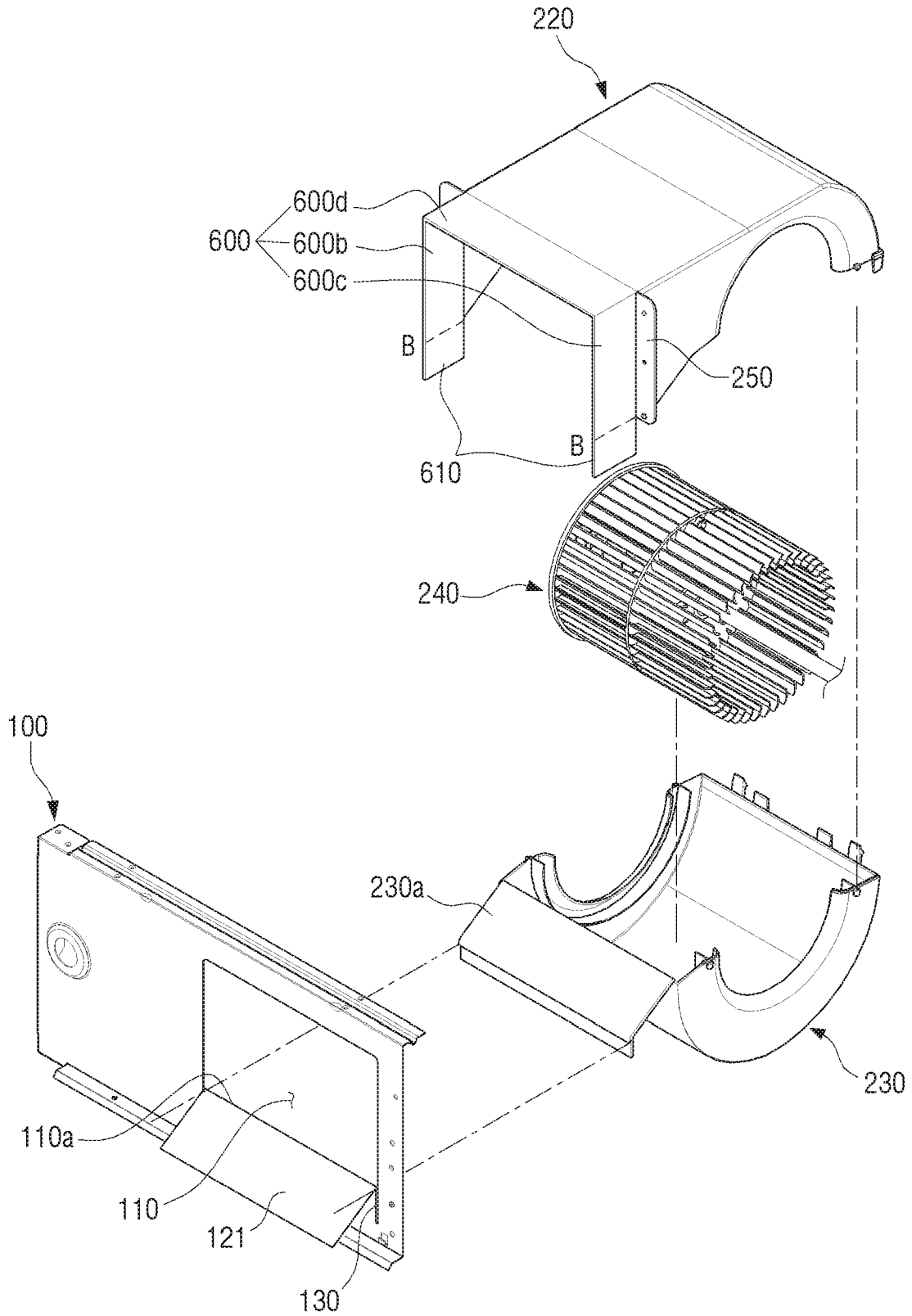


FIG. 13

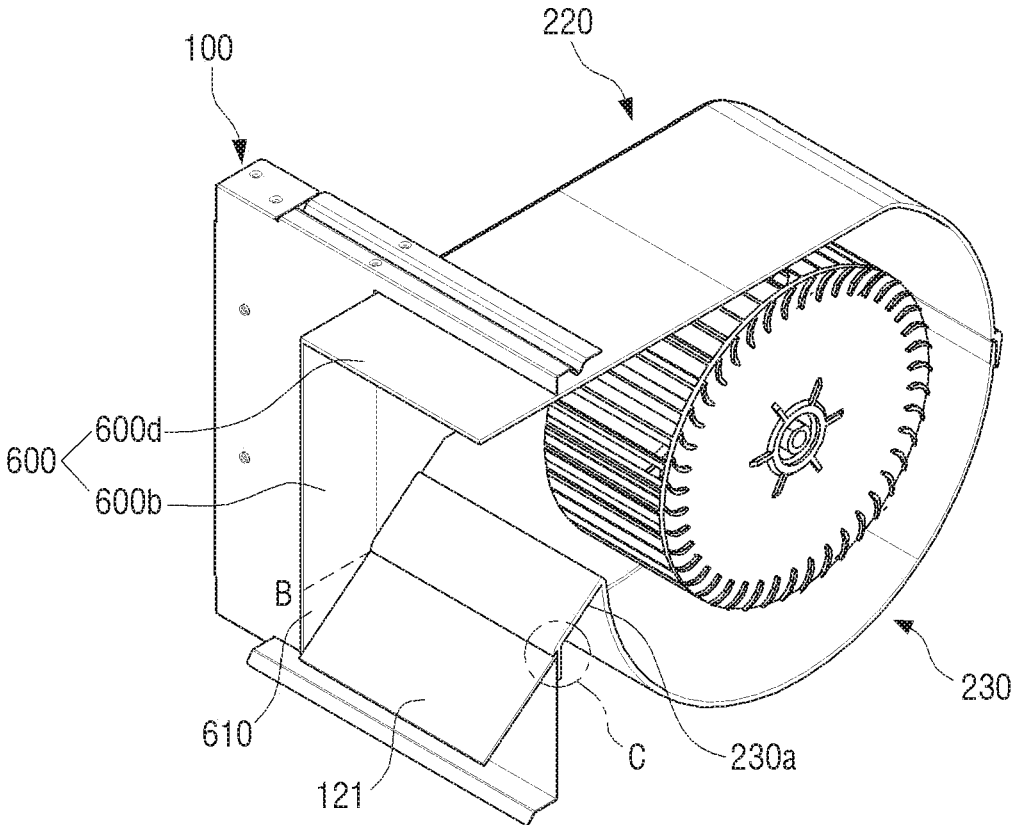
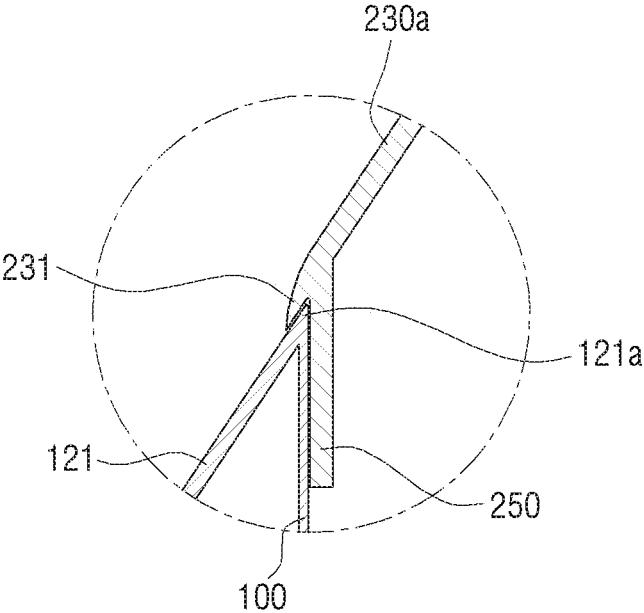


FIG. 14



AIR CONDITIONER

TECHNICAL FIELD

[0001] The disclosure relates to an air conditioner.

BACKGROUND ART

[0002] An air conditioner is a device providing air suitable for a user's convenience by controlling outside air. Accordingly, the air conditioner may include a heat exchanger controlling a temperature of the air and a blower unit introducing the outside air into the air conditioner. The air introduced into the air conditioner by the blower unit may have a changed temperature as the air passes through the heat exchanger.

DISCLOSURE

Technical Problem

[0003] Here, a partition may be disposed between the blower unit and the heat exchanger to prevent air having the changed temperature from returning to the blower unit again. The partition may require a separate guide component to guide air moved from the blower unit to the heat exchanger. However, the guide component disposed in the partition may require a separate production process, and may be restricted to be disposed in a position where the guide component communicates with the blower unit. Accordingly, separate time and cost may be required to fixedly dispose the guide component in the position where the guide component communicates with the blower unit.

Technical Solution

[0004] The disclosure provides an air conditioner including a duct capable of guiding air moved from a blower unit to a heat exchanger in a simple configuration.

[0005] According to an embodiment of the disclosure, an air conditioner may include: a housing having an inflow port and a discharge port; a partition disposed inside the housing to divide the inside of the housing into a first space near the inflow port and a second space near the discharge port, and having at least one opening for allowing the first space and the second space to communicate with each other; at least one blower unit disposed in the first space, and including a duct passing through the opening to protrude toward the second space and discharging air of the first space to the second space; and a heat exchanger disposed in the second space.

[0006] The blower unit may include an upper case, a lower case coupled to the upper case and a blower fan, and the duct may be coupled to at least one of the upper case or the lower case.

[0007] The duct may include an upper surface coupled to the upper case and both side surfaces extending downward from both ends of the upper surface.

[0008] The duct may include a lower surface which is coupled to the lower case and in contact with lower ends of the both side surfaces.

[0009] The partition may include an extension portion formed to be bent at a lower end of the opening toward the second space.

[0010] The extension portion may be in contact with the lower ends of the both side surfaces of the duct.

[0011] The extension portion may be inclined downward toward the second space.

[0012] The both side surfaces of the duct may include protrude portions extending downward to be in contact with both ends of the extension portion, respectively.

[0013] The partition may include an insertion groove into which the protrude portion is inserted.

[0014] The lower case may include a connection portion connected to the extension portion.

[0015] The connection portion may be inclined downward toward the extension portion.

[0016] The connection portion may include: a support protrusion in contact with an upper end of the extension portion; and a coupling extension portion disposed downward from the support protrusion to be in contact with the partition.

[0017] The upper case or the lower case may include a coupling extension portion disposed on each of both sides of the duct to be in contact with the partition.

DESCRIPTION OF DRAWINGS

[0018] FIG. 1 is a perspective view showing an air conditioner according to an embodiment of the disclosure;

[0019] FIG. 2 is an exploded perspective view showing the air conditioner having a cover separated therefrom;

[0020] FIG. 3 is a perspective view showing a coupling between a housing and a partition without a blower unit and a heat exchanger;

[0021] FIG. 4 is an exploded perspective view showing the air conditioner;

[0022] FIG. 5 is an exploded perspective view showing the blower unit and the partition;

[0023] FIG. 6 is a cross-sectional view taken along line A-A of FIG. 1;

[0024] FIG. 7 is an exploded perspective view showing one blower unit and a portion of the partition according to an embodiment of the disclosure;

[0025] FIG. 8 is an exploded perspective view showing a blower unit and a partition according to another embodiment of the disclosure;

[0026] FIG. 9 is an exploded perspective view showing the blower unit and the partition according to another embodiment of the disclosure in a state in which upper and lower cases of the blower unit are separated from each other;

[0027] FIG. 10 is a cross-sectional view of the blower unit and the partition according to another embodiment of the disclosure;

[0028] FIG. 11 is an exploded perspective view showing a blower unit and a partition according to still another embodiment of the disclosure;

[0029] FIG. 12 is an exploded perspective view showing the blower unit and the partition according to still another embodiment of the disclosure in a state in which upper and lower cases of the blower unit are separated from each other;

[0030] FIG. 13 is a cross-sectional view showing the blower unit and the partition according to still another embodiment of the disclosure; and

[0031] FIG. 14 is an enlarged cross-sectional view of portion C in FIG. 13.

BEST MODE

[0032] To sufficiently understood configurations and effects of the disclosure, embodiments of the disclosure are

described with reference to the accompanying drawings. However, the disclosure is not limited to embodiments described below, but may be implemented in several forms and may be variously modified. A description for these embodiments is provided only to make the disclosure complete and allow those skilled in the art to which the disclosure pertains to completely recognize the scope of the disclosure. In the accompanying drawings, sizes of components may be enlarged as compared with actual sizes for convenience of explanation, and ratios of the respective components may be exaggerated or reduced.

[0033] Terms such as 'first', 'second' and the like, may be used to describe various components, but the components are not to be interpreted to be limited to the terms. These terms may be used to differentiate one component from other components. For example, a 'first' component may be named a 'second' component and the 'second' component may also be similarly named the 'first' component, without departing from the scope of the disclosure.

[0034] Terms used in embodiments of the disclosure may be interpreted as the same meanings as meanings that are generally known to those skilled in the art unless defined otherwise.

[0035] Hereinafter, structure and operation of the air conditioner according to an embodiment of the disclosure are described in sequence with reference to the drawings.

[0036] FIG. 1 is a perspective view showing an air conditioner 1 according to an embodiment of the disclosure; FIG. 2 is an exploded perspective view showing the air conditioner 1 having a cover 11 separated therefrom; FIG. 3 is a perspective view showing a coupling between a housing 10 and a partition 100 without a blower unit 200 and a heat exchanger 300; FIG. 4 is an exploded perspective view showing the air conditioner; and FIG. 5 is an exploded perspective view showing the blower unit and the partition.

[0037] Referring to FIGS. 1 and 2, the air conditioner 1 may include the housing 10 accommodating the partition 100, the blower unit 200 and the heat exchanger 300.

[0038] The housing 10 may have a rectangular parallel-piped shape. However, the housing 10 is not limited to this shape, and may have any shape as long as accommodating the partition 100, the blower unit 200 and the heat exchanger 300.

[0039] Referring to FIG. 1, a coupling member 14 may be provided outside the housing 10. The coupling member 14 may serve to fix the housing 10 of the air conditioner 1 to an external support (not shown), and may fix the housing 10 at a fixed position by various types of coupling such as screw coupling and snap coupling.

[0040] Referring to FIG. 2, the housing 10 may include one or more covers 11. The covers 11 may be disposed on each side except an inflow port 12 (see FIG. 3) and a discharge port 13 (see FIG. 3), and may divide an inside of the housing 10 from the outside.

[0041] The inflow port 12, through which air is introduced from the outside, may be formed on one surface of the housing 10. The discharge port 13, through which air having a changed temperature by the heat exchanger 300 is discharged, may be formed on the other surface of the housing 10 opposite to the inflow port 12. However, the discharge port 13 may be formed not only on the other surface of the housing 10 opposite to the inflow port 12 but also on various positions of the housing 10 as long as the air introduced

through the inflow port 12 can be discharged from the air conditioner 1 through the discharge port 13.

[0042] Referring to FIG. 3, the partition 100 may be disposed inside the housing 10 to divide the inside of the housing 10 into a first space S1 near the inflow port 12 and a second space S2 near the discharge port 13.

[0043] The first space S1 and the second space S2 in the housing 10, which are divided by the partition 100, may communicate with each other by an opening 110 of the partition 100. That is, the air may be moved from the first space S1 to the second space S2 only through the opening 110 of the partition 100, and cannot be moved to the remaining portions of the partition 100 except the opening 110 of the partition 100.

[0044] The partition 100 may be screw coupled to the inside of the housing 10. However, as long as the partition 100 can be stably fixed to housing 10, the fixing method may be used in various ways such as snap coupling.

[0045] The opening 110 may be formed in a shape corresponding to a duct 400 (see FIG. 6) of the blower unit 200 described below. Accordingly, the duct 400 may be inserted into the opening 110 to pass through the opening 110.

[0046] The number of the opening 110 may be equal to that of the blower unit 200. Therefore, in case that each duct 400 of the blower unit 200 is coupled to each opening 110, air of the second space S2 may be the air that moved from the first space S1 through the duct 400.

[0047] Referring to FIG. 4, the blower unit 200 may be disposed in the first space S1 of the housing 10, and the heat exchanger 300 may be disposed in the second space S2 of the housing 10. Accordingly, the air introduced by the blower unit 200 may be moved to the heat exchanger 300.

[0048] The blower unit 200 may introduce air outside the housing 10 into the housing 10, and discharge the introduced air to the second space S2 through the duct 400, thereby allowing the air introduced to the second space S2 to be discharged through the heat exchanger 300 to the discharge port 13 of the housing 10.

[0049] The blower unit 200 may include an upper case 220 (see FIG. 7), a lower case 230 (see FIG. 7) coupled to the upper case 220 and a blower fan 240 (see FIG. 7). FIG. 7 shows the blower fan 240 as a centrifugal fan, however, the blower fan 240 may be configured as various known fans such as a side flow fan and a cross flow fan, as necessary.

[0050] A plurality of blower units 200 may be used as necessary, and three blower units 200 may be disposed according to an embodiment of the disclosure. Here, all the blower units 200 may be connected to each other by a single shaft 211 (see FIG. 5). The single shaft 211 may be connected to a motor 210 (see FIG. 5) for driving the plurality of blower units 200.

[0051] The heat exchanger 300 may be disposed in the second space S2 inside the housing 10. The heat exchanger 300 may be configured to have a plurality of tubes, and a high temperature material or a low temperature material may flow through the plurality of tubes of the heat exchanger 300. In case that the high temperature material flows through the tubes of the heat exchanger 300, air passing through the heat exchanger 300 may be increased in temperature through heat exchange; and in case that the low temperature material flows through the tube of the heat exchanger 300, the air passing through the heat exchanger 300 may be dropped in temperature through the heat exchange. Accordingly, the air

conditioner **1** may adjust a temperature of the outside air based on a user's need in various ways.

[0052] Referring to FIG. 5, the blower unit **200** may include the duct **400** passing through the opening **110** to protrude toward the second space **S2** and discharge air of the first space **S1** into the second space **S2**. Accordingly, the duct **400** may guide the air moved to the second space **S2** by the blower unit **200** to the heat exchanger **300** disposed in front of the blower unit **200**.

[0053] The duct **400** may be produced as a separate member and coupled to the blower unit **200**. In detail, the duct **400** may be coupled to at least one of the upper case **220** or the lower case **230**. Alternatively, the duct **400** may be integrally formed with the upper case **220** or the lower case **230**. In this case, there is no need for processes of producing the duct **400** and combining the duct **400** to the blower unit **200**, and production cost and time may thus be reduced by reducing the number of components and the number of fastenings.

[0054] A cross section of the duct **400** parallel to the partition **100** may have a shape corresponding to that of the opening **110**. Accordingly, the duct **400** may pass through and be inserted into the opening **110** to be fixed to and supported by the opening **110**. By inserting and fixing the duct **400** to the opening **110**, the blower unit **200** connected to the duct **400** may be fixed and the air moved by the blower unit **200** may also be guided to the heat exchanger **300**.

[0055] The upper case **220** or lower case **230** of the blower unit **200** may include a coupling extension portion **250** disposed on each of both sides of the duct **400** to be in contact with the partition **100**.

[0056] The coupling extension portion **250** may serve to stably fix the upper case **220** or the lower case **230** to the partition **100**, and the coupling extension portion **250** may be in contact with and screw coupled to the partition **100**. Therefore, for convenient coupling between the partition **100** and the coupling extension portion **250**, the coupling extension portion **250** may be formed in parallel to the partition **100**. However, the coupling between the partition **100** and the coupling extension portion **250** is not limited thereto, and may be implemented in various ways such as snap coupling, as necessary.

[0057] Hereinafter, an operation of the air conditioner **1** is described with reference to FIG. 6. FIG. 6 is a cross-sectional view taken along line A-A of FIG. 1.

[0058] The outside air may be introduced by the blower unit **200** through the inflow port **12** of the housing **10**. The introduced air may be introduced to a side of the blower unit **200** and moved to the heat exchanger **300** of the second space **S2** through the duct **400**.

[0059] The air moved to the second space **S2** may have the changed temperature through heat exchange with the heat exchanger **300** while passing through the heat exchanger **300**. The air having the changed temperature may be discharged to the outside through the discharge port **13** of the housing **10**.

[0060] FIG. 7 is an exploded perspective view showing one blower unit **200** and a portion of the partition **100** according to an embodiment of the disclosure. For convenience of description, shown are one blower unit **200** and only a portion of the partition **100** coupled with the one blower unit **200**.

[0061] The upper case **220** and the lower case **230** of the blower unit **200** may be coupled to each other to form an

appearance of the blower unit **200**. The upper case **220** may have an upper surface **400d** and both side surfaces **400b** and **400c** of the duct **400**, and the lower case **230** may have a lower surface **400a** of the duct **400**. That is, the duct **400** may include the upper surface **400d** coupled to the upper case **220** and the both side surfaces **400b** and **400c** extending downward from both ends of the upper surface **400d**; and the duct **400** may include a lower surface **400a** which is coupled to the lower case **230** and in contact with lower ends of the both side surfaces **400b** and **400c**.

[0062] By coupling the upper case **220** with the lower case **230**, the duct **400** may have a shape of a substantially rectangular parallelepiped corresponding to the opening **110** of the partition **100**.

[0063] However, the duct **400** is not limited to the shape according to the above embodiment. The duct **400** may be formed by coupling a portion of the duct **400** to each of the upper case **220** and the lower case **230** as necessary and then coupling the upper case **220** and the lower case **230**.

[0064] In detail, the upper case **220** may form one surface of the duct **400** and the lower case **230** may form the other surfaces of the duct **400**. If necessary, the upper case **220** and the lower case **230** may include various surfaces forming the duct **400**, respectively. For example, the upper case **220** may form two surfaces of the duct **400** having a shape of a two-surface rectangular parallelepiped without two opposite surfaces, and the lower case **230** may form the remaining two surfaces of the duct **400**.

[0065] FIG. 8 is an exploded perspective view showing a blower unit and a partition according to another embodiment of the disclosure; FIG. 9 is an exploded perspective view showing the blower unit and the partition according to another embodiment of the disclosure in a state in which upper and lower cases of the blower unit are separated from each other; and FIG. 10 is a cross-sectional view of the blower unit and the partition according to another embodiment of the disclosure.

[0066] The same reference numeral is used for the same component, which is not described in detail. The same component denoted by the same reference numeral, which is not described, has the same configuration as described above.

[0067] In addition, for convenience of description, shown are one blower unit **200** and only a portion of the partition **100** coupled with the one blower unit **200**.

[0068] The partition **100** may include an extension portion **120** formed to be bent at a lower end **110a** of the opening **110** toward the second space **S2**. The extension portion **120** may be in contact with both side surfaces **500b** and **500c** of a duct **500**. Accordingly, the duct **500** and the extension portion **120** in contact with the duct **500** may guide air moved by the blower unit **200** to the heat exchanger **300**.

[0069] The extension portion **120** may be formed to be bent at a portion of the partition **100**. Accordingly, there is no need for a separate production of the extension portion **120**, and the production cost may thus be reduced by reducing the number of components and the number of fastening of each component.

[0070] In addition, the extension portion **120** may be in contact with the both side surfaces **500b** and **500c** of the duct **500** to guide the air moved by the blower unit **200** to the heat exchanger **300**. Accordingly, the air moved by the blower unit **200** may be moved toward the heat exchanger **300** without leaking below the duct **500**.

[0071] The extension portion 120 may be formed to extend from one end of the opening 110. In detail, in case that the opening 110 has a rectangular shape, the extension portion 120 may be formed to be bent at at least one surface of the partition 100. Therefore, in case that the extension portion 120 forms at least one surface of a flow path, the duct 500 of the blower unit 200 may form the remaining surfaces 500b, 500c and 500d of the flow path.

[0072] The duct 500 configured of the upper surface 500d and the both side surfaces 500b and 500c described above may be coupled to the upper case 220, and the duct 500 and the upper case 220 may be integrally formed with each other as shown in FIG. 9.

[0073] Air discharged from the blower unit 200 toward the second space S2 may be easily moved to the second space S2 along the flow path formed by the upper surface 500d and the both side surfaces 500b and 500c of the duct 500 and the extension portion 120 of the partition 100.

[0074] The upper case 220 and the duct 500 may be coupled to each other or integrally formed with each other, and the blower unit 200 connected to the partition 100 may thus be stably fixed to and supported by the partition 100. Therefore, even in case that there is no separate fixing member, the blower unit 200 may maintain a state of being connected to the partition 100.

[0075] FIG. 11 is an exploded perspective view showing a blower unit and a partition according to still another embodiment of the disclosure; FIG. 12 is an exploded perspective view showing the blower unit and the partition according to still another embodiment of the disclosure in a state in which upper and lower cases of the blower unit are separated from each other; and FIG. 13 is a cross-sectional view showing the blower unit and the partition according to still another embodiment of the disclosure.

[0076] The same reference numeral is used for the same component, which is not described in detail. The same component denoted by the same reference numeral, which is not described, has the same configuration as described above.

[0077] In addition, for convenience of description, shown are one blower unit 200 and only a portion of the partition 100 coupled with the one blower unit 200.

[0078] A duct 600 may include an upper surface 600d coupled to the upper case 220 and both side surfaces 600b and 600c extending downward from both ends of the upper surface 600d. However, if necessary, the duct 600 may be integrally formed with the upper case 220.

[0079] The duct 600 may include protrude portions 610 extending downward from lower ends (dotted lines B in FIG. 12) of the both side surfaces 600b and 600c of the duct 600. The protrude portions 610 may be in contact with both ends 121a and 121b of an extension portion 121 described below, respectively.

[0080] The partition 100 may include an insertion groove 130 into which the protrude portion 610 is inserted. The insertion groove 130 may be formed to extend from one corner of the opening 110 by a predetermined length. Accordingly, the protrude portion 610 may be inserted into the insertion groove 130 and fixed to the partition 100.

[0081] The partition 100 may include the extension portion 121 formed to be bent from the lower end 110a of the opening 110 toward the second space S2. The extension portion 121 may be inclined downward toward the second space S2. Accordingly, as the extension portion 121 in

contact with the protrude portion 610 of the duct 600 and the duct 600 are closer to the heat exchanger 300, a shape formed by the contact between the extension portion 121 and the duct 600 may have a wider cross-sectional area. Therefore, air moved by the blower unit 200 may become slower as the air is moved closer to the heat exchanger 300, and the slower-speed air may undergo sufficient heat exchange time in the heat exchanger 300. Therefore, it is possible to increase heat exchange efficiency of the air in the heat exchanger 300.

[0082] The lower case 230 may include a connection portion 230a connected to the extension portion 121. The connection portion 230a may be inclined downward toward the extension portion 121. Accordingly, as being closer to the heat exchanger 300, a shape formed by coupling the upper case 220 with the lower case 230 may have a wider cross-sectional area. Therefore, the air moved by the blower unit 200 may become slower as the air is moved closer to the heat exchanger 300, and the slower speed air may undergo sufficient heat exchange time in the heat exchanger 300. Therefore, it is possible to increase the heat exchange efficiency of the air in the heat exchanger 300.

[0083] The lower case 230 may not be coupled to the duct 600. Therefore, the lower case 230 may not pass through and be fixed to the partition 100. Accordingly, in case that the blower unit 200 needs to be repaired while the blower unit 200 is coupled to the partition 100, it is possible to repair an inside of the blower unit 200 by detaching only the lower case 230 of the blower unit 200. Therefore, in case that the duct 600 is coupled to only the upper case 220, the repair may be easily performed by detaching the lower case 230.

[0084] FIG. 14 is an enlarged cross-sectional view of portion C in FIG. 13.

[0085] Referring to FIG. 14, the connection portion 230a may include a support protrusion 231 in contact with the upper end 121a of the extension portion 121, and a coupling extension portion 250 disposed downward from the support protrusion 231 to be in contact with the partition 100.

[0086] The coupling extension portion 250 may be formed to extend downward from the connection portion 230a. The coupling extension portion 250 may be in contact with and screw coupled to the partition 100. Therefore, the coupling extension portion 250 may be formed in parallel to the partition 100. However, if necessary, the coupling extension portion 250 may be coupled to the partition 100 in various ways such as snap coupling.

[0087] The support protrusion 231 may be formed to extend from the lower case 230 toward the opening 110 by a predetermined length. Accordingly, in case that the blower unit 200 is coupled to the partition 100, the support protrusion 231 may naturally connect the connection portion 230a of the lower case 230 with the extension portion 121 of the partition 100. Accordingly, the air moved by the blower unit 200 may be moved to the heat exchanger 300 without eddy motion occurring by a step difference in the shapes. The support protrusion 231 may have any shape as long as supporting the lower case 230 to be held in the opening 110, and may have various shapes as necessary.

[0088] Although the embodiments of the disclosure are illustrated and described hereinabove, the disclosure is not limited to the above-mentioned specific embodiments, but may be variously modified by those skilled in the art to which the disclosure pertains without departing from the scope and spirit of the disclosure as disclosed in the accom-

panying claims. These modifications also need to be understood to fall within the scope of the disclosure.

1. An air conditioner comprising:
 - a housing having an inflow port and a discharge port;
 - a partition disposed inside the housing to divide the inside of the housing into a first space near the inflow port and a second space near the discharge port, and having at least one opening for allowing the first space and the second space to communicate with each other;
 - at least one blower unit disposed in the first space, and including a duct passing through the opening to protrude toward the second space and discharging air of the first space to the second space; and
 - a heat exchanger disposed in the second space.
2. The air conditioner as claimed in claim 1, wherein the blower unit includes an upper case, a lower case coupled to the upper case and a blower fan, and
 - the duct is coupled to at least one of the upper case or the lower case.
3. The air conditioner as claimed in claim 2, wherein the duct includes an upper surface coupled to the upper case and both side surfaces extending downward from both ends of the upper surface.
4. The air conditioner as claimed in claim 3, wherein the duct includes a lower surface which is coupled to the lower case and in contact with lower ends of the both side surfaces.
5. The air conditioner as claimed in claim 3, wherein the partition includes an extension portion formed to be bent at a lower end of the opening toward the second space.

6. The air conditioner as claimed in claim 5, wherein the extension portion is in contact with the lower ends of the both side surfaces of the duct.

7. The air conditioner as claimed in claim 6, wherein the extension portion is inclined downward toward the second space.

8. The air conditioner as claimed in claim 7, wherein the both side surfaces of the duct include protrude portions extending downward to be in contact with both ends of the extension portion, respectively.

9. The air conditioner as claimed in claim 8, wherein the partition includes an insertion groove into which the protrude portion is inserted.

10. The air conditioner as claimed in claim 8, wherein the lower case includes a connection portion connected to the extension portion.

11. The air conditioner as claimed in claim 10, wherein the connection portion is inclined downward toward the extension portion.

12. The air conditioner as claimed in claim 11, wherein the connection portion includes:

- a support protrusion in contact with an upper end of the extension portion; and
- a coupling extension portion disposed downward from the support protrusion to be in contact with the partition.

13. The air conditioner as claimed in claim 2, wherein the upper case or the lower case includes a coupling extension portion disposed on each of both sides of the duct to be in contact with the partition.

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