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(54) **AIR CONDITIONER**

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(57) **ABSTRACT**

An air conditioner may include: a first air conditioning unit disposed in a first space formed between a first ceiling and a second ceiling that is spaced downward from the ceiling inner wall and lower than the first ceiling, the first air conditioning unit configured to suction air from a second space recessed from the second ceiling toward the first ceiling; a second air conditioning unit disposed in the first space and to communicate with the first air conditioning unit and configured to discharge air introduced from the first air conditioning unit; and a guide device configured to guide the first air conditioning unit and the second air conditioning unit to move from the first space toward the second space or to move from the second space toward the first space.

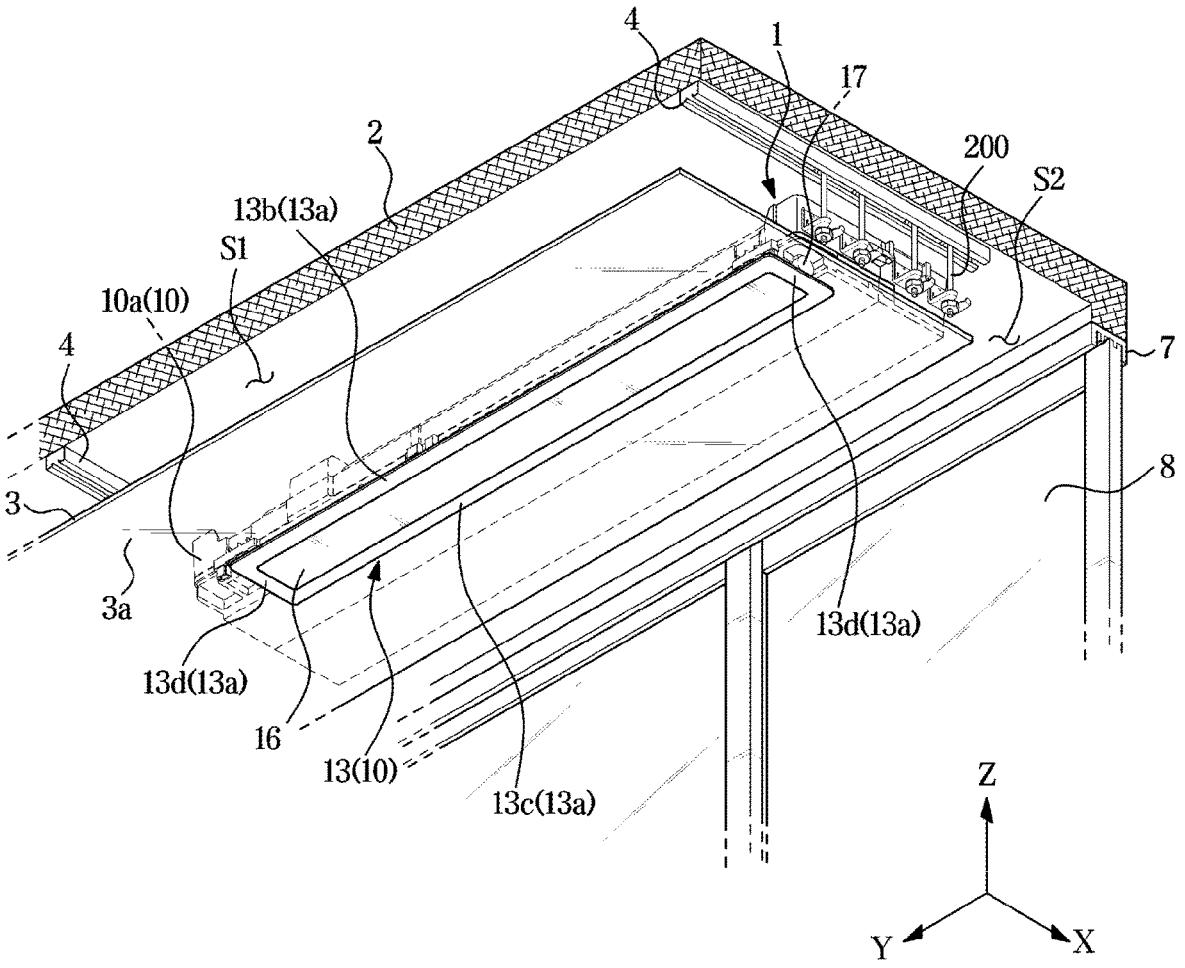
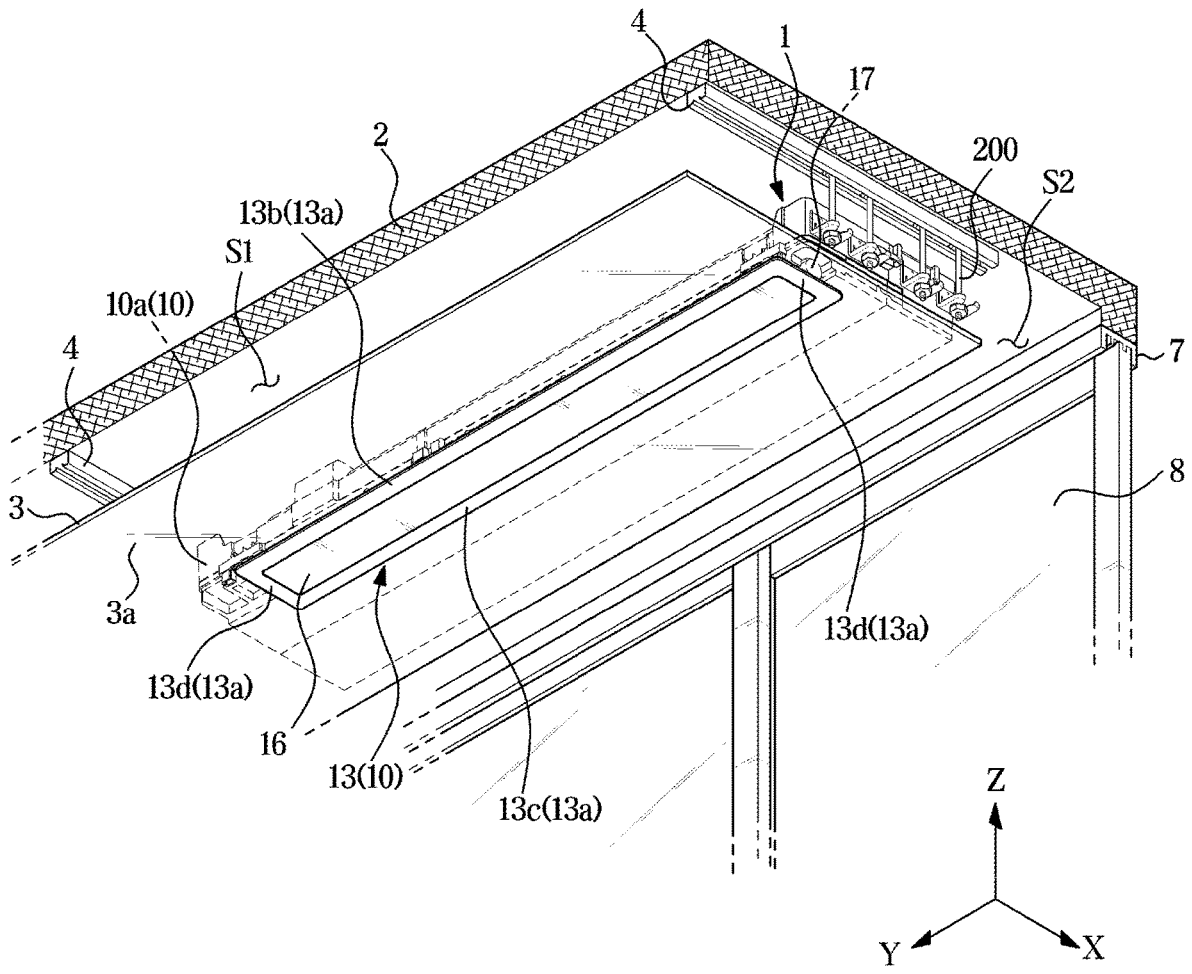


FIG. 1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17
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13b(13a)
S1
10a(10)
4
7
8
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13d(13a)
13d(13a)
16
13(10)
13c(13a)
Z
Y
X

FIG. 2

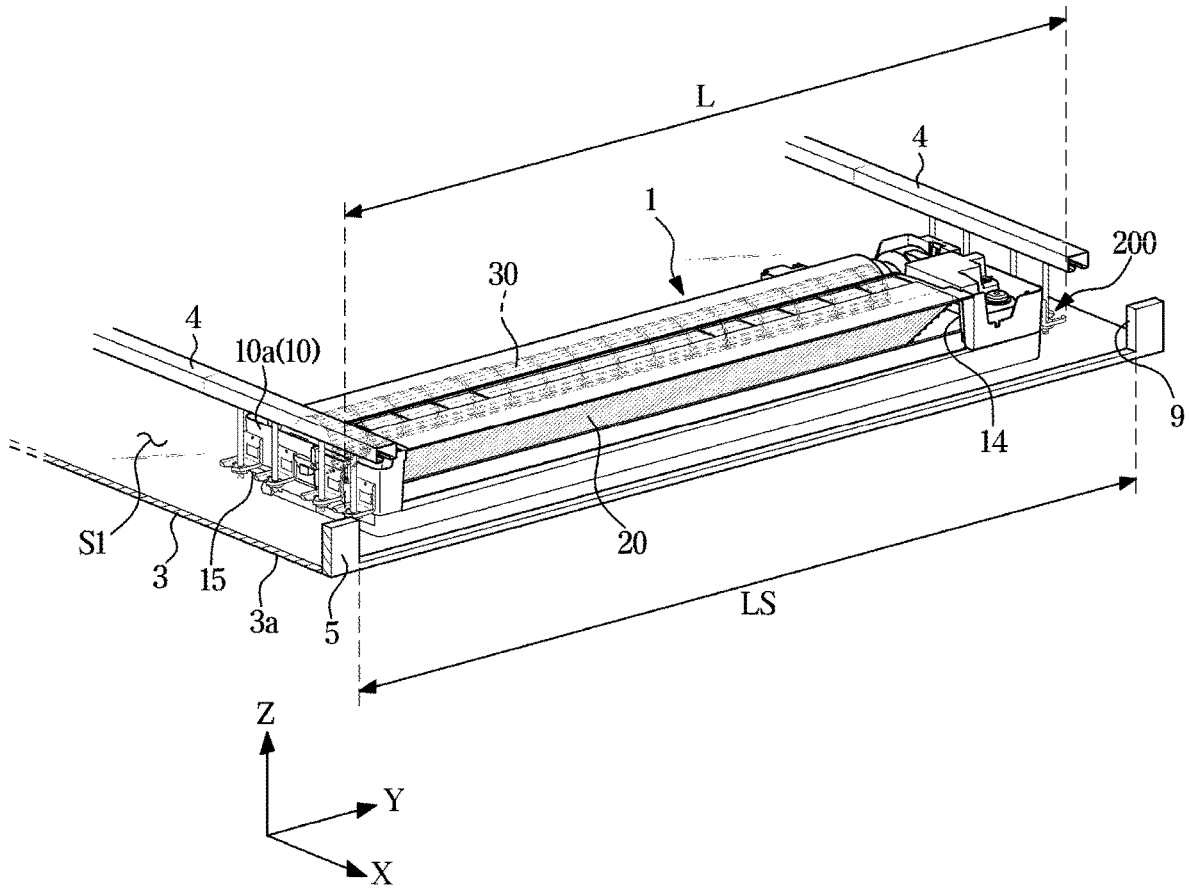


FIG. 3

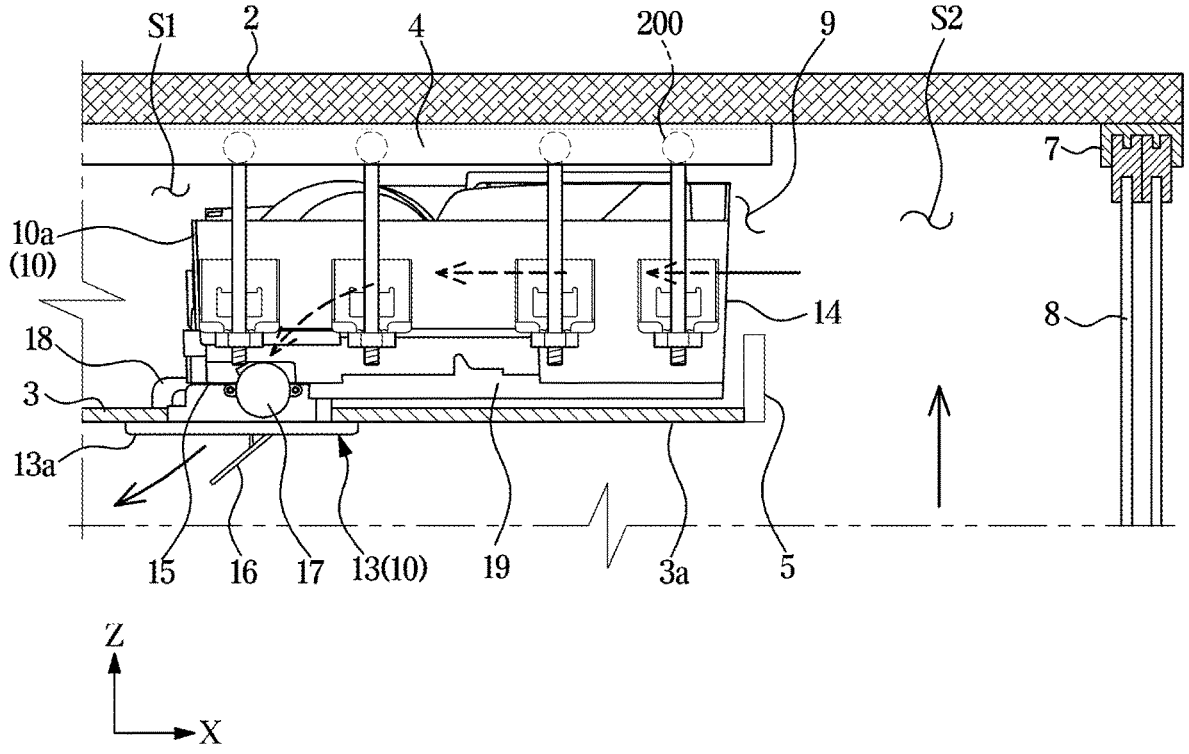


FIG. 4

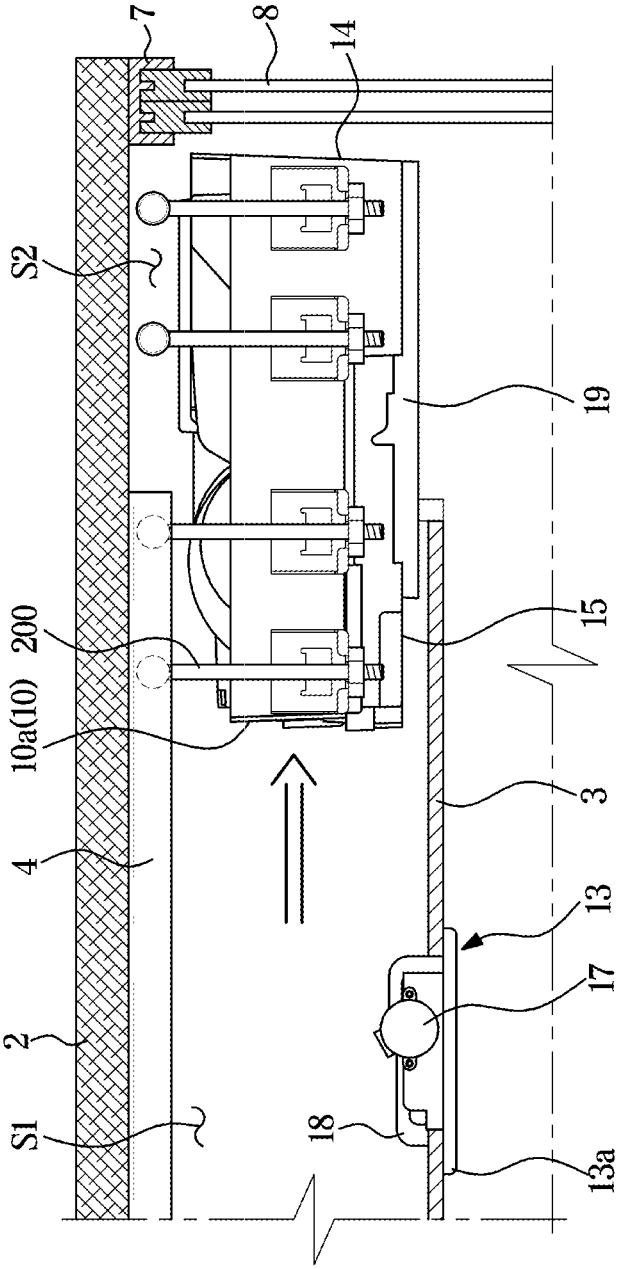
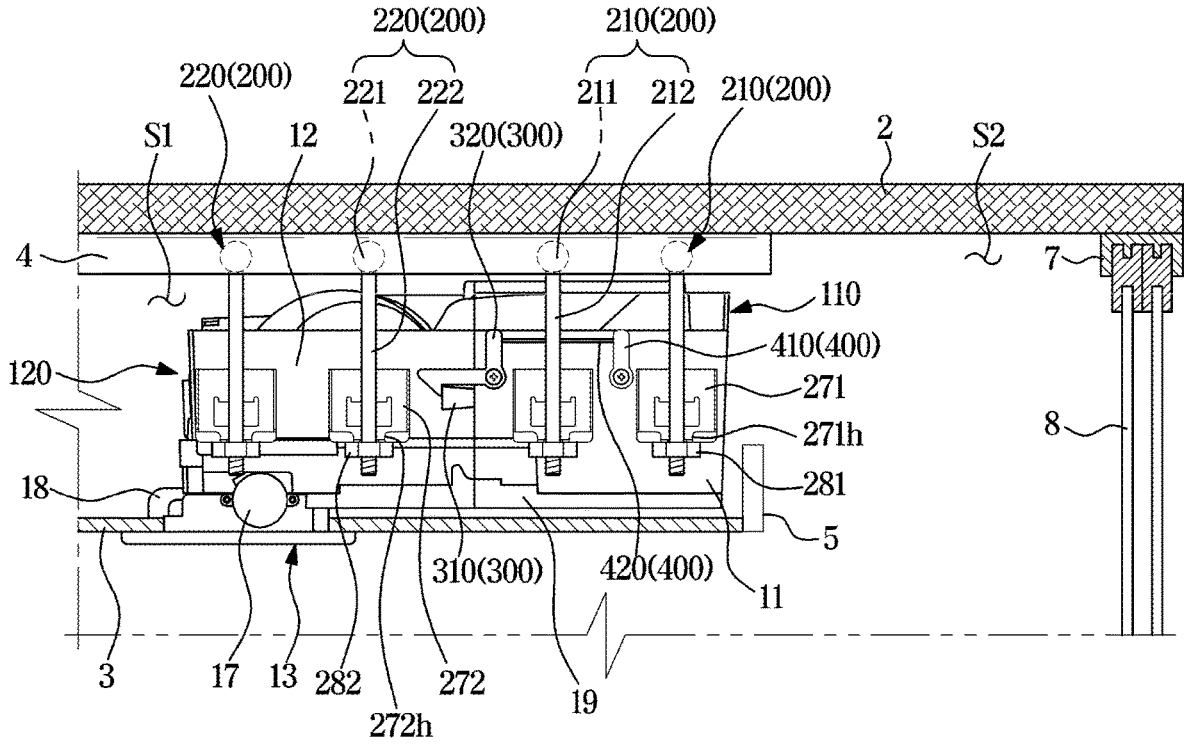


FIG. 5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320(300)
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410(400)
120
271
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19
272h

FIG. 6

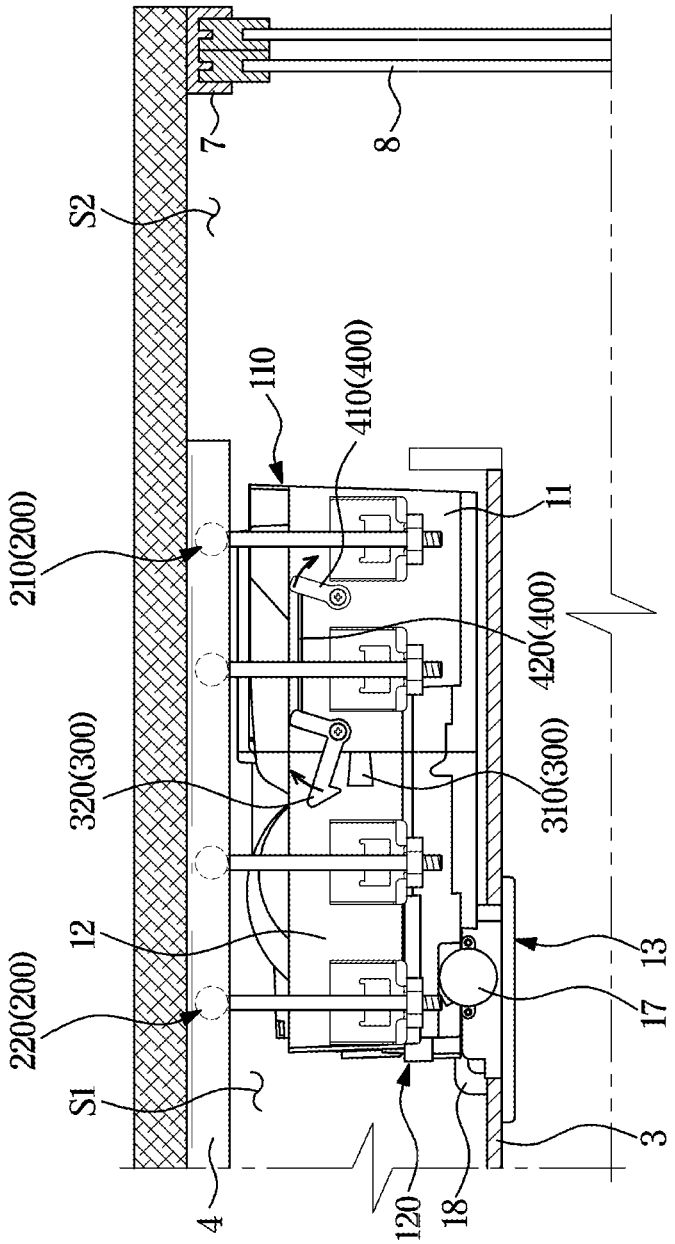
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FIG. 7

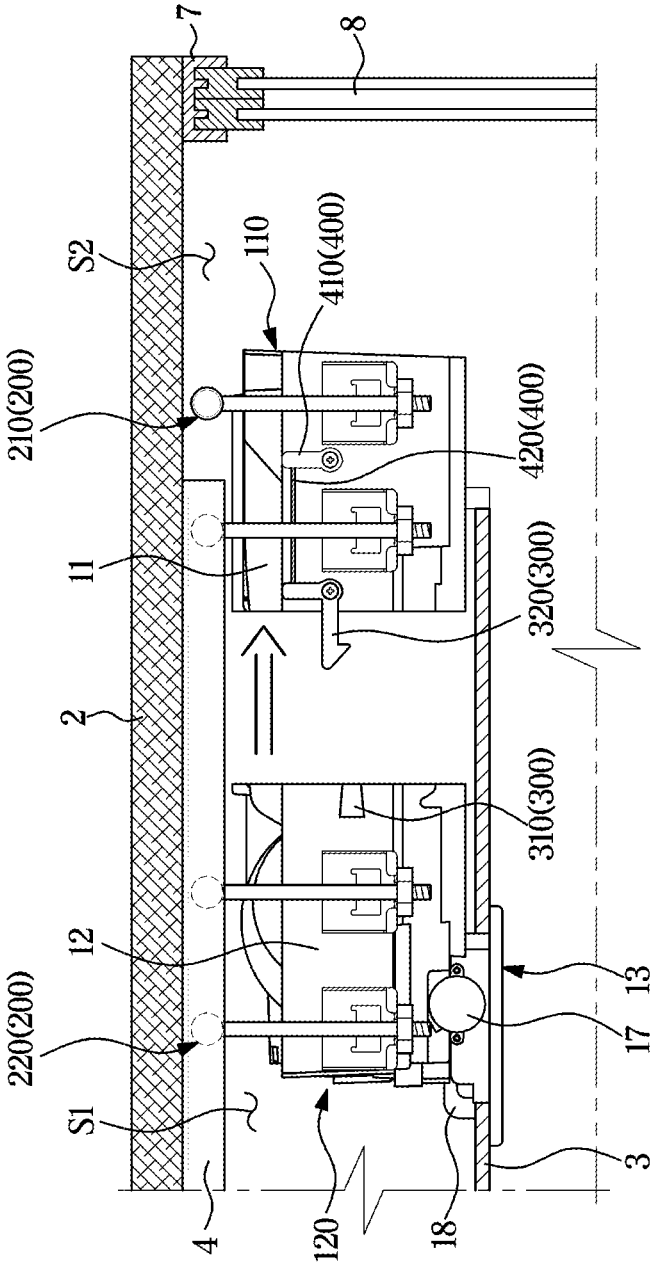
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FIG. 8

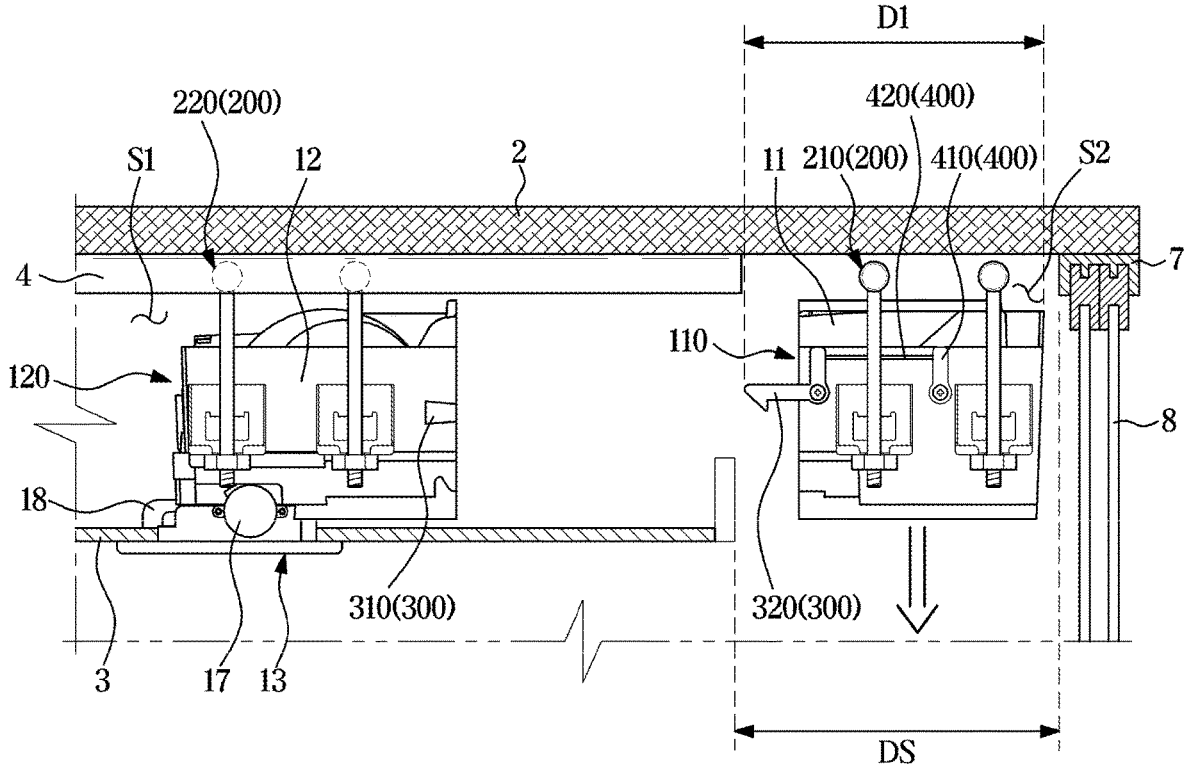
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FIG. 9

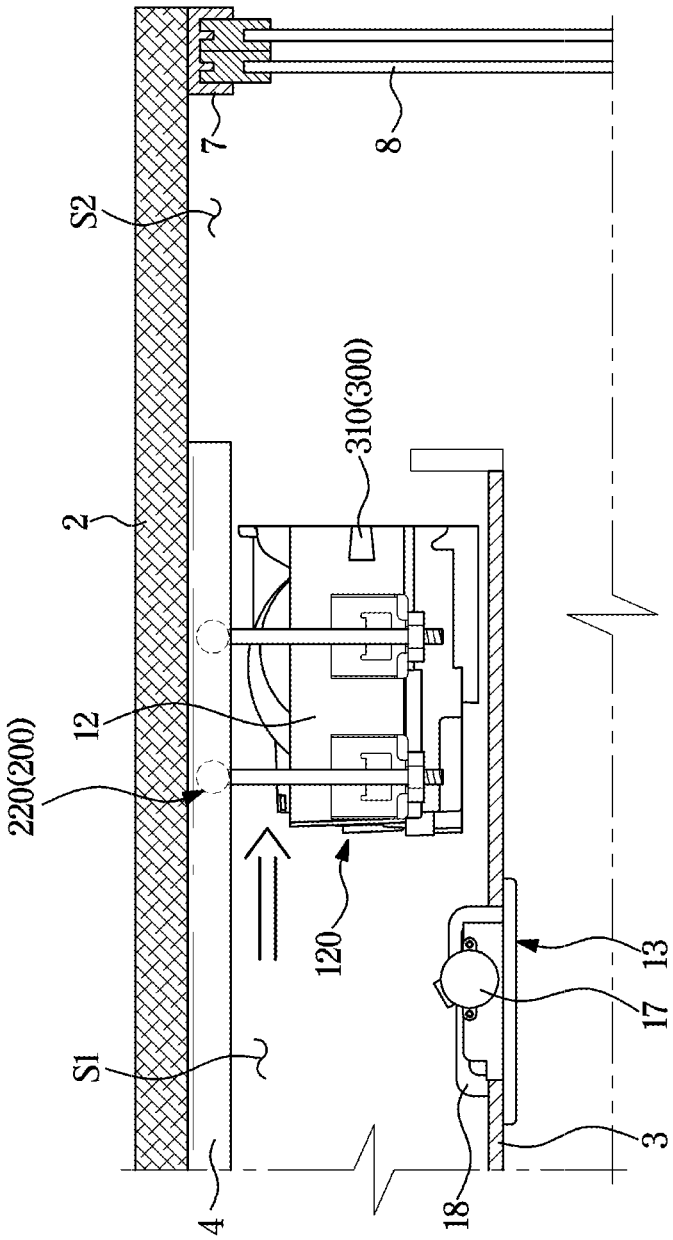


FIG. 10

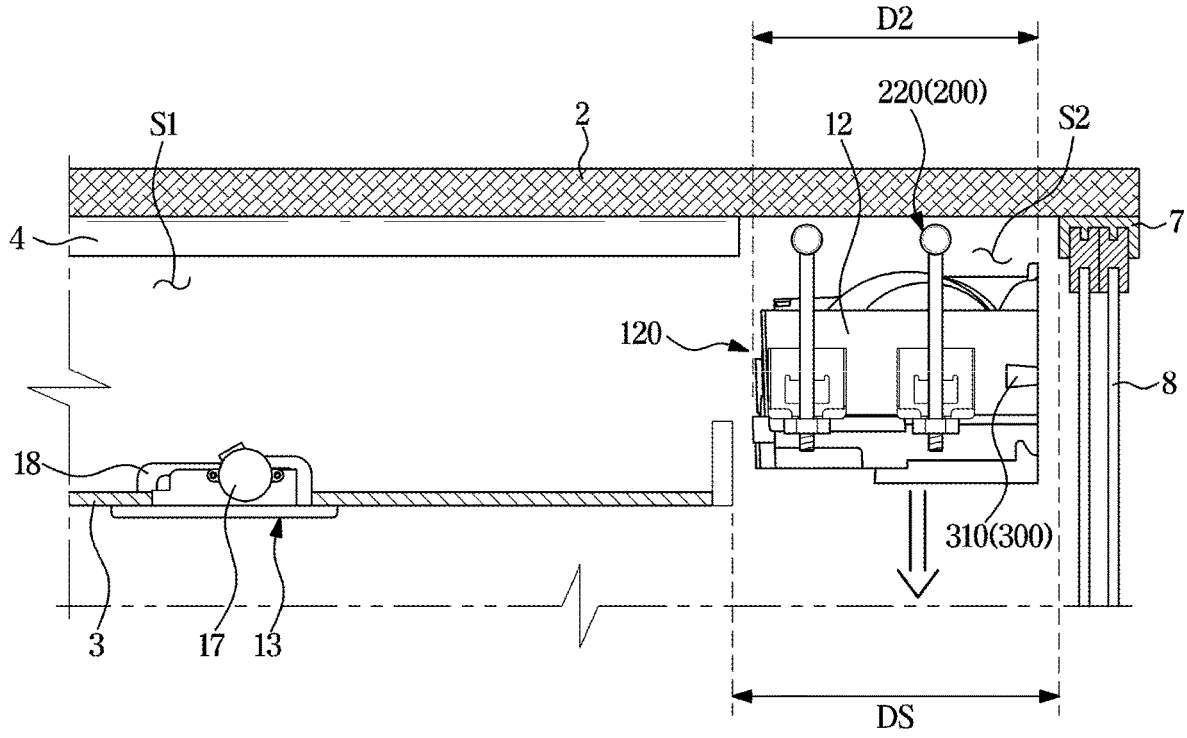
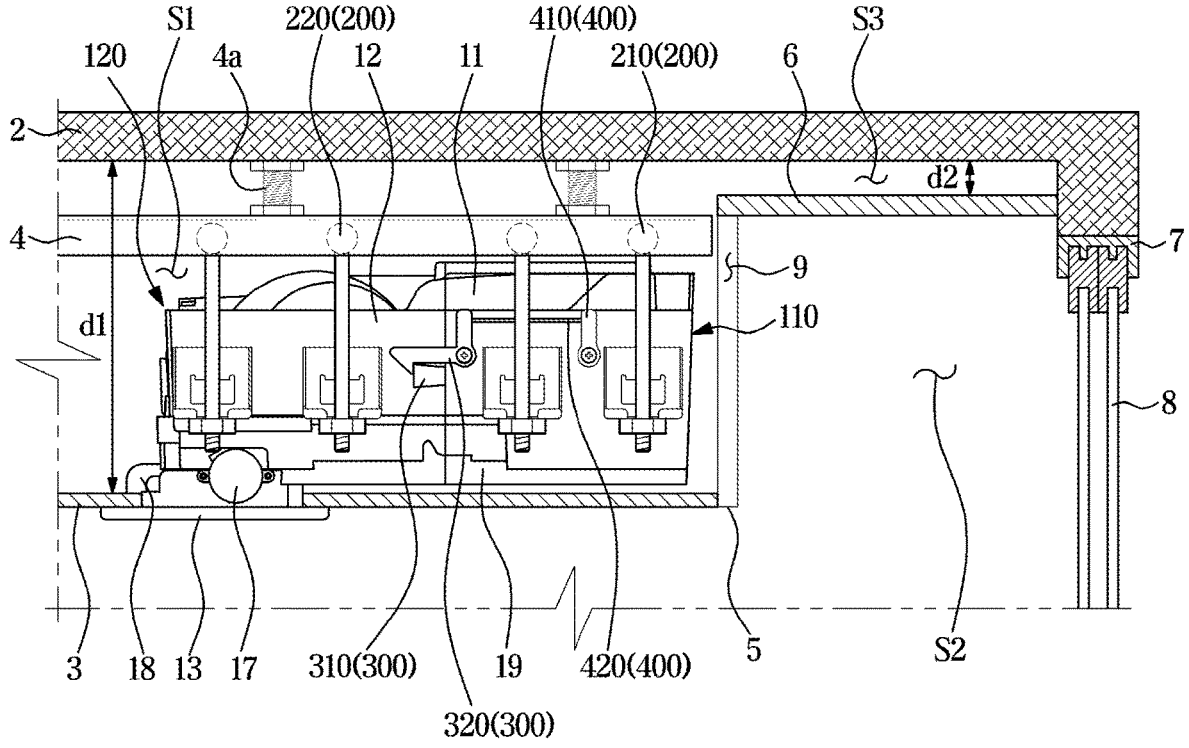


FIG. 11


S1
220(200)
410(400)
S3
120
4a
12
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d2
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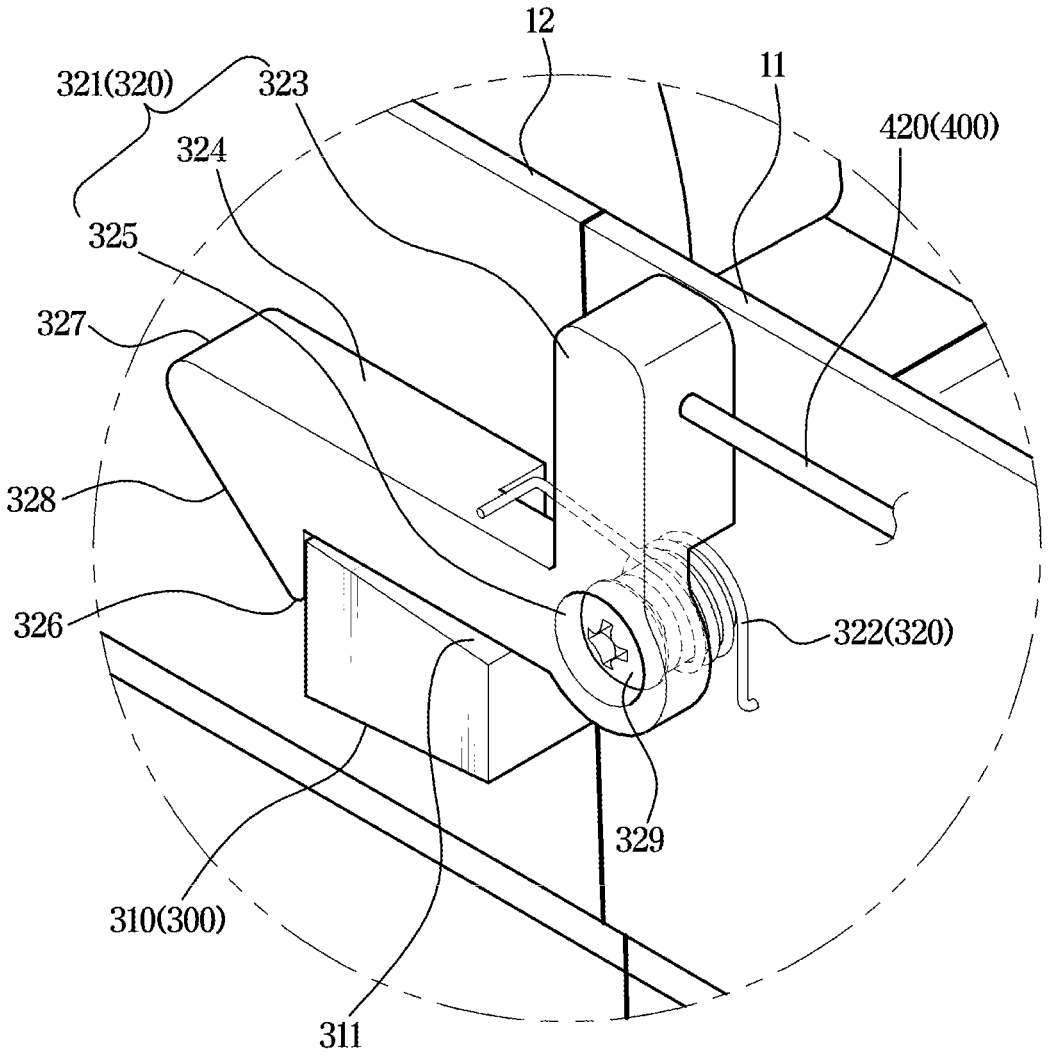
320(300)

FIG. 12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420(400)
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322(320)
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310(300)
311

FIG. 13

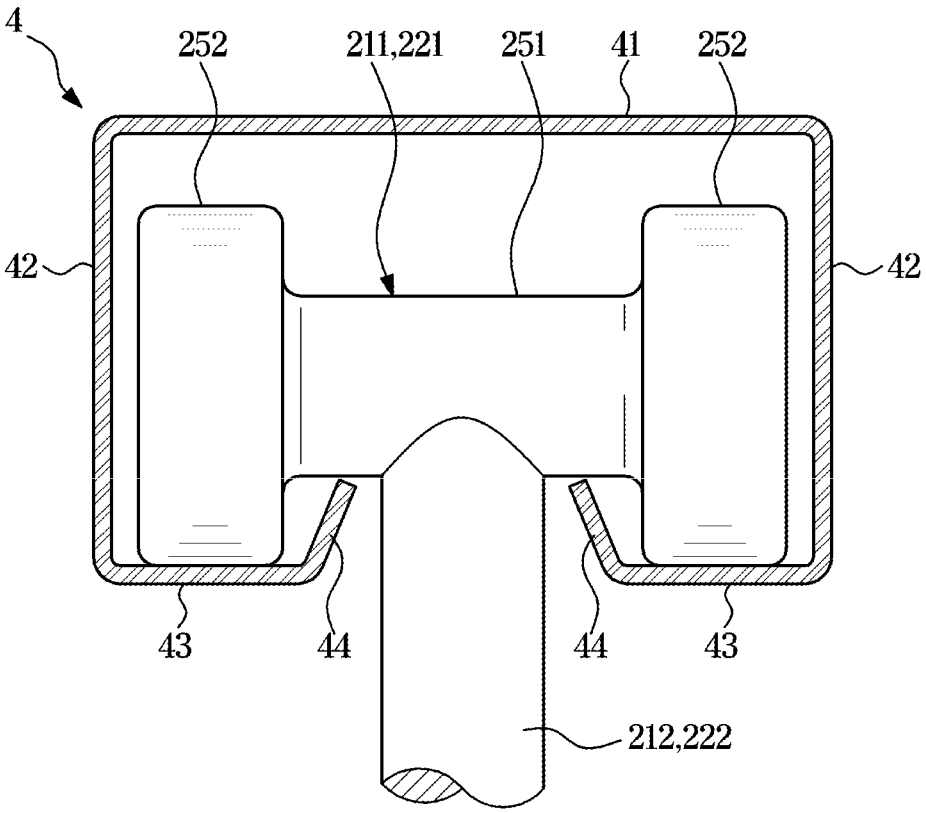


FIG. 14

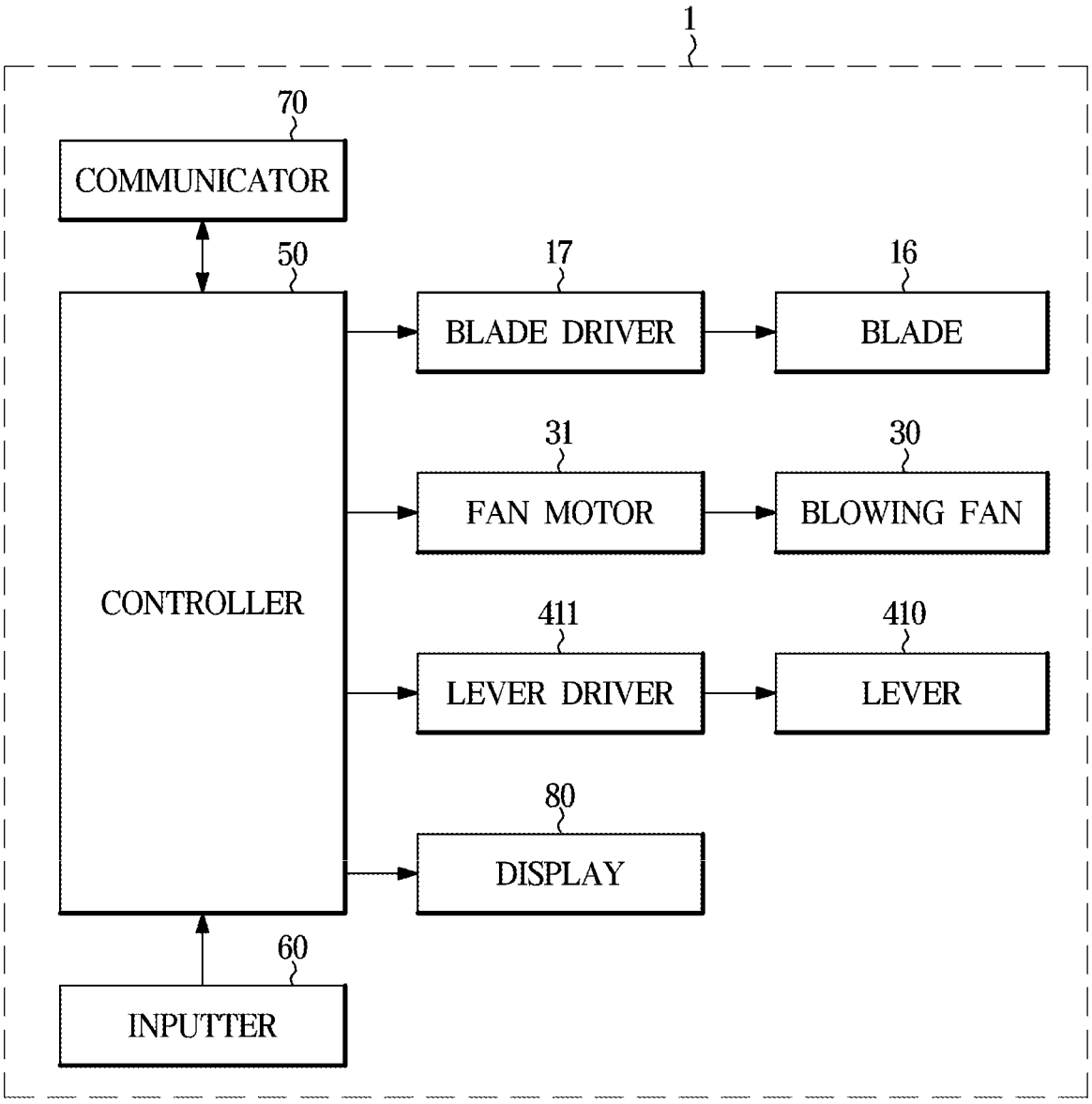

1
70
COMMUNICATOR
50
CONTROLLER
17
BLADE DRIVER
16
BLADE
31
FAN MOTOR
30
BLOWING FAN
411
LEVER DRIVER
410
LEVER
80
DISPLAY
60
INPUTTER

FIG. 15

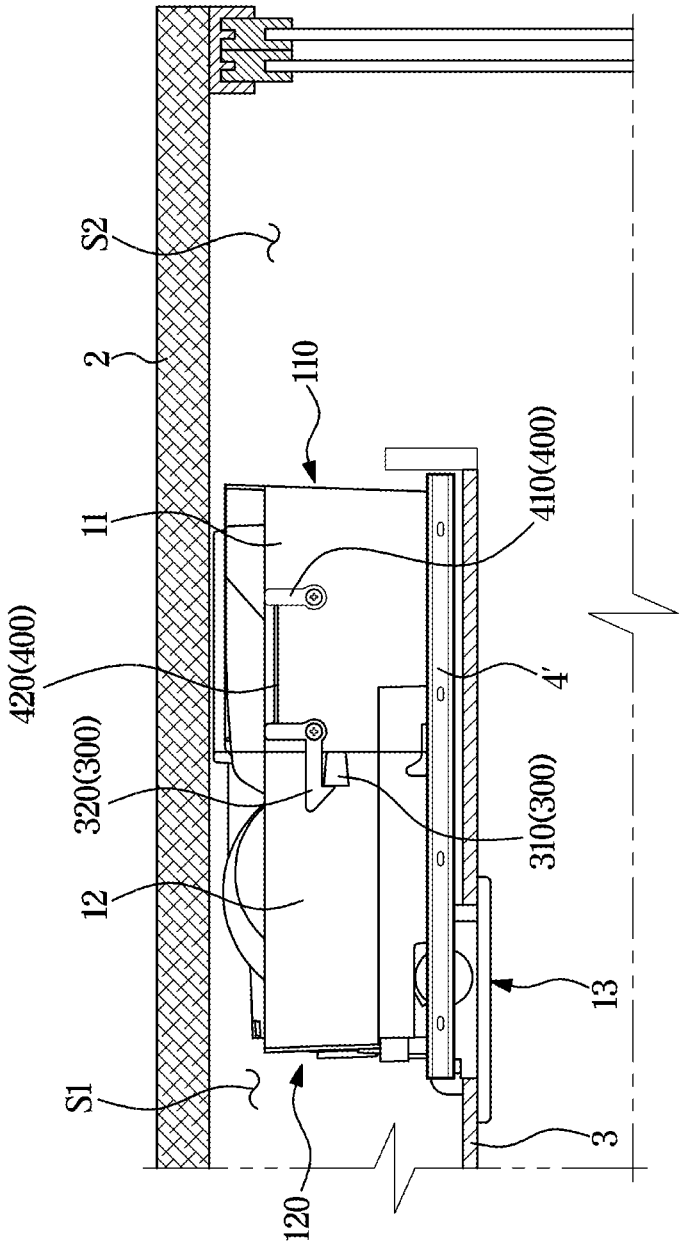


FIG. 16

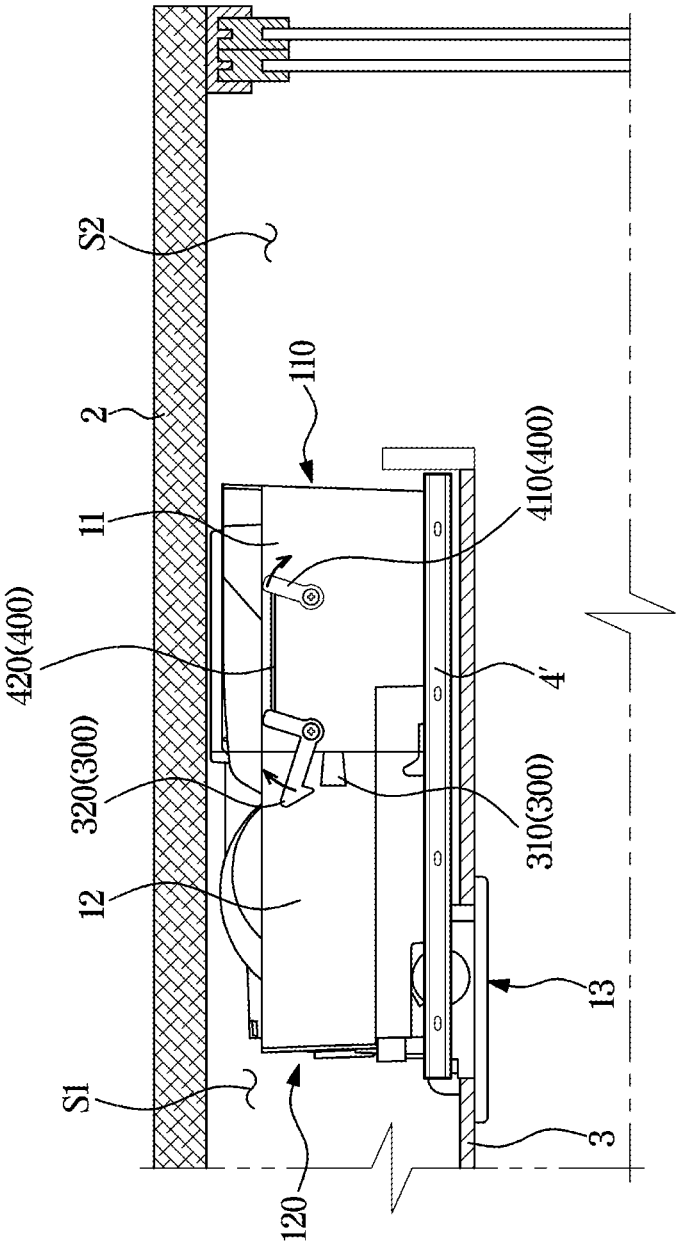


FIG. 17

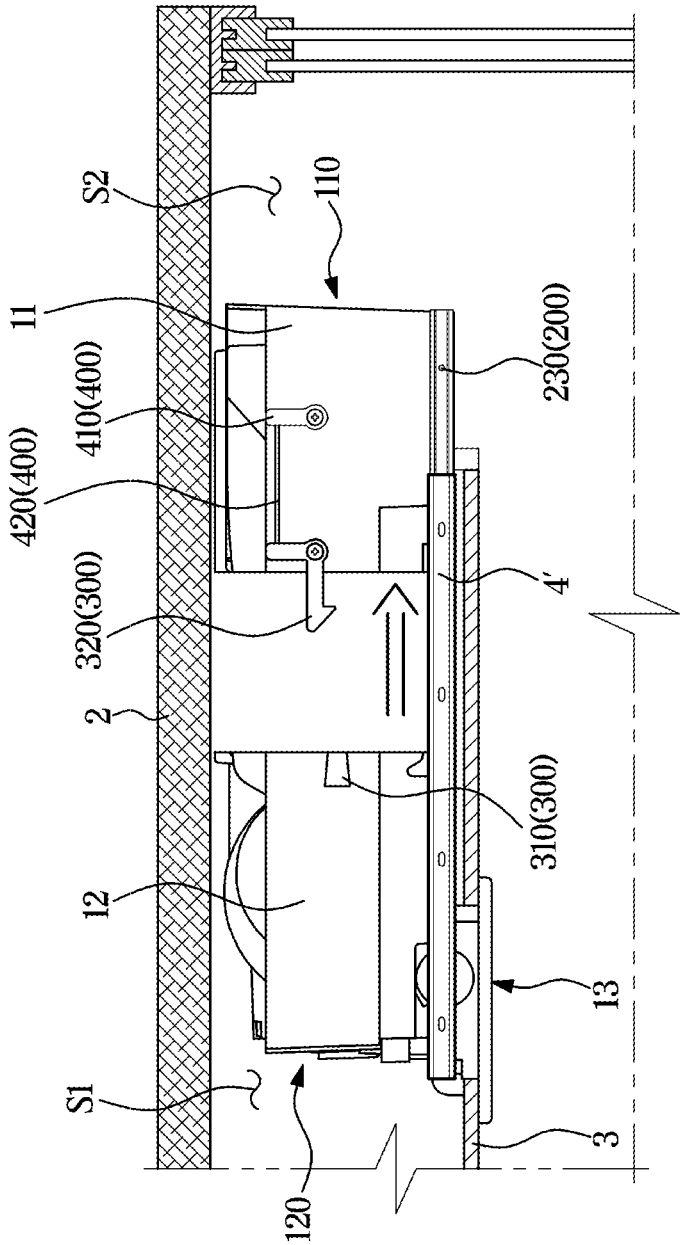


FIG. 18

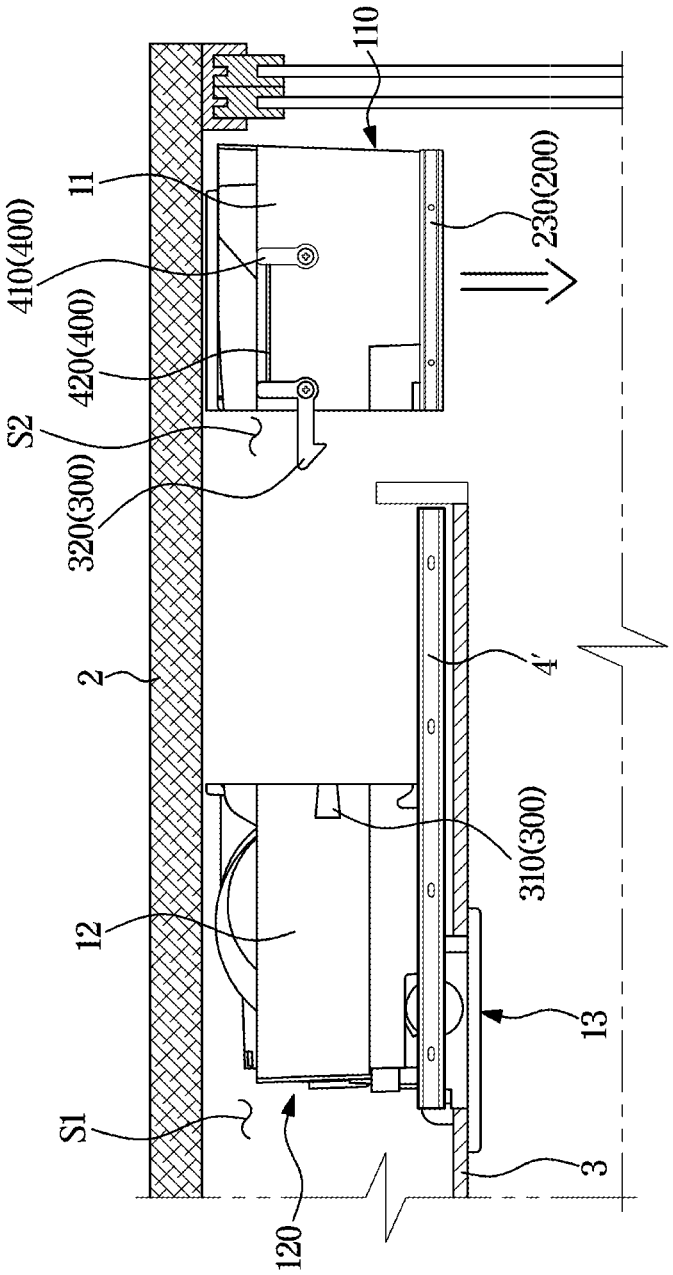


FIG. 19

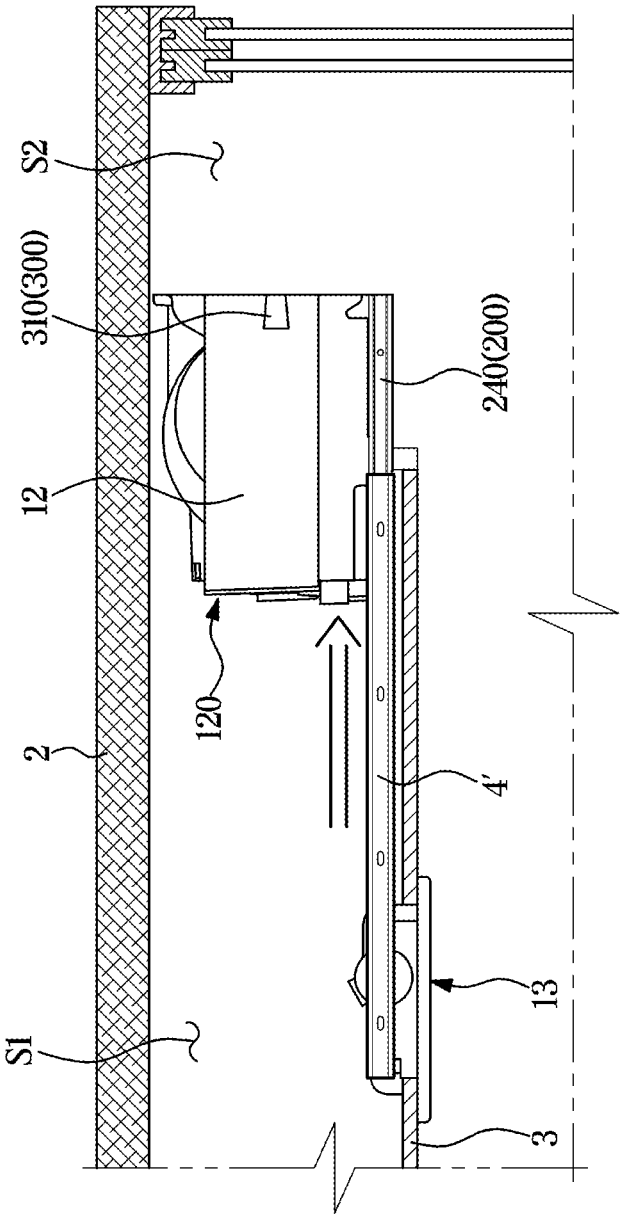
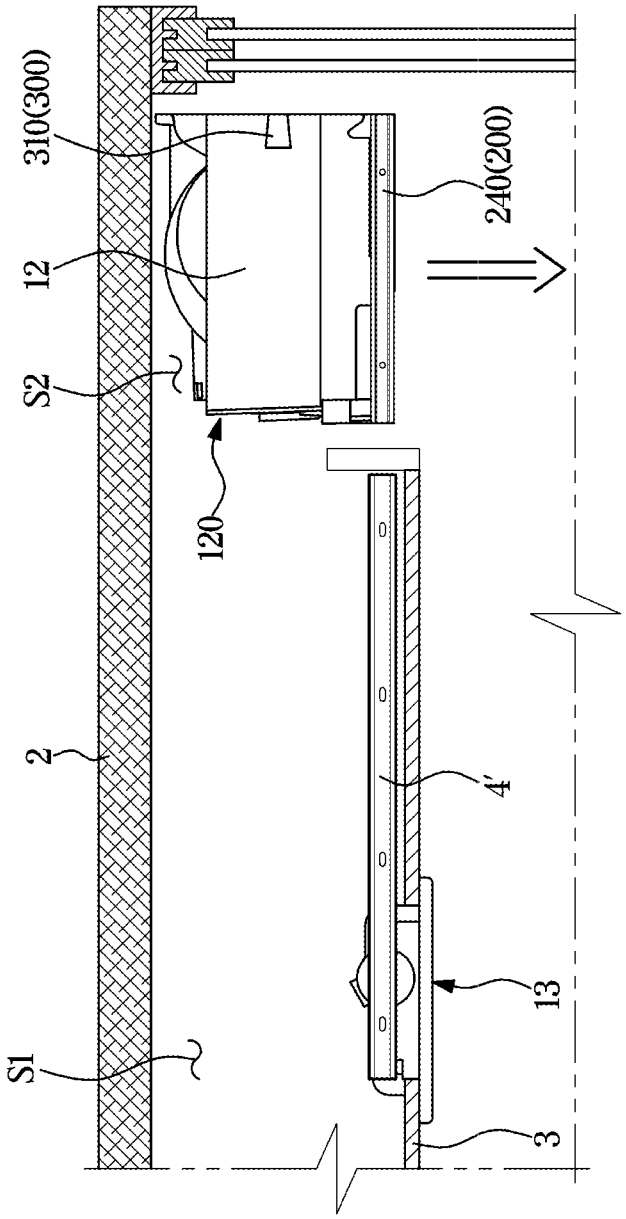


FIG. 20



AIR CONDITIONER

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation application, under 35 U.S.C. § 111(a), of International Patent Application No. PCT/KR2022/011350, filed on Aug. 2, 2022, which claims the benefit of Korean Patent Application No. 10-2021-0173502, filed Dec. 7, 2021, in the Korean Intellectual Property Office, the entire disclosure of which is incorporated herein by reference as a part of this application.

BACKGROUND

Field

[0002] The disclosure relates to an air conditioner, and to an air conditioner having an improved structure.

Description of Related Art

[0003] In general, an air conditioner is an apparatus which controls temperature, humidity, and air current distribution to be suitable for human activities and removes dust from air by using a refrigeration cycle.

[0004] A ceiling type air conditioner includes an outdoor unit and an indoor unit. The outdoor unit may include a compressor, an outdoor heat exchanger, an expansion device, and the like, and the indoor unit may include an indoor heat exchanger, a blowing fan, and the like. An expansion device may be provided even in the indoor unit.

[0005] In general, for maintenance of the air conditioner, there is a need for disassembly of parts of the air conditioner or entry into the interior of the air conditioner. In the case of a ceiling-type air conditioner that is arranged to be suspended from or buried into the ceiling, maintenance may not be easy. For example, a service, such as replacement or inspection of parts of a ceiling-type air conditioner, takes a long time or requires a lot of manpower.

SUMMARY

[0006] According to an aspect of the disclosure, there is provided an air conditioner including: a first air conditioning unit disposed in a first space formed between a first ceiling and a second ceiling that is spaced downward from the first ceiling and lower than the first ceiling, the first air conditioning unit configured to suction air from a second space recessed from the second ceiling toward the first ceiling; a second air conditioning unit disposed in the first space and to communicate with the first air conditioning unit and configured to discharge air introduced from the first air conditioning unit; and a guide device configured to guide the first air conditioning unit and the second air conditioning unit to move from the first space toward the second space or to move from the second space toward the first space.

[0007] The first air conditioning unit and the second air conditioning unit may be detachably coupled to each other, and the air conditioner may further include a locking device configured to couple the first air conditioning unit to the second air conditioning unit.

[0008] The air conditioner may further include an unlocking device to be connected to the locking device to release the coupling between the first air conditioning unit and the second air conditioning unit by the locking device.

[0009] The first air conditioning unit may further include a first housing supported by the first ceiling and a suction port formed at a lateral side of the first housing while communicating with the second space; and the second air conditioning unit may further include a second housing supported by the first ceiling and detachably coupled to the first housing and a discharge port formed at a lower side of the second housing to discharge the air introduced from the first air conditioning unit.

[0010] In response to separating the first housing of the first air conditioning unit and the second housing of the second air conditioning unit from each other, each of the first air conditioning unit and the second air conditioning unit may be withdrawable from the first space through the second space.

[0011] The guide device may include: a first guide member configured to guide the first air conditioning unit, the first guide member including a first moving roller slidably movable along a guide rail installed on the first ceiling and a first support member connected to the first moving roller to support the first housing; and a second guide member configured to guide the second air conditioning unit, the second guide member including a second moving roller slidably movable along the guide rail and a second support member connected to the second moving roller to support the second housing.

[0012] The guide device may include: a first moving rail configured to guide the first air conditioning unit, the first moving rail formed on the first housing of the first air conditioning unit and slidably movable along a guide rail disposed between the first ceiling and the second ceiling; and a second moving rail configured to guide the second air conditioning unit, the second moving rail formed on the second housing of the second air conditioning unit and slidably movable along the guide rail.

[0013] The locking device may further include: a locking portion formed on one of the first air conditioning unit and the second air conditioning unit, and a hook formed on an other one of the first air conditioning unit and the second air conditioning unit to be locked by the locking portion, and the unlicking device further includes a lever to separate the hook from the locking portion.

[0014] The unlocking device may further include a connection member connecting the lever to the hook and configured to rotate the hook in linkage with the lever.

[0015] The locking portion of the locking device may further include an inclined surface sloping upward in a direction in which the first air conditioning unit is coupled to the second air conditioning unit, and in response to coupling the first air conditioning unit and the second air conditioning unit to each other, the hook of the locking device may move along the inclined surface of the locking portion to be locked with the locking portion.

[0016] The air conditioner may further include: a heat exchanger accommodated in the first housing of the first air conditioning unit to exchange heat with the air suctioned through the suction port; and a blowing fan accommodated in the second housing of the second air conditioning unit to guide the air passed through the heat exchanger to flow toward the discharge port.

[0017] The air conditioner may further include a discharge panel installed on the second ceiling to correspond to the discharge port and exposed downward of the second ceiling.

[0018] A maximum length of the first air conditioning unit in a moving direction of the first air conditioning unit may be smaller than a minimum length of the second space in the moving direction, and a maximum length of the second air conditioning unit in the moving direction may be smaller than the minimum length of the second space in the moving direction.

[0019] The locking device may further include a torsion spring to elastically bias the hook in a direction in which the hook is locked with the locking portion.

[0020] Each of the first moving roller and the second moving roller may further include: a roller body forming a moving center; and roller wheels formed at opposite ends of the roller body to be supported by the guide rail, and to rotate on the guide rail, wherein the guide rail may further include: a seating portion on which the roller wheels are seated; and a separation preventing portion extending from the seating portion to prevent separation of the roller wheels.

[0021] According to an aspect of the disclosure, there is an air conditioner including: a first housing slidably movable in a first space formed between a first ceiling and a second ceiling that is spaced downward from the first ceiling by a first interval; a suction port formed in the first housing and configured to communicate with a second space formed by a horizontal panel spaced downward from the first ceiling by a second interval smaller than the first interval and a vertical panel extending from the horizontal panel toward the second ceiling, and to suction air from the second space therethrough; a heat exchanger accommodated in the first housing and to heat-exchange with the air suctioned through the suction port; a second housing detachably coupled to the first housing and slidably movable in the first space; a discharge port formed in the second housing to discharge air to indoors; and a blowing fan accommodated in the second housing to allow the air having heat exchanged with the heat exchanger to flow to the discharge port, and each of the first housing and the second housing is withdrawable from the first space through the second space.

[0022] The air conditioner may further include a locking device to allow the first housing and the second housing to be locked with each other and an unlocking device to move the locking device such that locking of the first housing and the second housing by the locking device is released.

[0023] The air conditioner may further include a guide device to guide a sliding movement of the first housing and a sliding movement of the second housing such that the first housing and the second housing are movable between the first space and the second space.

[0024] The locking device may further include a locking portion formed on the second housing and a hook formed on the first housing to be locked with the locking portion, and the unlocking device may further include a wire connected to the hook and a lever to pull the wire such that the hook is unlocked from the locking portion.

[0025] The air conditioner may further include a sealing member provided between the first housing and the second housing such that, in response to coupling the first housing to the second housing, air flowing in the first housing and the second housing is prevented from leaking to the outside of the first housing and the second housing.

BRIEF DESCRIPTION OF THE DRAWINGS

[0026] FIG. **1** is a perspective view illustrating an example of an air conditioner according to an embodiment.

[0027] FIG. **2** is a perspective view illustrating the air conditioner of FIG. **1**, seen from a different direction.

[0028] FIG. **3** is a side view illustrating an example of an air conditioner according to an embodiment.

[0029] FIG. **4** is a view schematically illustrating a state of an air conditioner shown in FIG. **3** slidably moved.

[0030] FIGS. **5** to **10** are views illustrating a guide process of an example of an air conditioner according to an embodiment.

[0031] FIG. **5** is a side view illustrating an example of an air conditioner according to an embodiment.

[0032] FIG. **6** is a view schematically illustrating a lock released state of a locking device of an air conditioner according to an embodiment.

[0033] FIG. **7** is a view schematically illustrating a state of a first air conditioning unit of an air conditioner according to an embodiment slidably moved.

[0034] FIG. **8** is a view schematically illustrating a state of a first air conditioning unit of an air conditioner according to an embodiment withdrawn.

[0035] FIG. **9** is a view schematically illustrating a state of a second air conditioning unit of an air conditioner according to an embodiment slidably moved.

[0036] FIG. **10** is a view schematically illustrating a state of a second air conditioning unit of an air conditioner according to an embodiment withdrawn.

[0037] FIG. **11** is a side view illustrating an example of an air conditioner according to an embodiment.

[0038] FIG. **12** is an enlarged view of a locking device of an air conditioner according to an embodiment.

[0039] FIG. **13** is an enlarged view of a cross-section of a portion of a guide device of an air conditioner according to an embodiment.

[0040] FIG. **14** is a control block diagram of an air conditioner according to an embodiment.

[0041] FIGS. **15** to **20** are views illustrating a guide process of an example of the air conditioner according to an embodiment.

[0042] FIG. **15** is a side view illustrating an example of an air conditioner according to an embodiment.

[0043] FIG. **16** is a view schematically illustrating a lock released state of a locking device of an air conditioner according to an embodiment.

[0044] FIG. **17** is a view schematically illustrating a state of a first air conditioning unit of an air conditioner according to an embodiment slidably moved.

[0045] FIG. **18** is a view schematically illustrating a state of a first air conditioning unit of an air conditioner according to an embodiment withdrawn.

[0046] FIG. **19** is a view schematically illustrating a state of a second air conditioning unit of an air conditioner according to an embodiment slidably moved.

[0047] FIG. **20** is a view schematically illustrating a state of a second air conditioning unit of an air conditioner according to an embodiment withdrawn.

DETAILED DESCRIPTION

[0048] Embodiments described in the specification and configurations shown in the accompanying drawings are merely examples of the disclosure, and various modifications may replace the embodiments and the drawings of the disclosure.

[0049] Further, identical symbols or numbers in the drawings of the disclosure denote components or elements configured to perform substantially identical functions.

[0050] Further, terms used herein are only for the purpose of describing particular embodiments and are not intended to limit to the disclosure. The singular form is intended to include the plural form as well, unless the context clearly indicates otherwise. It need to be further understood that the terms "include," "including," "have," and/or "having" specify the presence of stated features, integers, steps, operations, elements, components, and/or groups thereof, but do not preclude the presence or addition of one or more other features, integers, steps, operations, elements, components, and/or groups thereof.

[0051] When a part is referred to as being "connected to" another part, it may not only be directly connected to the other part but may in addition be indirectly connected to the other part. Similarly, when a part is referred to as being "coupled to" another part, it may not only be directly coupled to the other part but may in addition be indirectly coupled to the other part. Similarly, **[text missing or illegible when filed]**

[0052] In the description of an embodiment, it will be understood that, when a layer is referred to as being "on/under" another layer or substrate, it may be directly on/under the other layer or substrate, or one or more intervening layers may in addition be present.

[0053] Further, it need to be understood that, although the terms "first," "second," etc. may be used herein to describe various elements, the elements are not limited by the terms, and the terms are only used to distinguish one element from another. For example, a first element could be termed a second element, and similarly, a second element could be termed a first element without departing from the scope of the disclosure. The term "and/or" includes combinations of one or all of a plurality of associated listed items.

[0054] On the other hand, the terms "front", "rear", "side", "down", etc. used in the following descriptions are defined based on the drawings, and the shape and position of each component is not limited by the terms.

[0055] For example, referring to FIGS. **1** to **3**, an X direction may refer to a longitudinal direction, a Y direction may refer to a lateral direction, and a Z direction may refer to a height direction. However, this is only designated with reference to the drawings for the sake of convenience of description, and is not limited thereto.

[0056] A refrigeration cycle constituting an air conditioner may include a compressor, a condenser, an expansion valve, and an evaporator. The refrigeration cycle may enable circulation in a series of processes including compression-condensation-expansion-evaporation, and supply air having heat exchanged with a refrigerant. Accordingly, the air conditioner may adjust the temperature of the indoor space.

[0057] An outdoor unit of the air conditioner may include a compressor and an outdoor heat exchanger. An indoor unit of the air conditioner may include an indoor heat exchanger. An expansion valve may be located in one of the indoor unit and the outdoor unit. The indoor exchanger and the outdoor heat exchanger serve as a condenser or an evaporator. When the indoor heat exchanger is used as a condenser, the air conditioner performs an indoor heating mode. When the indoor heat exchanger is used as an evaporator, the air conditioner performs an indoor cooling mode.

[0058] Hereinafter, an embodiment according to the disclosure will be described in detail with reference to the accompanying drawings.

[0059] An air conditioner **1** according to an embodiment of the disclosure may be provided using an indoor unit of a ceiling type air conditioner. Hereinafter, the air conditioner **1** will be described.

[0060] FIG. **1** is a perspective view illustrating an example of an air conditioner according to an embodiment. FIG. **2** is a perspective view illustrating the air conditioner of FIG. **1**, which is seen from a different direction.

[0061] Referring to FIGS. **1** and **2**, the air conditioner **1** may include a main body **10**. The main body **10** may form the external appearance of the air conditioner **1**.

[0062] The main body **10** may include a housing **10***a* and a discharge panel **13** detachably coupled to a lower portion of the housing **10***a*.

[0063] The housing **10***a* may be disposed between a ceiling inner wall **2** (also referred to as a first ceiling **2**) and an indoor-side ceiling **3** (also referred to as a second ceiling **3**) spaced downward from the ceiling inner wall **2**. The air conditioner **1** may be disposed in a first space S**1** formed by the ceiling inner wall **2** and the indoor-side ceiling **3**.

[0064] The main body **10** may include a suction port **14** and a discharge port **15**. For example, the housing **10***a* may include the suction port **14** and the discharge port **15**.

[0065] The suction port **14** may suction indoor air into the main body **10**. The discharge port **15** may discharge heat-exchanged air into an indoor area. For example, the suction port **14** may suction air in a lateral direction, and the discharge port **15** may discharge the air in a downward direction.

[0066] The suction port **14** may be provided with a grille (not shown) and/or a filter member (not shown) for filtering out dust in the air suctioned to the suction port **14**.

[0067] The discharge port **15** may be provided with a wind direction control member (not shown) capable of adjusting a leftward and rightward direction (e.g., a Y direction) of the discharged air.

[0068] The discharge panel **13** may be provided to correspond to the discharge port **15**. The discharge panel **13** may be installed on the indoor-side ceiling **3**. The discharge panel **13** may be detachably mounted on the indoor-side ceiling **3**. The discharge panel **13** may be exposed downward of the indoor-side ceiling **3**. At least a portion of the discharge panel **13** may protrude downward of the indoor-side ceiling **3**.

[0069] The discharge panel **13** may include a blade **16** provided to open and close the discharge port **15**. The blade **16** may guide the air discharged through the discharge port **15**. The blade **16** may be rotated by a blade driver **17**. For example, the blade driver **17** may be coupled to at least one of the opposite ends in an extending direction (e.g., the Y direction) of the blade **16**. For example, the blade driver **17** may include a step motor.

[0070] For example, the blade **16** may have a substantially rectangular shape including a pair of long sides and a pair of short sides. The blade **16** may include an approximately plate shape.

[0071] The discharge panel **13** may include a panel body **13***a* provided to cover an edge of the blade **16**. For example, the panel body **13***a* of the discharge panel **13** may include a front portion **13***b* directed forward with respect to the air discharge direction, a rear portion **13***c* directed rearward

with respect to the air discharge direction, and a side portion **13***d* connecting the front portion **13***b* to the rear portion **13***c*.

[0072] The discharge panel **13** may include a support rib **18** provided to protrude from the panel body **13***a* toward the first space S**1**. The support ribs **18** may extend upward from the panel body **13***a*. The support rib **18** may rotatably support the blade **16**.

[0073] The support rib **18** may extend to connect the front portion **13***b* to the rear portion **13***c* of the panel body **13***a*. The support rib **18** may reinforce the strength of the panel body **13***a*. The support rib **18** may prevent the panel body **13***a* from sagging.

[0074] For example, the support rib **18** may be provided in plural, and the plurality of support ribs **18** may be provided to be spaced apart from each other along the extending direction of the blade **16**.

[0075] A heat exchanger **20** may be provided to allow air suctioned through the suction port **14** to heat-exchange with a refrigerant. The heat exchanger **20** may be accommodated in the housing **10***a*. For example, the heat exchanger **20** may include a tube through which a refrigerant flows and a heat exchange fin coming in contact with the tube to enlarge a heat transfer area. For example, the heat exchanger **20** may be slantingly disposed to be substantially perpendicular to the direction of the air flow.

[0076] A blowing fan **30** may force air to flow. The blowing fan **30** may allow indoor air to be suctioned through the suction port **14** or heat-exchanged air to be discharged back into the indoors through the discharge port **15**. The blowing fan **30** may be accommodated in the housing **10***a*. The blowing fan **30** may be driven by a fan motor **31** (see FIG. **14**).

[0077] A drain cover **19** for collecting condensed water generated in the heat exchanger **20** may be provided at a lower side of the heat exchanger **20**. For example, the condensed water accommodated in the drain cover **19** may be drained to the outside through a drain hose (not shown) or the like. The drain cover **19** may be provided to support the heat exchanger **20**. The drain cover **19** may further include a heat insulating material provided to insulate the heat exchanged air.

[0078] The drain cover **19** may be disposed between the ceiling inner wall **2** and the indoor-side ceiling **3**. The drain cover **19** may be provided in the first space S**1**. Accordingly, the drain cover **19** may be covered by the indoor-side ceiling **3** without being exposed downward of the indoor-side ceiling **3**.

[0079] In general, in the case of a ceiling-type air conditioner, a ceiling panel communicating with each of a suction port and a discharge port of a main body may be mounted on an indoor-side ceiling. In this case, the ceiling panel may include a suction panel corresponding to the suction port and a discharge panel corresponding to the discharge port. The ceiling panel suctions air from a lower side thereof, cools or heats the air, and then discharges the cooled or heated air to the lower side again. Such a ceiling panel is installed on the indoor-side ceiling and protrudes downward from a ceiling surface of the indoor-side ceiling. In addition, the ceiling panel needs to secure an area for communicating with each of the suction port and the discharge port of the main body, and therefore has a large size. In other words, as the area occupied by the ceiling panel in the indoor-side ceiling increases, the area of a portion protruding from the ceiling surface of the ceiling panel may also increase. As a result, the ceiling panel may spoil the aesthetics of indoors.

[0080] On the other hand, in the air conditioner **1** according to an embodiment, the indoor aesthetics may be improved by reducing the area of the ceiling panel. The housing **10***a* of the air conditioner **1** may be disposed in the first space S**1** formed between the ceiling inner wall **2** and the indoor-side ceiling **3**. The housing **10***a* may suction air in a lateral direction from a second space S**2** recessed from the indoor-side ceiling **3** toward the ceiling inner wall **2**. The housing **10***a* may allow the air suctioned from the second space S**2** and heat-exchanged to be discharged in the downward direction. The discharge panel **13** may be coupled to a lower portion of the housing **10***a* to guide the discharge air, and may be mounted on the indoor-side ceiling **3**. That is, the housing **10***a* may be covered by the indoor-side ceiling **3** and the discharge panel **13**, with only the discharge panel **13** seen by the user when the user views the indoor-side ceiling **3** from the indoors. In other words, only the discharge panel **13** corresponding to the discharge port **15** may be provided on the indoor-side ceiling **3**. That is, since the air conditioner **1** may reduce an area by as much as a portion (e.g., a suction panel) corresponding to the suction port in the existing ceiling panel, the ratio of the ceiling panel protruding from a ceiling surface **3***a* may also be reduced. In addition, in the air conditioner **1**, only the discharge panel **13** having a relatively neat appearance is exposed, improving aesthetics and appearance quality. In addition, in terms of interior design, excellent aesthetics may be formed.

[0081] Meanwhile, the second space S**2** may be a space recessed or open from the indoor-side ceiling **3** toward the ceiling inner wall **2**. For example, the second space S**2** may be a space in which shading members (e.g., curtains, blinds, etc.), lightings, electric wires, piping, and the like are disposed. The second space S**2** may include a curtain box. The second space S**2** may be adjacent to a window frame **7** and a window **8**, but is not limited thereto, and may be provided to be adjacent to a wall structure of indoors.

[0082] Referring to FIG. **2**, the first space S**1** and the second space S**2** may communicate with each other. For example, an opening portion **9** for communicating the first space S**1** with the second space S**2** may be provided. The opening portion **9** may be formed by cutting at least a portion of a vertical panel **5**.

[0083] The air conditioner **1** is movable toward the second space S**2** (e.g., movable in the +X direction), and may be withdrawn from the first space S**1** through the second space S**2**.

[0084] For example, a maximum length L in the lateral direction (the Y direction) of the air conditioner **1** may be smaller than a minimum length LS in the lateral direction (the Y direction) of the opening portion **9**. A maximum length L in the lateral direction (the Y direction) of the air conditioner **1** may be smaller than a minimum length in the lateral direction (the Y direction) of the second space S**2**. A maximum length in the longitudinal direction (the X direction) of the air conditioner **1** may be smaller than a minimum length in the longitudinal direction (the X direction) of the second space S**2**.

[0085] FIG. **3** is a side view illustrating an example of an air conditioner according to an embodiment. FIG. **4** is a view schematically illustrating a state of an air conditioner shown in FIG. **3** slidably moved.

[0086] Referring to FIG. **3**, the air conditioner **1** may suction air from the second space S**2**, cool or heat the suctioned air, and then discharge the cooled or heated air into the indoors.

[0087] For example, the air conditioner **1** may suction air in the lateral direction of the housing **10***a* and discharge the air in the lower direction of the housing **10***a* (see the arrow in FIG. **3**). Here, the lateral direction of the housing **10***a* may correspond to the extension direction of a guide rail **4**. The lateral direction of the housing **10***a* may correspond to the X direction. However, with respect to the flow of air, the air conditioner **1** may be referred to as suctioning air from the rear side of the housing **10***a* and discharging the air to the front lower side of the housing **10***a*.

[0088] The air conditioner **1** may include a guide device **200**. The guide device **200** may guide the housing **10***a* of the air conditioner **1** to move toward the second space S**2**. By the guide device **200**, the housing **10***a* may be guided toward the second space S**2**. For example, the guide device **200** may include moving rollers **211** and **221** provided to be slidably movable along the guide rail **4** and support members **212** and **222** connected to the moving rollers **211** and **221** to support the housing **10***a*. Details thereof will be described below.

[0089] Referring to FIG. **4**, the housing **10***a* of the air conditioner **1** may be exposed toward the second space S**2** by the guide device **200**. Accordingly, the operator may access the air conditioner **1** through the second space S**2**. Since the operator may access the air conditioner **1** through a simple operation (e.g., a sliding movement of the housing **10***a*) without disassembling the components of the air conditioner, the service of the air conditioner **1** may be easily provided.

[0090] In FIG. **4**, a portion of the housing **10***a* is illustrated as protruding into the second space S**2**, but the disclosure is not limited thereto. For example, the entire area of the housing **10***a* may protrude into the second space S**2** to thereby be withdrawable through the second space S**2**. In this case, the maximum length along the moving direction of the air conditioner **1** may be provided to be smaller than the minimum length of the second space S**2** along the moving direction.

[0091] Meanwhile, the 'service' of the air conditioner described in the disclosure may refer to all operations involved for maintenance, repair, inspection, installation or removal of the air conditioner.

[0092] FIGS. **5** to **10** are views illustrating a guide process of an example of an air conditioner according to an embodiment.

[0093] Referring to FIGS. **5** to **10**, an air conditioner **1** may include a plurality of units **110** and **120**. The air conditioner shown in FIGS. **5** to **10** may have the same configuration as that of the air conditioner described above, except for including a plurality of air conditioning units. The same reference numerals may be assigned to the same components, and the same descriptions may be omitted. Hereinafter, the air conditioner **1** will be illustrated as including a first air conditioning unit **110** and a second air conditioning unit **120**. However, the disclosure is not limited thereto, and the air conditioner **1** may include three or more units.

[0094] The first air conditioning unit **110** and the second air conditioning unit **120** may be detachably coupled to each other. A first housing **11** of the first air conditioning unit **110** and a second housing **12** of the second air conditioning unit **120** may be detachably coupled to each other.

[0095] For example, the main body **10** of the air conditioner **1** may include the first housing **11** of the first air conditioning unit **110**, the second housing **12** of the second air conditioning unit **120**, and the discharge panel **13**. The housing **10***a* may include the first housing **11** and the second housing **12**.

[0096] When the first air conditioning unit **110** and the second air conditioning unit **120** are coupled to each other, a flow path through which air flows may be formed in the main body **10**. When the first housing **11** and the second housing **12** are coupled to each other, a flow path through which air flows may be formed in the housing **10***a*.

[0097] The air conditioner **1** may further include a sealing member (not shown). The sealing member may, when the first housing **11** and the second housing **12** are coupled to each other, prevent the air flowing in the first housing **11** and the second housing **12** from leaking to the outside of the first housing **11** and the second housing **12**. The sealing member may be provided between the first housing **11** and the second housing **12**. The sealing member may be provided at a portion in which the first housing **11** and the second housing **12** are coupled to each other.

[0098] Meanwhile, the first air conditioning unit **110** and the second air conditioning unit **120** may be provided as one body. In this case, the first air conditioning unit **110** and the second air conditioning unit **120** provided as one body is substantially the same as the air conditioner shown in FIGS. **3** and **4**, and detailed descriptions thereof will be omitted.

[0099] The first air conditioning unit **110** may be disposed in the first space S**1** formed between the inner ceiling wall **2** and the indoor-side ceiling **3** spaced downward from the inner ceiling wall **2**. The first air conditioning unit **110** may form a part of the air conditioner **1**.

[0100] The first air conditioning unit **110** may include the first housing **11** forming the external appearance of the first air conditioning unit **110**. The first housing **11** may be supported on the ceiling inner wall **2**. For example, the first housing **11** may be supported on the ceiling inner wall **2** by a first guide member **210** of the guide device **200** to be described below.

[0101] The first air conditioning unit **110** may be provided to suction air from the second space S**2** recessed from the indoor-side ceiling **3** toward the ceiling inner wall **2**. The first air conditioning unit **100** may include the suction port **14**. The suction port **14** may be formed on the lateral side of the first housing **11**. The suction port **14** may be provided adjacent to the second space S**2**. The suction port **14** may communicate with the second space S**2**.

[0102] The first housing **11** of the first air conditioning unit **110** may accommodate the heat exchanger **20**. The heat exchanger **20** may be provided to perform heat-exchange on the air suctioned through the suction port **14**.

[0103] The second air conditioning unit **120** may be disposed in the first space S**1** formed between the ceiling inner wall **2** and the indoor-side ceiling **3** spaced downward from the ceiling inner wall **2**. The second air conditioning unit **120** may be disposed to communicate with the first air conditioning unit **110** in the first space S**1**. The second air conditioning unit **120** may form a part of the air conditioner **1**.

[0104] The second air conditioning unit **120** may include the second housing **12** forming the external appearance of the second air conditioning unit **120**. The second housing **12** may be supported on the ceiling inner wall **2**. For example,

the second housing **12** may be supported on the inner ceiling wall **2** by a second guide member **220** of the guide device **200** to be described below. The second housing **12** may be detachably coupled to the first housing **11**.

[0105] The second air conditioning unit **120** may be provided to discharge the air introduced from the first air conditioning unit **110**. The second air conditioning unit **120** may discharge heat-exchanged air into the indoors. The second air conditioning unit **120** may include the discharge port **15**. The discharge port **15** may be formed on the lower side of the second housing **12**.

[0106] The second housing **12** of the second air conditioning unit **120** may accommodate the blowing fan **30**. The blowing fan **30** may be provided to cause the air passed through the heat exchanger **20** to flow to the discharge port **15**.

[0107] The air conditioner **1** may include the guide device **200** configured to guide the first air conditioning unit **110** and the second air conditioner so that the first air conditioning unit **110** and the second air conditioning unit **120** move toward the second space S2.

[0108] The guide device **200** may include the first guide member **210** for guiding the first air conditioning unit **110** and the second guide member **220** for guiding the second air conditioning unit **120**.

[0109] The guide rail **4** may be installed on or fixed to the ceiling inner wall **2**. The guide rail **4** may extend to correspond to the moving direction of the air conditioner **1**.

[0110] The first guide member **210** may include the first moving roller **211** provided to be slidably movable along the guide rail **4** and the first support member **212** connected to the first moving roller **211** to support the first housing **11**. The first support member **212** may extend downward from the first moving roller **211**.

[0111] The first support member **212** may pass through a hole **271***h* formed in a supporting bracket **271** coupled to the first housing **11**. The first support member **212** passed through the hole **271***h* of the supporting bracket **271** may be coupled to a fixing member **281** at a lower side of the supporting bracket **271**. The fixing member **281** may have a diameter larger than that of the hole **271***h*. Accordingly, the fixing member **281** may fix the first support member **212** to prevent the first support member **212** from being separated from the supporting bracket **271**. For example, the first support member **212** may be a threaded bolt with a thread formed on the outer circumferential surface thereof. For example, the fixing member **281** may be a fastening nut. In addition, a washer (not shown) may be provided between the supporting bracket **271** and the fixing member **281**.

[0112] However, the disclosure is not limited thereto, and the first support member **212** may be provided as one body with the first housing **11** and support the first housing **11**.

[0113] The second guide member **220** may include a second moving roller **221** provided to be slidably movable along the guide rail **4** and a second support member **222** connected to the second moving roller **221** to support the second housing **12**. The second support member **222** may extend downward from the second moving roller **221**.

[0114] The second support member **222** may pass through a hole **272***h* formed in a supporting bracket **272** coupled to the second housing **12**. The second support member **222** passed through the hole **272***h* of the supporting bracket **272** may be coupled to a fixing member **282** at a lower side of the supporting bracket **272**. The fixing member **282** may have a diameter larger than that of the hole **272***h*. Accordingly, the fixing member **282** may fix the second support member **222** to prevent the second support member **222** from being separated from the supporting bracket **272**. For example, the second support member **222** may be a threaded bolt with a thread formed on the outer circumferential surface thereof. For example, the fixing member **282** may be a fastening nut. In addition, a washer (not shown) may be provided between the supporting bracket **272** and the fixing member **282**.

[0115] However, the disclosure is not limited thereto, and the second support member **222** may be provided as one body with the second housing **12** to support the second housing **12**.

[0116] Except that the first guide member **210** guides the first air conditioning unit **110** and the second guide member **220** guides the second air conditioning unit **120**, the shape and the structure of the first guide member **210** may be substantially the same as those of the second guide member **220**.

[0117] The supporting bracket **271** may be substantially identical to the supporting bracket **272**, and the fixing member **281** may be substantially identical to the fixing member **282**.

[0118] The air conditioner **1** may include a locking device **300** provided to couple the first air conditioning unit **110** to the second air conditioning unit **120**.

[0119] The locking device **300** may include a locking portion **310** and a hook **320**. The locking portion **310** may be formed on one of the first air conditioning unit **110** and the second air conditioning unit **120**, and the hook **320** may be formed on the other one of the first air conditioning unit **110** and the second air conditioning unit **120** to be locked with the locking portion **310**.

[0120] For example, the locking portion **310** may be formed on the second air conditioning unit **120**, and the hook **320** may be formed on the first air conditioning unit **110**. Conversely, the locking portion **310** may be formed on the first air conditioning unit **110** and the hook **320** may be formed on the second air conditioning unit **120**.

[0121] The air conditioner **1** may include an unlocking device **400** provided to release the coupling between the first air conditioning unit **110** and the second air conditioning unit **120** by the locking device **300**.

[0122] The unlocking device **400** may be connected to the locking device **300** so that the locking device **300** is moved. For example, the unlocking device **400** may rotate the locking device **300** to unlock the locking device **300**.

[0123] The unlocking device **400** may include a lever **410**. The lever **410** may be provided to separate the hook **320** from the locking portion **310**.

[0124] For example, the unlocking device **400** may further include a connection member **420** connecting the lever **410** to the hook **320**. The connection member **420** may move the hook **320** in linkage with the lever **410**. The hook **320** may be moved by a predetermined force of the connection member **420** to thereby be released from the locking portion **310**. That is, the locking of the hook **320** and the locking portion **310** may be released.

[0125] For example, referring to FIG. **6**, the lever **410** may rotate to pull the connection member **420**, and the connection member **420** in linkage with the rotation of the lever **410** may rotate the hook **320**. Accordingly, the locking of the hook **320** and the locking portion **310** may be released.

[0126] For example, the connection member **420** may include a wire and/or a chain. The lever **410** of the unlocking device **400** may be operated manually or automatically. For example, the lever **410** may be operated by an operator or may be operated by a separate lever driver **411** (see FIG. **14**).

[0127] As the locking of the locking device **300** is released, the first air conditioning unit **110** and the second air conditioning unit **120** may be set into a separable state. The coupling between the first air conditioning unit **110** and the second air conditioning unit **120** may be released. That is, the first housing **11** and the second housing **12** may be separated from each other.

[0128] Upon the coupling between the first air conditioning unit **110** and the second air conditioning unit **120** being released, the first air conditioning unit **110** and the second air conditioning unit **120** may move independent of each other. For example, each of the first air conditioning unit **110** and the second air conditioning unit **120** may slide along the guide rail **4**. Each of the first air conditioning unit **110** and the second air conditioning unit **120** may move toward the second space S**2** to provide a service of the air conditioner.

[0129] Upon the coupling between the first air conditioning unit **110** and the second air conditioning unit **120** being released, each of the first air conditioning unit **110** and the second air conditioning unit **120** may be withdrawn from the first space S**1** through the second space S**2**. Upon the first housing **11** of the first air conditioning unit **110** and the second housing **12** of the second air conditioning unit **120** being separated from each other, each of the first air conditioning unit **110** and the second air conditioning unit **120** may be withdrawn from the first space S**1** through the second space S**2**.

[0130] Referring to FIG. **7**, after the first housing **11** and the second housing **12** are separated from each other, the first air conditioning unit **110** may be guided by the first guide member **210** to be moved toward the second space S**2**. The first air conditioning unit **110** may be slidably moved along the guide rail **4**.

[0131] Referring to FIG. **8**, the first air conditioning unit **110** may be completely withdrawn from the first space S**1** through the second space S**2**. The first air conditioning unit **110** withdrawn from the first space S**1** and provided in the second space S**2** may be movable downward. For example, the operator may lower the first air conditioning unit **110** withdrawn from the first space S**1**. In this case, the maximum length D**1** of the first air conditioning unit **110** in the moving direction of the first air conditioning unit **110** may be provided to be smaller than the minimum length DS of the second space S**2** in the moving direction.

[0132] The first air conditioning unit **110** may be allowed to easily escape from the space between the ceiling inner wall **2** and the indoor-side ceiling **3** by the first guide member **210**. That is, by a simple operation (e.g., a sliding movement), the first air conditioning unit **110** may be easily withdrawn from the installation space. Accordingly, a service space for service provision may be more effectively secured and workability, such as maintenance, may be improved.

[0133] Referring to FIG. **9**, after the second housing **12** is separated from the first housing **11**, the second air conditioning unit **120** may be guided by the second guide member **220** to be moved toward the second space S**2**. The second air conditioning unit **120** may be slidably moved along the guide rail **4**.

[0134] Referring to FIG. **10**, the second air conditioning unit **120** may be completely withdrawn from the first space Si through the second space S**2**. The second air conditioning unit **120** withdrawn from the first space S**1** and provided in the second air space S**2** may be movable downward. For example, the operator may lower the second air conditioning unit **120** withdrawn from the first space S**1**. In this case, the maximum length D**2** of the second air conditioning unit **120** in the moving direction of the second air conditioning unit **120** may be provided to be smaller than the minimum length DS of the second space S**2** in the moving direction.

[0135] The second air conditioning unit **120** may be allowed to easily escape from the space between the ceiling inner wall **2** and the indoor-side ceiling **3** by the second guide member **220**. That is, by a simple operation (e.g., a sliding movement), the second air conditioning unit **120** may be easily withdrawn from the installation space. Accordingly, a service space for service provision may be more effectively secured and workability, such as maintenance, may be improved.

[0136] FIG. **11** is a side view illustrating an example of an air conditioner according to an embodiment.

[0137] The second space S**2** may be a space recessed from the indoor-side ceiling **3** toward the ceiling inner wall **2**.

[0138] For example, referring to FIG. **11**, the first space S**1** may be formed between the ceiling inner wall **2** and the indoor-side ceiling **3** spaced apart from the ceiling inner wall **2** by a first interval dl. The second space S**2** may be formed by a horizontal panel **6** spaced downward from the ceiling inner wall **2** by a second interval d**2** smaller than the first interval dl and a vertical panel **5** extending from the horizontal panel **6** toward the indoor-side ceiling **3**.

[0139] That is, the second space S**2** is a space formed to be open from the indoor-side ceiling **3** toward the ceiling inner wall **2** (see FIGS. **3** to **10**), or a space formed by separate panels **5** and **6** to be recessed from the indoor-side ceiling **3**. For example, each of the vertical panel **5** and the horizontal panel **6** may include a ceiling finish, such as gypsum board, plywood, or the like.

[0140] In a space S**3** formed between the ceiling inner wall **2** and the horizontal panel **6**, an electric wire, a pipe, a duct, etc. may be provided.

[0141] Referring to FIG. **11**, the guide rail **4** may be mounted on the ceiling inner wall **2**. The guide rail **4** may be installed on the ceiling inner wall **2**. The guide rail **4** may be directly fixed to the ceiling inner wall **2** or may be fixed to the ceiling inner wall **2** by a separate installation member **4***a*.

[0142] FIG. **12** is an enlarged view of a locking device of an air conditioner according to an embodiment.

[0143] The locking device **300** may be provided to lock the first air conditioning unit **110** with the second air conditioning unit **120**. The locking device **300** may be provided to lock the first housing **11** with the second housing **12**.

[0144] Referring to FIG. **12**, the locking portion **310** may include a first inclined surface **311** provided to guide the hook **320**. The first inclined surface **311** may slope upward in a direction in which the first air conditioning unit **110** is coupled to the second air conditioning unit **120**. The first inclined surface **311** may slope downward toward the second space S**2**.

[0145] When the first air conditioning unit **110** and the second air conditioning unit **120** are coupled, the hook **320**

may be provided to move along the first inclined surface **311** of the locking portion **310** to be locked with the locking portion **310**.

[0146] The hook **320** may include a hook body **321**. The hook body **321** may include a connecting portion **323** connected to the connection member **420**, a locking corresponding portion **324** provided to correspond to the locking portion **311**, and a rotating portion **325** provided to be rotated by the connection member **420** between the connecting portion **323** and the locking corresponding portion **324**.

[0147] For example, the connecting portion **323** and the locking corresponding portion **324** may be provided substantially vertically. For example, the locking corresponding portion **324** may have a substantially arrow shape. However, the shape of the hook **320** is not limited thereto, and may be variously provided as long as it can be locked with the locking portion **310**.

[0148] The locking corresponding portion **324** may include a locking jaw **326** provided to come in contact with the locking portion **310** so as to restrict a sliding movement of the housing in which the hook **320** is formed. In FIG. **12**, the locking jaw **326** is illustrated as restricting a sliding movement of the first housing **11**, but the disclosure is not limited thereto. For example, when the hook **320** is formed in the second housing **12**, the locking jaw **326** may be provided to restrict a sliding movement of the second housing **12**.

[0149] The locking corresponding portion **324** may include a second inclined surface **328** connecting an end **327** of the locking corresponding portion **324** to the locking jaw **326**. The second inclined surface **328** may slope upward in a direction in which the first air conditioning unit **110** is coupled to the second air conditioning unit **120**. The second inclined surface **328** may slope downward toward the second space S**2**.

[0150] For example, the inclination angle of the second inclined surface **328** may be provided to be greater than or equal to the inclination angle of the first inclined surface **311**. Accordingly, the second inclined surface **328** of the hook **320** may be more easily moved on the first inclined surface **311** of the locking portion **311**. However, the disclosure is not limited thereto, and the inclination angle of the second inclined surface **328** may be smaller than the inclination angle of the first inclined surface **311**.

[0151] The locking device **300** may further include a torsion spring **322** provided to elastically bias the hook **320** in a direction in which the hook **320** is locked with the locking portion **310**. For example, the locking device **300** may further include a fastener **329** provided to secure the torsion spring **322**.

[0152] For example, when a predetermined force is applied to the torsion spring **322** by the unlocking device **400**, the torsion spring **322** lifts the locking corresponding portion **324** of the hook **320** to release the locking of the locking portion **310** and the hook **320**. When the predetermined force applied to the torsion spring **322** by the unlocking device **400** is removed, the torsion spring **322** elastically biases the locking corresponding portion **324** of the hook **320** to cause the hook **320** to be locked with the locking portion **310** again.

[0153] FIG. **13** is an enlarged view of a cross-section of a portion of a guide device of an air conditioner according to an embodiment.

[0154] Referring to FIG. **13**, the moving rollers **211** and **221** of the guide device **200** may include a roller body **251** and a roller wheel **252**. Each of the first moving roller **211** of the first guide member **210** and the second moving roller **221** of the second guide member **220** may include a roller body **251** and a roller wheel **252**.

[0155] The roller body **251** may form a moving center of the moving roller. The roller wheels **252** may be formed at the opposite ends of the roller body **251** to be supported by the guide rail and rotatable on the guide rail **4**.

[0156] The guide rail **4** may include a seating portion **43** on which the roller wheel **252** is mounted. The guide rail **4** may include a separation preventing portion **44** extending from the seating portion **43** to prevent separation of the roller wheel **252**.

[0157] For example, the guide rail **4** may include a plate body **41** installed on the ceiling inner wall **2**. The guide rail **4** may include a pair of first bent portions **42** bent in a substantially vertical direction at the opposite ends of the plate body **41** to face each other. The guide rail **4** may include a pair of second bent portions **43** each bent in an approximately horizontal direction at an end of a respective one side of the pair of first bent portions **42**. The pair of second bent portions **43** may include a seating portion **43**. The guide rail **4** may include a pair of third bent portions **44** each bent upward at an end of a respective one side of the pair of second bent portions **43**. The pair of third bent portions **44** may include a separation preventing portion **44**.

[0158] FIG. **14** is a control block diagram of an air conditioner according to an embodiment.

[0159] Referring to FIG. **14**, the air conditioner **1** may include a controller **50**, an inputter **60**, a communicator **70**, a blade driver **17**, a blade **16**, a fan motor **31**, a blowing fan **30**, a lever driver **411**, a lever **410**, and a display **80**.

[0160] However, each of the components of the air conditioner **1** shown in FIG. **14** may be omitted according to embodiments, and a configuration not shown in FIG. **14** may be added according to embodiments.

[0161] The air conditioner **1** may include the controller **50** for controlling the operation of the air conditioner. The controller **50** may control each component of the air conditioner **1**. For example, the controller **50** may control the blade driver **17** to adjust the rotation range of the blade **16**. The controller **50** may control the fan motor **31** to adjust the blowing force of the blowing fan **31**. The controller **50** may control the lever driver **411** to operate the lever **411**. A rotation range of the lever **411** may be adjusted by the lever driver **411**.

[0162] The inputter **60** may receive an input from a user. For example, the controller **50** may control each component of the air conditioner **1** based on information received from the inputter **60**. The communicator **70** may communicate with an external terminal (not shown), and may be provided as a wireless communication module. For example, the external terminal may refer to a smart phone, a tablet personal computer (PC), a PC, or the like. The display **80** may display various types of information to the user. For example, the display **80** and the inputter **60** may be integrally provided as a touch panel.

[0163] FIGS. **15** to **20** are views illustrating a guide process of an example of the air conditioner according to an embodiment.

[0164] Referring to FIGS. **15** to **20**, the air conditioner may have the same configuration as that of the above-

described air conditioner except that the guide device **200** is different from that of the air conditioner described above. The same reference numerals may be assigned to the same components, and the same descriptions may be omitted.

[0165] A guide rail **4'** may be disposed between the ceiling inner wall **2** and the indoor-side ceiling **3**. The guide rail **4'** may be disposed on the indoor-side ceiling **3**. Although not shown in the drawings, the guide rail **4'** may be provided to be supported on the ceiling inner wall **2** by a separate support member (not shown).

[0166] The first air conditioning unit **110** and the second air conditioning unit **120** may be detachably coupled to each other. The first housing **11** of the first air conditioning unit **110** and the second housing **12** of the second air conditioning unit **120** may be detachably coupled to each other.

[0167] The guide device **200** may include a first moving rail **230** for guiding the first air conditioning unit **110**. The first moving rail **230** may extend to correspond to the guide rail **4'**. The first moving rail **230** may be provided to be slidably movable along the guide rail **4'**. The first moving rail **230** may be formed on the first housing **11** of the first air conditioning unit **110**.

[0168] The guide device **200** may include a second moving rail **240** for guiding the second air conditioning unit **120**. The second moving rail **240** may extend to correspond to the guide rail **4'**. The second moving rail **240** may be provided to be slidably movable along the guide rail **4'**. The second moving rail **240** may be formed on the second housing **12** of the second air conditioning unit **120**.

[0169] Referring to FIG. **16**, as the lever **410** is driven, the connection member **420** may be moved in linkage with the lever **410**. The hook **320** may be separated from the locking portion **310** by a predetermined force of the connection member **420**. That is, the hook **320** may be released from the locking portion **310**. Locking of the locking portion **310** and the locking portion **310** may be released.

[0170] As the locking of the locking portion **310** and the locking portion **310** is released, the coupling between the first air conditioning unit **110** and the second air conditioning unit **120** may be released. The first air conditioning unit **110** and the second air conditioning unit **120** may be set into a separable state.

[0171] Upon the coupling between the first air conditioning unit **110** and the second air conditioning unit **120** being released, the first air conditioning unit **110** and the second air conditioning unit **120** may be moved individually. The first air conditioning unit **110** may slide along the guide rail **4'**. The second air conditioning unit **120** may slide along the guide rail **4'**.

[0172] Referring to FIG. **17**, the first air conditioning unit **110** may be guided by the first moving rail **230** to slidably move toward the second space S**2**. Referring to FIG. **18**, the first air conditioning unit **110** may be withdrawn from the first space S**1** through the second space S**2**. The maximum length of the first air conditioning unit **110** in the moving direction of the first air conditioning unit **110** may be smaller than the minimum length of the second space S**2** in the moving direction.

[0173] The first air conditioning unit **110** may escape from an area between the ceiling inner wall **2** and the indoor-side ceiling **3** through the first moving rail **230**. Accordingly, a service space may be effectively secured, and maintenance may be facilitated.

[0174] Referring to FIG. **19**, the second air conditioning unit **120** may be guided by the second moving rail **240** to slidably move toward the second space S**2**. Referring to FIG. **20**, the second air conditioning unit **120** may be withdrawn from the first space S**1** through the second space S**2**. The maximum length of the second air conditioning unit **120** in the moving direction of the second air conditioning unit **120** may be smaller than the minimum length of the second space S**2** in the moving direction.

[0175] The second air conditioning unit **120** may escape from an area between the ceiling inner wall **2** and the indoor-side ceiling **3** through the second moving rail **240**. Accordingly, a service space may be effectively secured, and maintenance may be facilitated.

[0176] Meanwhile, the first air conditioning unit **110** and the second air conditioning unit **120** may be provided as one body with each other. The first moving rail **230** and the second moving rail **240** may also be provided as one body. In this case, one moving rail **230** or **240** provided in the air conditioner may slidably move along the guide rail **4'**.

[0177] As shown above, according to one aspect of the disclosure, the air conditioner can be provided with an improved appearance quality.

[0178] According to one aspect of the disclosure, the air conditioner can be provided with ease of maintenance, such as replacement of parts and inspection.

[0179] According to one aspect of the disclosure, the air conditioner can secure a service space.

[0180] Although certain illustrative embodiments and implementations have been described herein, other embodiments and modifications will be apparent from this description. Accordingly, the inventive concepts are not limited to such embodiments, but rather to the broader scope of the appended claims and various obvious modifications and equivalent arrangements as would be apparent to a person of ordinary skill in the art.

What is claimed is:

1. An air conditioner comprising:

a first air conditioning unit disposed in a first space formed between a first ceiling and a second ceiling that is spaced downward from the first ceiling and lower than the first ceiling, the first air conditioning unit configured to suction air from a second space recessed from the second ceiling toward the first ceiling;

a second air conditioning unit disposed in the first space and to communicate with the first air conditioning unit and configured to discharge air introduced from the first air conditioning unit; and

a guide device configured to guide the first air conditioning unit and the second air conditioning unit to move from the first space toward the second space or to move from the second space toward the first space.

2. The air conditioner of claim **1**, wherein the first air conditioning unit and the second air conditioning unit are detachably coupled to each other, and

the air conditioner further comprises a locking device configured to couple the first air conditioning unit to the second air conditioning unit.

3. The air conditioner of claim **2**, further comprising an unlocking device to be connected to the locking device to release the coupling between the first air conditioning unit and the second air conditioning unit by the locking device.

4. The air conditioner of claim **1**, wherein the first air conditioning unit further includes a first housing supported

by the first ceiling and a suction port formed at a lateral side of the first housing while communicating with the second space; and

the second air conditioning unit further includes a second housing supported by the first ceiling and detachably coupled to the first housing and a discharge port formed at a lower side of the second housing to discharge the air introduced from the first air conditioning unit.

5. The air conditioner of claim **4**, wherein in response to separating the first housing of the first air conditioning unit and the second housing of the second air conditioning unit from each other, each of the first air conditioning unit and the second air conditioning unit is withdrawable from the first space through the second space.

6. The air conditioner of claim **4**, wherein the guide device includes:

a first guide member configured to guide the first air conditioning unit, the first guide member including a first moving roller slidably movable along a guide rail installed on the first ceiling and a first support member connected to the first moving roller to support the first housing; and

a second guide member configured to guide the second air conditioning unit, the second guide member including a second moving roller slidably movable along the guide rail and a second support member connected to the second moving roller to support the second housing.

7. The air conditioner of claim **4**, wherein the guide device includes:

a first moving rail configured to guide the first air conditioning unit, the first moving rail formed on the first housing of the first air conditioning unit and slidably movable along a guide rail disposed between the first ceiling and the second ceiling; and

a second moving rail configured to guide the second air conditioning unit, the second moving rail formed on the second housing of the second air conditioning unit and slidably movable along the guide rail.

8. The air conditioner of claim **3**, wherein the locking device further includes:

a locking portion formed on one of the first air conditioning unit and the second air conditioning unit, and a hook formed on an other one of the first air conditioning unit and the second air conditioning unit to be locked by the locking portion, and

the unlicking device further includes a lever to separate the hook from the locking portion.

9. The air conditioner of claim **8**, wherein the unlocking device further includes a connection member connecting the lever to the hook and configured to rotate the hook in linkage with the lever.

10. The air conditioner of claim **8**, wherein the locking portion of the locking device further includes an inclined surface sloping upward in a direction in which the first air conditioning unit is coupled to the second air conditioning unit, and

in response to coupling the first air conditioning unit and the second air conditioning unit to each other, the hook of the locking device moves along the inclined surface of the locking portion to be locked with the locking portion.

11. The air conditioner of claim **4**, further comprising:

a heat exchanger accommodated in the first housing of the first air conditioning unit to exchange heat with the air suctioned through the suction port; and

a blowing fan accommodated in the second housing of the second air conditioning unit to guide the air passed through the heat exchanger to flow toward the discharge port.

12. The air conditioner of claim **4**, further comprising a discharge panel installed on the second ceiling to correspond to the discharge port and exposed downward of the second ceiling.

13. The air conditioner of claim **1**, wherein a maximum length of the first air conditioning unit in a moving direction of the first air conditioning unit is smaller than a minimum length of the second space in the moving direction, and a maximum length of the second air conditioning unit in the moving direction is smaller than the minimum length of the second space in the moving direction.

14. The air conditioner of claim **8**, wherein the locking device further includes a torsion spring to elastically bias the hook in a direction in which the hook is locked with the locking portion.

15. The air conditioner of claim **6**, wherein each of the first moving roller and the second moving roller further includes:

a roller body forming a moving center; and

roller wheels formed at opposite ends of the roller body to be supported by the guide rail, and to rotate on the guide rail,

wherein the guide rail further includes:

a seating portion on which the roller wheels are seated; and

a separation preventing portion extending from the seating portion to prevent separation of the roller wheels.

16. An air conditioner including:

a first housing slidably movable in a first space formed between a first ceiling and a second ceiling that is spaced downward from the first ceiling by a first interval;

a suction port formed in the first housing and configured to communicate with a second space formed by a horizontal panel spaced downward from the first ceiling by a second interval smaller than the first interval and a vertical panel extending from the horizontal panel toward the second ceiling, and to suction air from the second space therethrough;

a heat exchanger accommodated in the first housing and to heat-exchange with the air suctioned through the suction port;

a second housing detachably coupled to the first housing and slidably movable in the first space;

a discharge port formed in the second housing to discharge air to indoors; and

a blowing fan accommodated in the second housing to allow the air having heat exchanged with the heat exchanger to flow to the discharge port,

wherein each of the first housing and the second housing is withdrawable from the first space through the second space.

17. The air conditioner of claim **16**, further comprising a locking device to allow the first housing and the second housing to be locked with each other and an unlocking

device to move the locking device such that locking of the first housing and the second housing by the locking device is released.

18. The air conditioner of claim **16**, further comprising a guide device to guide a sliding movement of the first housing and a sliding movement of the second housing such that the first housing and the second housing are movable between the first space and the second space.

19. The air conditioner of claim **17**, wherein the locking device further comprises a locking portion formed on the second housing and a hook formed on the first housing to be locked with the locking portion, and the unlocking device further includes a wire connected to the hook and a lever to pull the wire such that the hook is unlocked from the locking portion.

20. The air conditioner of claim **16**, further comprising a sealing member between the first housing and the second housing such that, in response to coupling the first housing to the second housing, air flowing in the first housing and the second housing is prevented from leaking to the outside of the first housing and the second housing.

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