(12) STANDARD PATENT (11) Application No. **AU 2021445984 B2**
(19) AUSTRALIAN PATENT OFFICE

(54) Title
INDOOR UNIT FOR AIR CONDITIONER

(51) International Patent Classification(s)
F24F 13/20 (2006.01)

(21) Application No: **2021445984** (22) Date of Filing: **2021.05.19**

(87) WIPO No: **WO22/244124**

(43) Publication Date: **2022.11.24**
(44) Accepted Journal Date: **2024.11.07**

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(56) Related Art
US 8627672 B2
KR 102168584 B1

(12) 特許協力条約に基づいて公開された国際出願

(19) 世界知的所有権機関
国際事務局

(43) 国際公開日
2022年11月24日(24.11.2022)

WIPO | PCT

(10) 国際公開番号
WO 2022/244124 A1

(51) 国際特許分類:
F24F 13/20 (2006.01)

(21) 国際出願番号： PCT/JP2021/018898

(22) 国際出願日： 2021年5月19日(19.05.2021)

(25) 国際出願の言語： 日本語

(26) 国際公開の言語： 日本語

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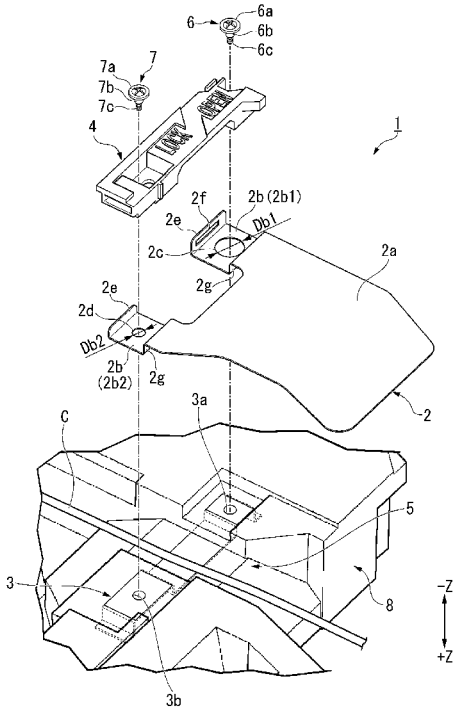
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(81) 指定国(表示のない限り、全ての種類の国内保護が可能): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, IT, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL,

(54) **Title:** INDOOR UNIT FOR AIR CONDITIONER

(54) 発明の名称： 空気調和機の室内機



(57) **Abstract:** This indoor unit for an air conditioner comprises: a cover member that can be moved between a cover position at which a portion of a wiring part is covered and an open position at which the wiring part is open; a slide member that can move in a sliding direction between a restriction position and a release position; and a first support member that has a head which supports from below the slide member in the restriction position and a shoulder part having a smaller diameter than the head, wherein the cover member has a first locking part in which is formed a first insertion hole through which the shoulder part is inserted, the first locking part is positioned above the slide member, and the equation La1 > Ta1 + Tb1 is satisfied.

(57) 要約：空気調和機の室内機は、通線部の少なくとも一部を覆うカバー位置と前記通線部を開放した開放位置との間で移動可能なカバー部材と、規制位置と解除位置との間でスライド方向に移動可能なスライド部材と、前記規制位置にある前記スライド部材を下方から支持するヘッドおよび前記ヘッドよりも径が小さいショルダー部を有する第１支持部材と、を備え、前記カバー部材は、前記ショルダー部が挿通される第１挿通孔が形成された第１係止部を有し、前記第１係止部は前記スライド部材よりも上方に位置し、Ｌａ１＞Ｔａ１＋Ｔｂ１を満たす。

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［続葉有］

ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) 指定国(表示のない限り、全ての種類の広域保護が可能): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), ユーラシア (AM, AZ, BY, KG, KZ, RU, TJ, TM), ヨーロッパ (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

添付公開書類:

一　国際調査報告（条約第21条(3)）

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[Technical Field]

[0001]

The present disclosure relates to an indoor unit of an air conditioner.

[Background]

[0002]

An indoor unit of an air conditioner described in Patent Document 1 includes a lid that opens and closes a wire passing portion that passes an electric cable or the like. The lid has a notch portion and is fixed using a screw. When opening and closing the lid, the screw is loosened using a tool such as a driver or the like to cause the lid to slide.

[Patent Document]

[0003]

[Patent Document 1]: Japanese Unexamined Patent Application, First Publication No. 2018-159525

[0004]

In a typical indoor unit of an air conditioner, when opening and closing a lid, there is room to improve workability, since the use of a tool such as a driver or the like for loosening and tightening operations of a screw is needed.

[0005]

It is desired to address or alleviate one or more disadvantages or limitations of the prior art, or to at least provide a useful alternative, for example by providing an indoor unit of an air conditioner that makes it easier to carry out the opening and closing operation of a wire passing portion

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[Summary]

[0006]

An indoor unit of an air conditioner according to the present embodiment includes a wire passing portion that passes a cable, a covering member that is movable between a covering position where the covering member covers at least a portion of the wire passing portion and an opening position where the wire passing portion is opened, a sliding member that is movable along a sliding direction between a restricting position that restricts a movement of the covering member and a releasing position that allows the movement of the covering member, and a first support member that has a head that supports the sliding member in the restricting position from a bottom side and a shoulder portion with a diameter that is smaller than the head. The covering member has a first locking portion in which a first insertion hole that passes the shoulder portion through is formed, the first locking portion is positioned in a top side more than the sliding member, and in an up-down direction, when a length in the up-down direction of the shoulder portion is La1, a thickness of a portion supported by the head out of thicknesses of the sliding member is Ta1, and a thickness of the first locking portion is Tb1, La1>Ta1+Tb1 is satisfied.

[0007]

According to the present disclosure, it is possible to provide an indoor unit of an air conditioner that makes it easier to carry out an opening and closing operation of a wire passing portion.

[Brief Description of Drawings]

[0008]

One or more embodiments of the present invention are hereinafter described, by way of

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example only, with reference to the accompanying drawings in which:

FIG. 1 is a view that shows an example of a configuration of an air conditioner in an embodiment.

FIG. 2 is a perspective view of a state where a decorative panel is attached to an indoor unit in the embodiment.

FIG. 3 is a perspective view of a state where the decorative panel is removed from the indoor unit of FIG. 2.

FIG. 4 is an enlarged view of a vicinity of an opening and closing mechanism in the embodiment.

FIG. 5 is an exploded view of the opening and closing mechanism in the embodiment.

FIG. 6 is a perspective view as seen from a bottom side of a sliding member in the embodiment.

FIG. 7 is a view as seen from a top side of a sliding member in the embodiment.

FIG. 8 is a perspective view of the opening and closing mechanism when a covering member is in a covering position in the embodiment.

FIG. 9 is a cross-sectional view of the opening and closing mechanism when the sliding member is in a restricting position in the embodiment.

FIG. 10 is a cross-sectional view of the opening and closing mechanism when the sliding member is in a releasing position in the embodiment.

FIG. 11 is a perspective view of the opening and closing mechanism when the covering member is inclined to the bottom side in the embodiment.

FIG. 12 is a perspective view of the opening and closing mechanism when the covering member of FIG. 11 is moved to an opening position.

[Detailed Description]

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[0009]

Hereinafter, an embodiment is explained with reference to drawings. In explanations below, terms that define directions (for example, up, down or the like) are used where appropriate to facilitate understanding. In drawings, an up-down direction is represented by a Z axis. The +Z side is a top side, and the –Z side is a bottom side.

[0010]

First Embodiment

FIG. 1 is a view that shows an example of a configuration of an air conditioner A according to a present embodiment. The air conditioner A includes an indoor unit 100, an outdoor unit 200, a gas refrigerant pipe 300, and a liquid refrigerant 400. Each of the gas refrigerant pipe 300 and the liquid refrigerant pipe 400 are connected to the indoor unit 100 and the outdoor unit 200. The outdoor unit 200 has a compressor 210, a four-way valve 220, an outdoor heat exchanger 230, and an expansion valve 240.

[0011]

The compressor 210 compresses and discharges a coolant that is absorbed. For example, it is possible for the compressor 210 to change a capacity of the compressor 210 (an amount of the coolant being transported per unit time) by optionally changing an operational frequency using an inverter circuit or the like. The four-way valve 220 is a valve that switches the flow of the coolant between a cooler operation and a heater operation.

[0012]

The outdoor heat exchanger 230 conducts heat exchange between the coolant and the air (outdoor air). For example, when in heater operation, the outdoor heat exchanger 230 functions as an evaporator, evaporating the coolant of a liquid phase. When in cooler operation, the outdoor heat exchanger 230 functions as a condenser to

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condense the coolant of a vapor phase.

[0013]

The expansion valve 240 is a flow amount control means to control the amount of the coolant flow. The expansion valve 240 expands the coolant by decompressing the coolant. For example, in a case where the expansion valve 240 is electronic, the expansion valve 240 conducts an adjustment of a degree of opening, based on a command from a control device (not shown) or the like. An interior heat exchanger 110 conducts heat exchange between inside air and the coolant. When in heater operation, the interior heat exchanger 110 functions as the condenser, and condenses the coolant. When in cooler operation, the interior heat exchanger 110 functions as the evaporator, and evaporates the coolant.

The air conditioner A is configured as described above, and it is possible to realize the heater operation and the cooler operation by switching the flow of the coolant using the four-way valve 220.

[0014]

FIG. 2 is a perspective view of a state where a decorative panel 50 is attached to the indoor unit 100 in the embodiment. FIG. 3 is a perspective view of a state where the decorative panel 50 is removed from the indoor unit 100. As an example of the indoor unit 100, a four-directional cassette type indoor unit that sends air indoors from each of four air outlets 52 is shown. However, it is possible to apply the indoor unit 100 that is not a four-directional cassette type to a present disclosure.

[0015]

As shown in FIG. 3, the indoor unit 100 includes a housing 8 that opens towards the bottom side. The housing 8 is formed of a heat insulator for example. The decorative panel 50 is square shaped, and covers an opening portion of a bottom end of

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the housing 8. The indoor unit 100 is installed to an indoor ceiling in a state where the decorative panel 50 is disposed in an indoor space, and most of the housing 8 or the like is disposed on a back side of the ceiling (a top side from a ceiling surface). As shown in FIG. 2, the decorative panel 50 has an air inlet 51, and four air outlets 52. The air inlet 51 is provided in a center of the decorative panel 50, and is used to draw air into the indoor unit 100. The four air outlets 52 are disposed along each side (four sides) of the square shaped decorative panel 50, on a circumference of the air inlet 51. Each of the air outlets 52 is used to blow out air of which a temperature is adjusted to an indoors.

[0016]

As shown in FIG. 3, when the decorative panel 50 is removed from the housing 8 an opening and closing mechanism 1 is exposed. FIG. 4 is an enlarged view of a vicinity of the opening and closing mechanism 1 seen from the top side. A wiring opening 10 is provided right underneath the gas refrigerant pipe 300 and the connection pipe 9 of the liquid refrigerant pipe 400 to insert a cable C through. The opening and closing mechanism 1 is provided further in the bottom side of the wiring opening 10. The cable C is for example a power cable or the like to supply electric power to the indoor unit 100. The cable C may be a transmission cable to conduct transmission between the indoor unit 100 and the outdoor unit 200. In the figure, although a number of the cable C is one, a case where a plurality of cables C are bundled may exist.

[0017]

FIG. 5 is an exploded view of the opening and closing mechanism 1 in the embodiment. The opening and closing mechanism 1 is configured to make opening and closing of a wire passing portion 5 that the indoor unit 100 has possible. The wire passing portion 5 is provided to pass the cable C, extending from an inside of the indoor unit 100 to the outside. Although the view of the wiring opening 10 is omitted from

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FIG. 5, the cable C is drawn out from the inside of the indoor unit 100 to the outside passing the wire passing portion 5 and the wiring opening 10. The wire passing portion 5 in the present embodiment is a depression that sinks to the top side from a bottom surface of the housing 8. Further, the wire passing portion 5 may be formed in a configuration element other than the housing 8 out of the configuration elements of the indoor unit 100.

[0018]

As shown in FIG. 5, the opening and closing mechanism 1 has a covering member 2, a fixing member 3, a sliding member 4, a first support member 6 and a second support member 7. The first support member 6 has a head 6a, a shoulder portion 6b, and a thread portion 6c. The second support member 7 has a head 7a, a shoulder portion 7b, and a thread portion 7c.

In other words, the first support member 6 and the second support member 7 is a shoulder bolt. The first support member 6 and the second support member 7 may have the same shape, and in such a case, and it is possible to commonly use parts in such case.

[0019]

The covering member 2 is disposed so as to cover the wire passing portion 5 from the bottom side. The covering member 2 has a cover main body 2a and locking portions 2b. The cover main body 2a is a plate shape that extends along a flat surface that is orthogonal to an up-down direction. Two connection portions 2g that protrude towards the up-down (+Z side) are formed on ends out of ends of the cover main body 2a. Each of the locking portions 2b extends farther away from the cover main body 2a from a top end portion of each of the connection portions 2g. In other words, each of the connection portions 2g connects each of the locking portions 2b to the cover main body 2a. Both of the locking portions 2b are positioned in the top side more so than the

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sliding member 4. When the sliding member 4 is supported by the first support member 6 and the second support member 7 from the bottom side, two locking portions 2b are supported from the bottom side by the sliding member 4. In other words, the two locking portions 2b are indirectly supported by the first support member 6 and the second support member 7.

[0020]

The two locking portions 2b are located on the top side more than the cover main body 2a. Guide walls 2e are formed in each of the locking portions 2b. Each of the guide walls 2e protrudes towards to the bottom side from an end of an opposite side of the connection portions 2g in each of the locking portions 2b. Each of the guide walls 2e faces each of the connection portions 2g. A first insertion hole 2c is formed on one out of the two locking portions 2b, while a second insertion hole 2d is formed on the other of the two locking portions 2b. In the explanation below, a locking portion 2b having the first insertion hole 2c formed is referred to as a "first locking portion 2b1", while the locking portion 2b having the second insertion hole 2d formed is referred to a as "second locking portion 2b2". A guide groove 2f is formed on a guide wall 2e of the first locking portion 2b1. The guide groove 2f penetrates the guide wall 2e, and has a long thin shape that extends along a direction the two locking portions 2b are arranged in. A sliding direction of the sliding member 4 coincides with a longitudinal direction of the guide groove 2f. In the present description, an inner diameter of the first insertion hole 2c is represented as an "inner diameter Db1". An inner diameter of the second insertion hole 2d is represented as an "inner diameter Db2". The inner diameter Db1 is larger than the inner diameter Db2.

[0021]

The fixing member 3 is fixed to the housing 8. In the present embodiment, the

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fixing member 3 is formed by working a sheet metal and insert molding the fixing member 3 into the housing 8. However, the fixing member 3 may be fixed to the housing 8 by methods other than insert molding (for example, thread fastening or adhesive fixing). A first thread hole 3a and a second thread hole 3b are formed in the fixing member 3. The first thread hole 3a is disposed in a location that overlaps with the first insertion hole 2c, and the second thread hole 3b is disposed in a location that overlaps with the second insertion hole 2d. The first support member 6 that passes through the first insertion hole 2c in the first thread hole 3a is tightened. The second support member 7 that passes through the second insertion hole 2d in the second thread hole 3b is tightened.

[0022]

FIG. 6 is a perspective view of the sliding member 4 as seen from the bottom side, and FIG. 7 is a view of the sliding member 4 as seen from the top side. As shown in FIG. 6 and FIG. 7, the sliding member 4 has a notch portion 4a that passes the shoulder portion 6b of the first support member 6, and a long hole 4b that passes the shoulder portion 7b of the second support member 7 through. The sliding member 4 is slidably movable along the sliding direction shown in FIG. 6. The sliding direction in FIG. 6 or the like is represented by a Y axis. A direction orthogonal to both the up-down direction (Z axis) and the sliding direction (Y axis) is referred to as an "orthogonal direction", and is represented by an X axis in FIG. 6 or the like.

[0023]

The sliding direction is also a direction in which the notch portion 4a and the long hole 4b are arranged. Out of directions of the sliding direction, a direction from the long hole 4b towards the notch portion 4a is referred to as a "locking direction", a direction from the notch portion 4a towards the long hole 4b is referred to as an "opening

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direction". In FIG. 6 or the like, a +Y side is the opening direction, and a -Y side is the locking side. A viewing portion that shows the locking direction and the opening direction is provided on a bottom surface of the sliding member 4. Specifically, along with letters "OPEN" and "LOCK", arrows indicating each direction are formed as the viewing portion. By having the sliding member 4 slide with respect to the fixing member 3, it is possible for the sliding member 4 to switch between a state where a movement of the covering member 2 is restricted, and a state where the movement of the covering member 2 is allowable. A location of the sliding member 4 in a state where the movement of the covering member 2 is restricted is referred to as a "restricted location". The location of the sliding member 4 in a state where the movement of the covering member 2 is allowable is referred to as a "releasing position".

[0024]

The sliding member 4 has the notch portion 4a that has a first area 4c, the long hole 4b that has a second area 4d, and a transition portion 4e that connects the first area 4c and the second area 4d. A first restricting surface 4d1 and a second restricting surface 4d2 are provided towards the bottom side in the second area 4d. The second restricting surface 4d2 is located so as to be more in the bottom side than the first restricting surface 4d1. The second restricting surface 4d2 is provided so as to be more on the opening direction opening direction (+Y side) than the first restricting surface 4d1. The long hole 4b is formed so as to straddle across the first restricting surface 4d1 and the second restricting surface 4d2. In other words, the long hole 4b is formed so as to straddle a step of the up-down direction provided in the second area 4d.

[0025]

As shown in FIG. 7, the notch portion 4a opens towards the -Y side (locking direction). Protrusions 4f are formed on each surface of a pair of side surfaces that the

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long hole 4b has. A "side surface of the long hole 4b" is a surface that extends along the sliding direction on the inside of the long hole 4b. The pair of protrusions 4f are disposed in a location where the pair of protrusions 4f mutually face one another in the orthogonal direction to the sliding direction. In the present description, a width of the notch portion 4a in the orthogonal direction (X axis) is represented as a "width W1". A gap between the pair of side surfaces of the long hole 4b in the orthogonal direction is represented as a "width W2". A gap between the pair of protrusions 4f in the orthogonal direction is represented as a "width Wt2". An outer diameter of the shoulder portion 7b of the second support member 7 is represented as an "outer diameter Dc2" (refer to FIG. 9). In the present embodiment $Wt2 < Dc2 < W2$.

[0026]

The pair of protrusions 4f have a function of restricting the sliding member 4 from unintentionally moving (due to vibrations or the like) in the sliding direction with respect to the second support member 7, in a state where the shoulder portion 7b of the second support member 7 is passed through the inside of the long hole 4b. When an operator moves the sliding member 4 to a space between the restricting position and the releasing position, the protrusions 4f go over the second support member 7 in the sliding direction. At this time, the protrusions 4f and surrounding parts elastically deform the width W1 of the long hole 4b so that the width W1 expands. By having both of the protrusions 4f provided so as to face one another, it is possible to make an amount of the above elastic deformation be small. However, even if a number of the protrusions 4f is one, it is possible to demonstrate the function of restricting the sliding member 4 from unintentionally moving.

[0027]

As shown in FIG. 6, an operation portion 4g is provided on each of both ends of the

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sliding member 4 in the sliding direction. The operation portion 4g is utilized by the operator when moving the sliding member 4 in the sliding direction. For example, when moving the sliding member 4 to the opening direction, the operator pushes in the operation portion 4g located on an end in the locking direction (-Y side). Inversely, when moving the sliding member 4 to the locking direction, the operator pushes in the operation portion 4g located on the end in the opening direction (+Y). The operation portion 4g in the present embodiment are both ends of the sliding member 4 in the sliding direction. However, a shape of the operation portion 4g may be changed appropriately, and may for example be a protruding shape or a ringed shape. When providing a shape (for example, a protruding shape of a ringed shape) such that it is possible for the operator to easily push or pull the operation portion 4g, it is possible to make a number of operation portions 4g the sliding member 4 has be one.

[0028]

As shown in FIG. 6, a guide claw 4h is formed on the sliding member 4. The guide claw 4h forms an L shape when seen from the sliding direction. As shown in FIG. 8, the guide claw 4h is inserted into the guide groove 2f of the covering member 2. A part of the guide claw 4h protruding to the bottom side is locked to one of the guide walls 2e from the -X side. The guide claw 4h and the guide groove 2f make it possible for the sliding member 4 to move in the sliding direction with respect to the covering member 2, and make it possible for the covering member 2 and the sliding member 4 to integrally rotate.

[0029]

FIG. 9 is a cross-sectional view of the opening and closing mechanism 1 when the sliding member 4 is in the restricting position. The shoulder portion 6b of the first support member 6 passes through the notch portion 4a of the sliding member 4 (refer to

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FIG. 7) and the first insertion hole 2c of the covering member 2. In this state, the thread portion 6c of the first support member 6 is tightened to the first thread hole 3a. The shoulder portion 7b of the second support member 7 passes through the long hole 4b of the sliding member 4 and the second insertion hole 2d of the covering member 2. In this state, the thread portion 7c of the second support member 7 is tightened to the second thread hole 3b.

[0030]

The first locking portion 2b1 of the covering member 2 and the sliding member 4 are sandwiched between the head 6a of the first support member 6 and the fixing member 3. The second locking portion 2b2 of the covering member 2 and the sliding member 4 are sandwiched between the head 7a of the second support member 7 and the fixing member 3. When the sliding member 4 is in the restricting position (FIG. 9), the head 7a of the second support member 7 overlaps the second restricting surface 4d2 in the up-down direction.

[0031]

Although an outer diameter Da1 of the head 6a of the first support member 6 is larger than the width W1 of the notch portion 4a of the sliding member 4, the outer diameter Da1 is smaller than the inner diameter Db1 of the first insertion hole. In other words, Db1>Da1>W1 is satisfied.

Although an outer diameter Da2 of the head 7a of the second support member 7 is larger than the width W2 of the long hole 4b of the sliding member 4, the outer diameter Da2 is larger than the inner diameter Db2 of the second insertion hole 2d of the covering member 2. In other words, Da2>W2 and Da2>Db2 are satisfied.

[0032]

As shown in FIG. 9, a length in the up-down direction of the shoulder portion 6b

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of the first support member 6 is represented by a "dimension La1". A thickness in the up-down direction of a part, the sliding member 4, sandwiched between the head 6a of the first support member 6 and the first locking portion 2b1 is represented by a "thickness Ta1". In other words, out of thicknesses of the sliding member 4, the thickness Ta1 is the thickness in the up-down direction of a part that is supported from the bottom side by the head 6a. A thickness (plate thickness) in the up-down direction of the first locking portion 2b1 is represented by a "thickness Tb1". The dimension La1 is larger than the sum of sum total of the thickness Ta1 and the thickness Tb1. In other words, La1>Ta1+Tb1 is satisfied. Due to the above, the first support member 6 is tightened to the first thread hole 3a, and even in a state where the shoulder portion 6b contacts the fixing member 3, the covering member 2 and the sliding member 4 are not in a state of being compressed between the head 6a and the fixing member 3.

[0033]

As shown in FIG. 9, a length in the up-down direction of the shoulder portion 7b of the second support member 7 is represented by a "dimension La2". A thickness in the up-down direction of the sliding member 4 of a part sandwiched between the head 7a of the second support member 7 and the second locking portion 2b2 is represented by a "thickness Ta2" when the sliding member 4 is in the restricting position. In other words, out of the thicknesses in the sliding member 4, the thickness Ta2 is the thickness in the up-down direction of a part that is supported from the bottom side by the head 7a. A thickness (plate thickness) in the up-down direction of the second locking portion 2b2 is represented by a "thickness Tb2". The dimension La2 is larger than the sum of sum total of the thickness Ta2 and the thickness Tb2. In other words, La2>Ta2+Tb2 is satisfied. Due to the above, the second support member 7 is tightened to the second thread hole 3b, and even in a state where the shoulder portion 7b contacts the fixing

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member 3, the covering member 2 and the sliding member 4 are not in a state of being compressed between the head 7a and the fixing member 3.

[0034]

Satisfying La1>Ta1+Tb1 means that play (backlash) of the up-down direction exists between the head 6a of the first support member 6, the sliding member 4, the first locking portion 2b1, and the fixing member 3. Similarly, satisfying La2>Ta2+Tb2 means that play exists between the head 7a of the second support member 7, the sliding member 4, the second locking portion 2b2, and the fixing member 3. From such a configuration, even if the sliding member 4 is in the restricting position, the sliding member 4 is not completely fixed. Therefore, it is possible to move the sliding member 4 that is in the restricting position in the sliding direction. To minimize the backlash of the opening and closing mechanism 1 when the sliding member 4 is in the restricting position, it is preferable to have a value of La2-(Ta2+Tb2) and La1-(Ta1+Tb1)) be less than 1mm.

[0035]

When the sliding member 4 is in the restricting position, the protrusions 4f (refer to FIG. 7) are positioned so as to be more in the locking direction (-Y side) than the shoulder portion 7b of the second support member 7. As mentioned earlier, Wt2<Dc2<W2 is satisfied in the present embodiment. To move the sliding member 4 to the releasing position, a force of the opening direction is applied to the sliding member 4, and the protrusions 4f go over the shoulder portion 7b of the second support member 7 in the opening direction (+Y side). From the above, the sliding member 4 moves to the releasing position. In the releasing position, the protrusions 4f are more towards the opening direction from the center of the shoulder portion 7b of the second support member 7. At such time, an opening of the notch portion 4a passes through to the

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opening direction of the shoulder portion 6b of the first support member 6 in the first area 4c. Therefore, the notch portion 4a separates from the first support member 6.

[0036]

FIG. 10 is a cross-sectional view of the sliding member 4 that is shifted further in the bottom side when the sliding member 4 is moved to the releasing position in the sliding direction. The shoulder portion 7b of the second support member 7 separates to the locking direction (-Y side) with respect to the second restricting surface 4d2 when the sliding member 4 is in the releasing position. A thickness in the up-down direction of the sliding member 4 of a part sandwiched between the head 7a of the second support member 7 and the second locking portion 2b2 is represented by a "thickness Tc2" when the sliding member 4 is in the releasing position. The thickness Tc2 is a plate thickness of the sliding member 4 in a part where the first restricting surface 4d1 is provided in the present embodiment. The thickness Tc2 is less than the previously mentioned thickness Ta2. Due to the above, a possible movement amount in the up-down direction of the sliding member 4 and the second locking portion 2b2 increases by a difference between the thickness Ta2 and the thickness Tc2. From the above, it is possible to greatly incline the sliding member 4 and the second locking portion 2b2 between the head 7a of the second support member 7 and the fixing member 3.

[0037]

FIG. 11 is a perspective view in a state where the sliding member 4 is tilted to the bottom side, where a vicinity of the second support member 7 as the center. By having the guide claw 4h be locked by the guide groove 2f, the covering member 2 and the sliding member 4 incline to the bottom side as one entity when the sliding member 4 is inclined to the bottom side. When the covering member 2 is inclined as shown in FIG. 11, the first locking portion 2b1 separates to the bottom side from the first support

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member 6 and the first insertion hole 2c passes through the head 6a of the first support member 6 to the bottom side. From the above, it is possible for the covering member 2 to be rotatable around the up-down direction (Z axis), with the second insertion hole 2d (second support member 7) as the center.

[0038]

FIG. 12 is a view of a state where the cover main body 2a is distanced from the wire passing portion 5, and the covering member 2 is rotated around the up-down direction, having the second insertion hole 2d and the second support member 7 as a center. As shown in FIG. 12, a position of the covering member 2 in a state where the wire passing portion 5 is opened is referred to as an "opening position". As opposed to the above, as shown in FIG. 8, the position of the covering member 2 where the covering member 2 covers at least a portion of the wire passing portion 5 is referred to as a "covering position". It is possible for the covering member 2 to be rotatable between the covering position and the opening position, with the second insertion hole 2d and the second support member 7 as the center. By having the guide claw 4h be locked by the guide groove 2f, it is possible for the sliding member 4 to rotate as one entity with the covering member 2. By opening the wire passing portion 5, the cover main body 2a is distanced from the wire passing portion 5, and the cable C is exposed. From the above, it is possible to conduct maintenance operations related to the cable C. At such time, the first support member 6 and the second support member 7 remain fixed to the fixing member 3. In other words, it is possible to open the wire passing portion 5 without the need to manipulate the first support member 6 and the second support member 7 with tools or the like. Also, the sliding member 4 and the covering member 2 are not distanced from the second support member 7, and are supported by the fixed head 7a of the second support member 7. Therefore, there is no need to remove and temporarily

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store the covering member 2 and the sliding member 4 when conducting maintenance operations.

[0039]

After maintenance operations, the cover main body 2a rotates the covering member 2 around the second support member 7 to a position that overlaps with the wire passing portion 5 when returning the opening and closing mechanism 1 to an original position thereof. Next, the first locking portion 2b1 is pushed up, and the head 6a of the first support member 6 is passed through an inside of the first insertion hole 2c. In this state, the sliding member 4 is slid from the releasing position to the restricting position and the locking direction. From the above, the shoulder portion 6b of the first support member 6 settles in the notch portion 4a in the first area 4c, and the sliding member 4 and the first locking portion 2b1 are locked by the head 6a of the first support member 6. Simultaneously, the protrusions 4f go over the shoulder portion 7b of the second support member 7 in the locking direction (-Y side) at the second area 4d. The second restricting surface 4d2 and the second locking portion 2b2 are locked by the head 7a of the second support member 7. From the above, it is possible to return the covering member 2 to a state where the covering member 2 covers the wire passing portion 5.

[0040]

As shown in FIG. 9, when the sliding member 4 is returned to the restricting position, the play between the head 7a of the second support member 7 and the fixing member 3 becomes smaller. Due to the above, a large inclination of the covering member 2 and the sliding member 4 between the head 7a and the fixing member 3 is restricted. As such, the movement of the covering member 2 is restricted by returning the sliding member 4 back to the restricting position.

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[0041]

As in the above, the opening and closing mechanism 1 is configured such that it is possible to open the wire passing portion 5 without loosening the first support member 6 and the second support member 7. In other words, there is no need for any tools (screw drivers or the like) to loosen the first support member 6 and the second support member 7. However, a case where the operator mistakenly loosens the first support member 6 and the second support member 7 is conceivable. To suppress such erroneous operation, in the sliding member 4, a first blind 4i and a second blind 4j (refer to FIG. 6 or the like) are formed.

[0042]

As shown in FIG. 9, the first blind 4i covers at least a portion of the first support member 6 from the bottom side when the sliding member 4 is in the restricting position. Similarly, the second blind 4j covers at least a portion of the second support member 7 from the bottom side when the sliding member 4 is in the restricting position. From such a configuration, it becomes harder for the operator to see the first support member 6 and the second support member 7, and it becomes difficult to conduct loosening operations of the first support member 6 and the second support member 7 with tools or the like. Therefore, it is possible to suppress erroneous operations. As shown in FIG. 10, the first blind 4i and the second blind 4j are distanced from the first support member 6 and the second support member 7 when the sliding member 4 is moved to the releasing position. Therefore, it is possible to easily tighten the first support member 6 and the second support member 7 to the fixing member 3 when setting the indoor unit 100.

[0043]

As explained above, the indoor unit 100 of the air conditioner A according to the present embodiment includes the wire passing portion 5 to pass the cable C, the covering

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member 2 movable between the covering position where at least a portion of the wire passing portion 5 is covered and the opening positon where the wire passing portion 5 is opened, the sliding member 4 that is movable in the sliding direction between the restricting position that restricts the movement of the covering member 2 and the releasing position that allows the movement of the covering member 2, and the first support member 6 that has the head 6a and the shoulder portion 6b having a smaller diameter than the head 6a supporting the sliding member 4 in the restricting position from the bottom side. The covering member 2 has the first locking portion 2b1 in which the first insertion hole 2c that passes the shoulder portion 6b through is formed. The first locking portion 2b1 is positioned in the top side more than the sliding member 4. In the up-down direction, when the dimension of the shoulder portion 6b is La1, the thickness of a portion supported by the head 6a out of the thicknesses of the sliding member 4 is Ta1, and the thickness of the first locking portion 2b1 is Tb1, La1>Ta1+Tb1 is satisfied.

[0044]

From the configuration above, the sliding member 4 is supported from the bottom side by the head 6a of the first support member 6 when the sliding member 4 is in the restricting position. Simultaneously, the first locking portion 2b1 that is positioned more in the top side than the than the sliding member 4 is supported. Therefore, dangling due to weights of the sliding member 4 and the covering member 2 is suppressed. By moving the sliding member 4 to the releasing positon, the movement of the covering member 2 is allowed, and it is possible to move the covering member 2 from the covering position to the opening position. Therefore, it is possible to open the wire passing portion 5 to expose the cable C. By satisfying La1>Ta1+Tb1, no compression forces in the up-down direction are received by the sliding member 4 and

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the first locking portion 2b1 from the head 6a even when the first support member 6 is in a state of being tightened. Therefore, it is possible to move the sliding member 4 from the restricting position to the releasing position. Since no tools such as screw drivers or the like are needed to move the sliding member 4, it is possible to improve usability compared to a conventional case.

[0045]

The inner diameter Db1 of the first insertion hole 2c is larger than the outer diameter Da1 of the head 6a. From such a configuration, it is possible to move the covering member 2 so that the first insertion hole 2c passes through the head 6a in the bottom side when the sliding member 4 is positioned in the releasing position. From the above, it is possible to easily move the covering member 2 to the releasing position, dissolving the state where the first locking portion 2b1 is supported by the head 6a.

[0046]

The notch portion 4a that passes the shoulder portion 6b is formed in the sliding member 4. The notch portion 4a is open towards one side (-Y side) in the sliding direction. From such a configuration, it is possible to separate the shoulder portion 6b from the notch portion 4a when the sliding member 4 is slid to the releasing position. Therefore, it is possible to easily release a support by the head 6a of the sliding member 4.

[0047]

The indoor unit 100 further includes the second support member 7 that supports from the bottom side the sliding member 4 in the restricting position and the releasing position. The covering member 2 has the second locking portion 2b2 in which the second insertion hole 2d that passes the second support member 7 through is formed. The second locking portion 2b2 is positioned more in the top side than the sliding

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member 4. From such a configuration, the sliding member 4 and the covering member 2 are supported from the bottom side at two locations of the first support member 6 and the second support member 7. Therefore, it is possible to effectively suppress the sliding member 4 and the covering member 2 from dangling due to the weights thereof.

[0048]

In the sliding member 4, the long hole 4b is formed extending along the sliding direction, and the second support member 7 is passed through the long hole 4b. From such configuration, it is possible to slide the sliding member 4 by having the long hole 4b and the second support member 7 be slidable with respect to one another.

[0049]

The long hole 4b has the pair of side surfaces that extend in the sliding direction. At least on a part of the pair of side surfaces, a protrusion 4f that protrudes in the orthogonal direction (X axis) that is orthogonal to both the sliding direction (Y axis) and the up-down direction (Z axis) is formed. The protrusion 4f goes over the second support member 7 in the sliding direction when the sliding member 4 is sliding between the restricting position and the releasing position. From such configuration, the sliding member 4 is suppressed by the protrusions 4f from unintentionally moving between the restricting position and the releasing position.

[0050]

When the gap between the pair of side surfaces is W2, the width of the portion of the long hole 4b where the protrusions 4f are formed is Wt2, and the outer diameter of the portion (shoulder portion 7b) passed through the long hole 4b out of the second support member 7 is Dc2, $Wt2<Dc2<W2$ is satisfied. From such a configuration, since $Dc2<W2$, it is possible to easily slide the second support member 7 with respect to the long hole 4b in portions other than the portions where the protrusions 4f are formed.

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Since Wt2<Dc2, it is possible to effectively suppress the sliding member 4 from unintentionally moving with respect to the second support member 7 by the protrusions 4f.

[0051]

The covering member 2 has the guide groove 2f that extends along the sliding direction. The sliding member 4 has the guide claw 4h that is locked to the guide groove 2f. From such configuration, the sliding member 4 and the covering member 2 move as a one entity when moving the covering member 2 between the covering position and the releasing position. As such, it is possible improve operability by configuring the covering member 2 and the sliding member 4 so as not to separate from one another. It is possible to slide the sliding member 4 by having the guide claw 4h slidable with respect to the guide groove 2f.

[0052]

When the sliding member 4 is in the restricting position the first blind 4i that covers at least a portion of the first support member 6 from the bottom side is formed in the sliding member 4. From such configuration, it is possible to suppress the operator from erroneously operating the first support member 6 using a tool.

[0053]

Further, the technical scope of the present disclosure is not limited to the embodiments above, and various changes are possible, so long as the scope of the object of the present disclosure is not deviated from.

[0054]

For example, a configuration where the fixing member 3 is omitted, and the first support member 6 and the second support member 7 are directly fixed to the housing 8 may be adopted. Specifically, each of the thread portion 6c and 7c of the first support

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member 6 and the second support member 7 may be thread fastened directly onto the housing 8.

There is also no need to have the first support member 6 and the second support member 7 be shoulder bolts. For example, it is possible to have the first support member 6 and the second support member 7 be inserts that are formed onto the housing 8.

[0055]

It is also possible to replace the configuration components in the embodiments above with conventional configuration components as appropriate, so long as there is no deviation from the technical scope of the present disclosure. It is also possible to appropriately combine or modify the above embodiments.

[0055a]

Throughout this specification and the claims which follow, unless the context requires otherwise, the word "comprise", and variations such as "comprises" and "comprising", will be understood to imply the inclusion of a stated integer or step or group of integers or steps but not the exclusion of any other integer or step or group of integers or steps.

[0055b]

The reference in this specification to any prior publication (or information derived from it), or to any matter which is known, is not, and should not be taken as an acknowledgment or admission or any form of suggestion that that prior publication (or information derived from it) or known matter forms part of the common general knowledge in the field of endeavour to which this specification relates.

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[Reference Signs List]

[0056]

2...Covering Member 2b...Locking Portions 2b1...First Locking Portion 2b2...Second Locking Portion 2c...First Insertion Hole 2d...Second Insertion Hole 2f...Guide Groove 4...Sliding Member 4a...Notch Portion 4b...Long Hole 4f...Protrusions 4h...Guide Claws 4i...First Blind 5...Wire Passing Portion 6...First Support Member 6a...Head 6b...Shoulder Portion 7...Second Support Member 100...Indoor Unit A...Air Conditioner C...Cable

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[THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:]

[Claim 1]

An indoor unit of an air conditioner comprising:

a wire passing portion that passes a cable;

a covering member that is movable between a covering position where the covering member covers at least a portion of the wire passing portion, and an opening position where the wire passing portion is opened;

a sliding member that is movable along a sliding direction between a restricting position that restricts a movement of the covering member, and a releasing position that allows the movement of the covering member, and

a first support member that has a head that supports the sliding member in the restricting position from a bottom side, and a shoulder portion with a diameter that is smaller than the head; wherein

the covering member has a first locking portion in which a first insertion hole that passes the shoulder portion through is formed,

the first locking portion is positioned in a top side more than the sliding member, and

in an up-down direction, when a length in the up-down direction of the shoulder portion is La1, a thickness of a portion supported by the head out of thicknesses of the sliding member is Ta1, and a thickness of the first locking portion is Tb1,

La1>Ta1+Tb1 is satisfied.

[Claim 2]

The indoor unit of the air conditioner according to claim 1, wherein

an inner diameter of the first insertion hole is larger than an outer diameter of the head.

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[Claim 3]

The indoor unit of the air conditioner according to claim 1 or 2, wherein

a notch portion that passes the shoulder portion through is formed in the sliding member, and

the notch portion is open towards one side in the sliding direction.

[Claim 4]

The indoor unit of the air conditioner according to any one of claims 1 to 3 further comprising:

a second support member that supports the sliding member in the restricting position and the sliding position from the bottom side; wherein

the covering member has a second locking portion in which a second insertion hole that passes the second support member through is formed, and

the second locking portion is positioned in a top side more than the sliding member.

[Claim 5]

The indoor unit of the air conditioner according to claim 4, wherein

in the sliding member, a long hole is formed extending along the sliding direction, and

the second support member is passed through the long hole.

[Claim 6]

The indoor unit of the air conditioner according to claim 5, wherein

the long hole has a pair of side surfaces that extend in the sliding direction, and

at least on a part of the pair of side surfaces, a protrusion that protrudes in an orthogonal direction that is orthogonal to both the sliding direction and the up-down direction is formed,

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the protrusion goes over the second support member in the sliding direction when the sliding member is sliding between the restricting position and the releasing position.

[Claim 7]

The indoor unit of the air conditioner according to claim 6, wherein

when a gap between the pair of side surfaces is W2, a width of a portion of the long hole where the protrusions are formed is Wt2, and an outer diameter of the portion passed through the long hole out of the second support member is Dc2,

$Wt2<Dc2<W2$ is satisfied.

[Claim 8]

The indoor unit of the air conditioner according to any one of claims 1 to 7, wherein

the covering member has a guide groove that extends along the sliding direction, and

the sliding member has a guide claw that is locked to the guide groove.

[Claim 9]

The indoor unit of the air conditioner according to any one of claims 1 to 8, wherein

when the sliding member is in the restricting position, a first blind that covers at least a portion of the first support member from the bottom side is formed in the sliding member.

FIG. 1

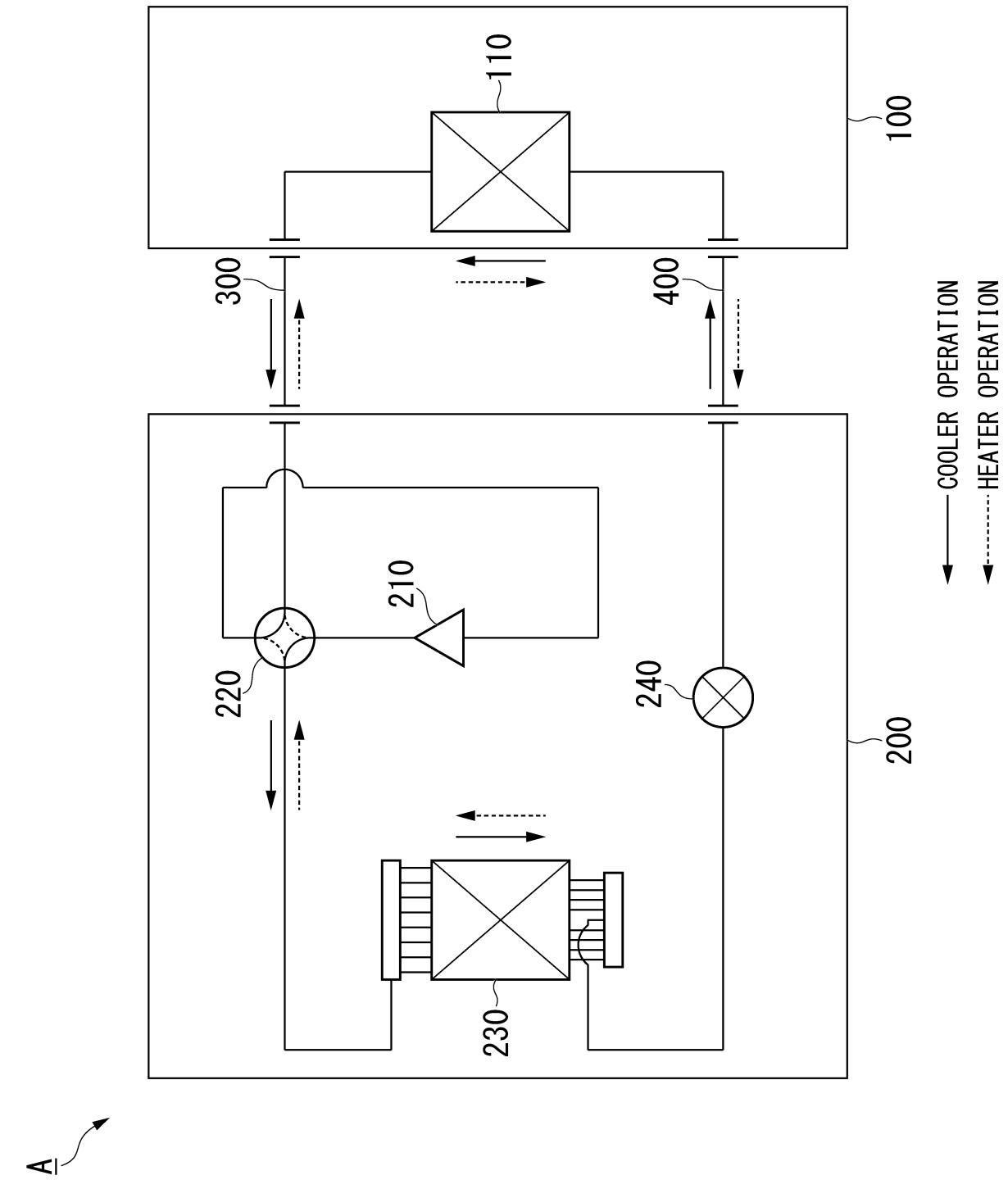

A
100
110
300
400
200
210
220
230
240
COOLER OPERATION
HEATER OPERATION

FIG. 2

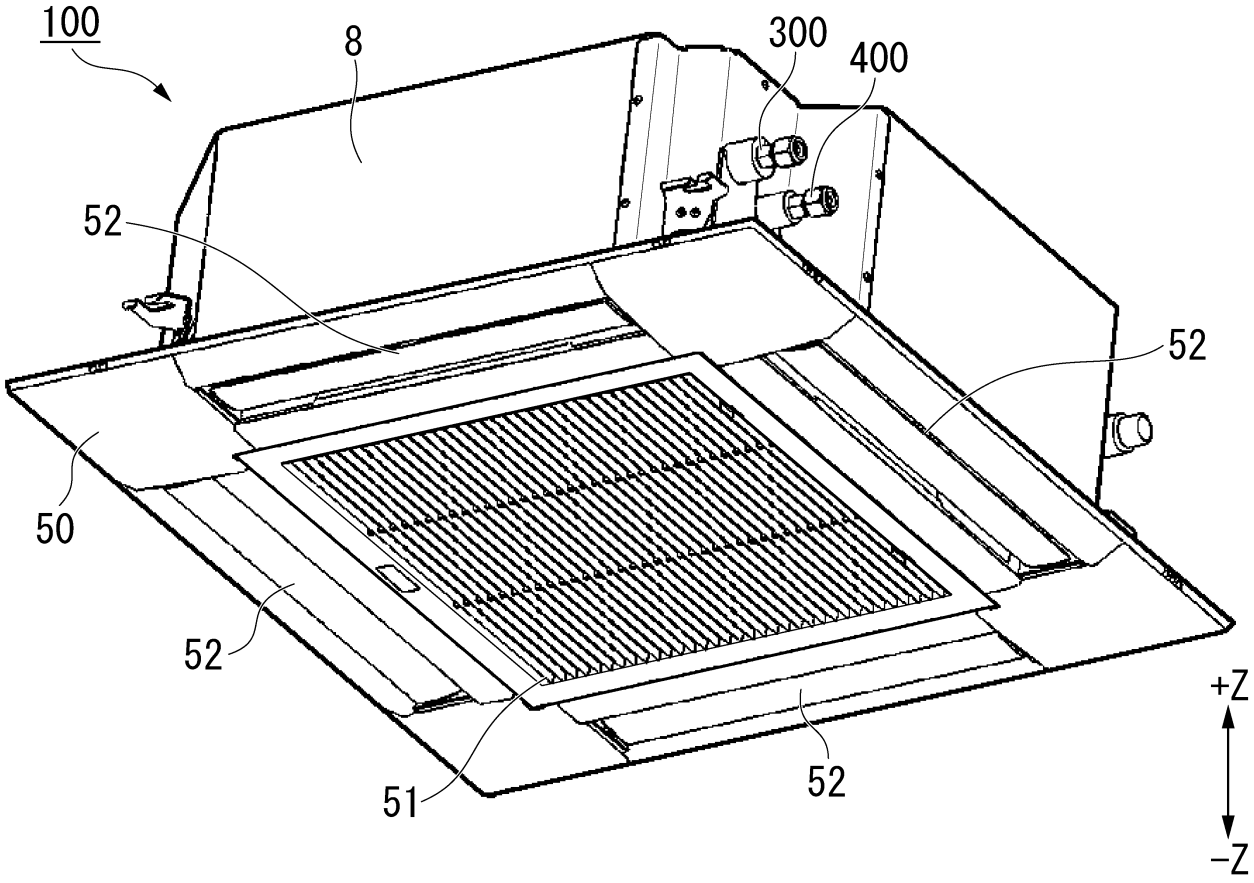


FIG. 3

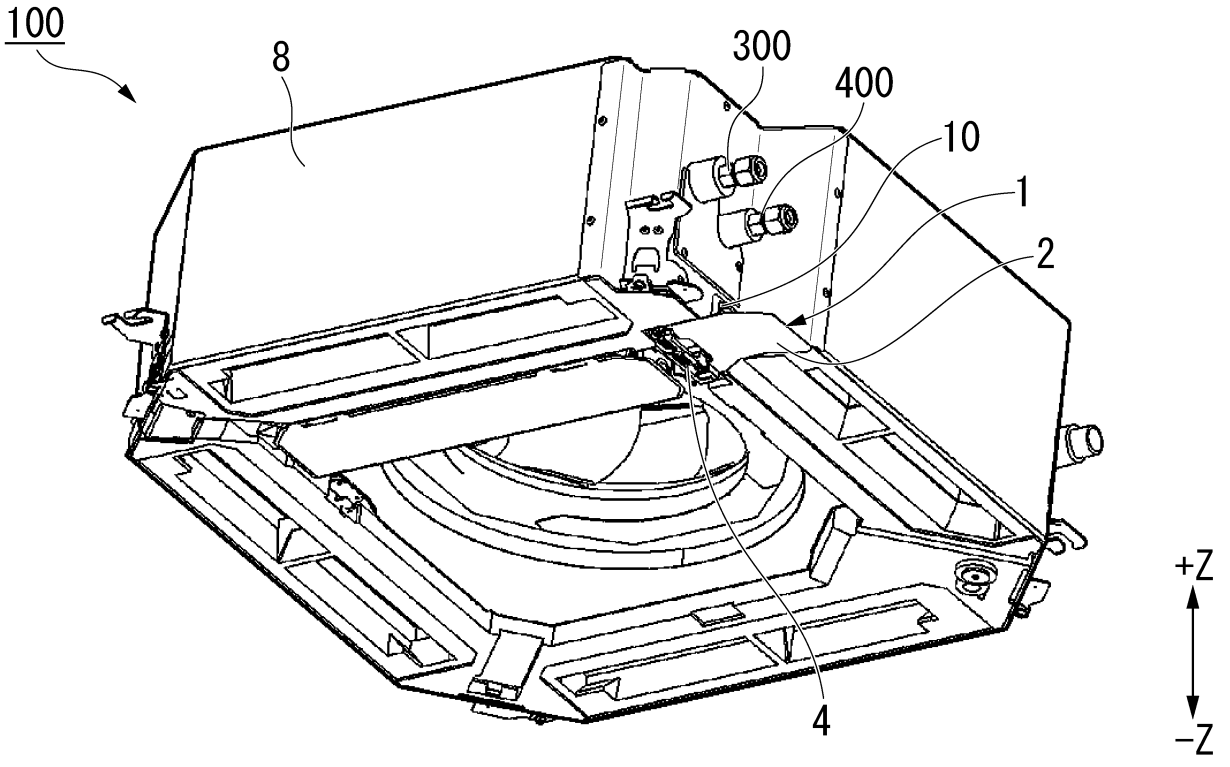


FIG. 4

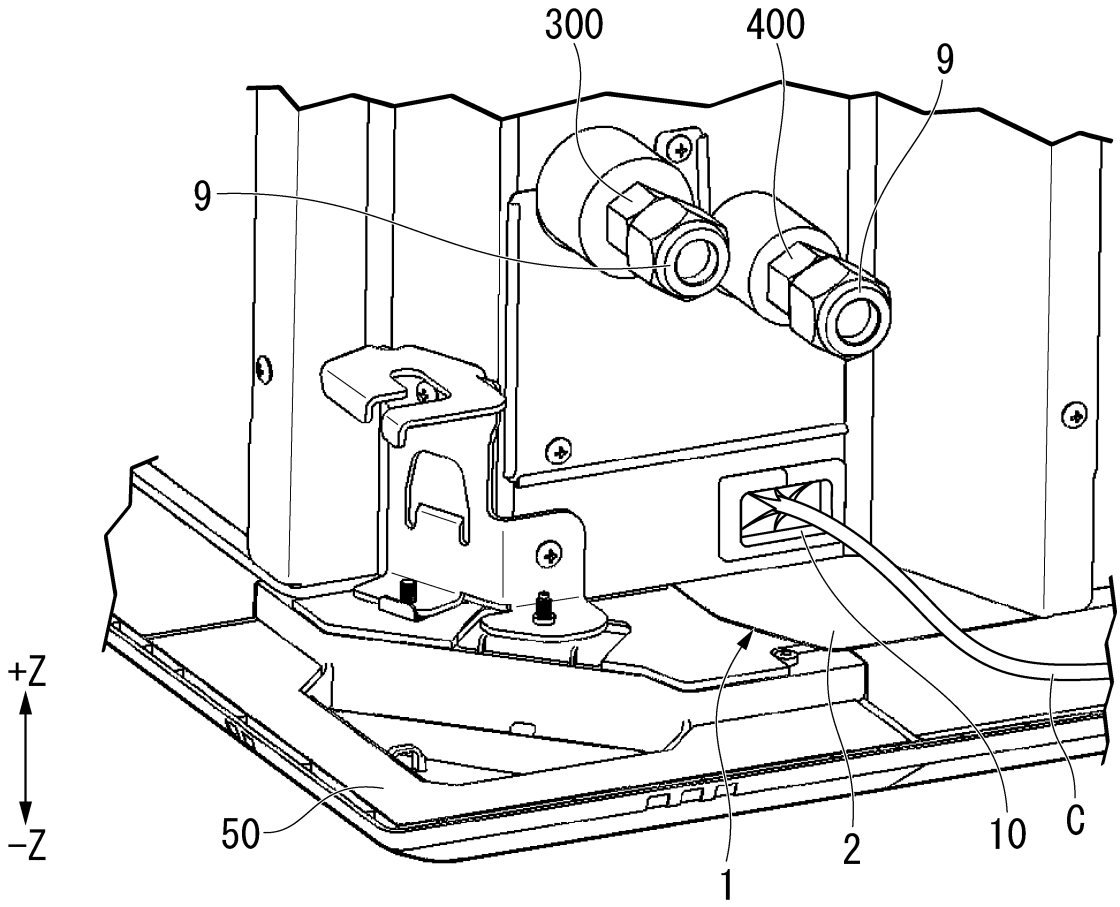


FIG. 5

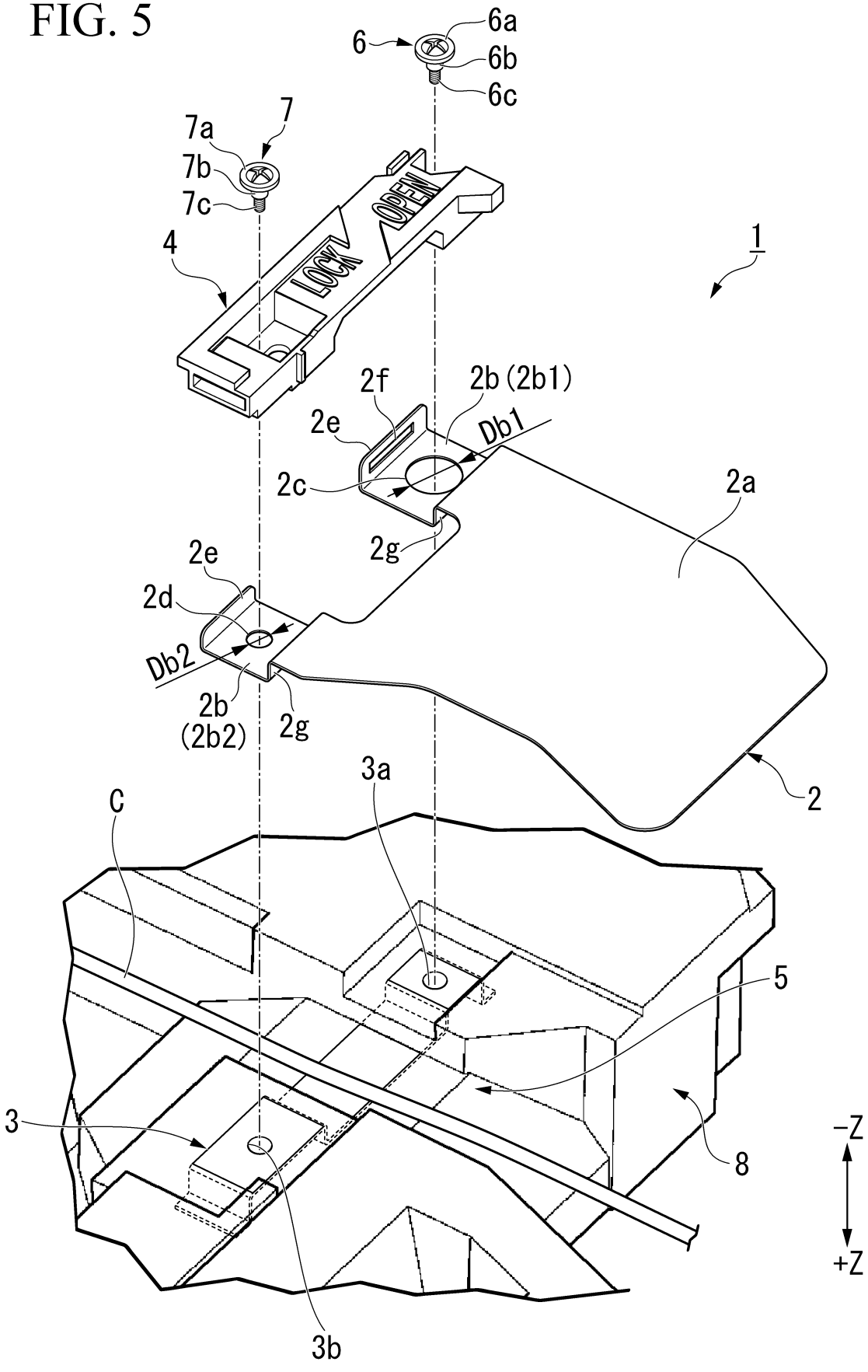

6
6a
6b
6c
7
7a
7b
7c
4
LOCK
OPEN
1
2f
2b (2b1)
2e
Db1
2c
2a
2g
2e
2d
Db2
2b
(2b2)
2g
2
3a
C
5
3
8
3b
−Z
+Z

FIG. 6

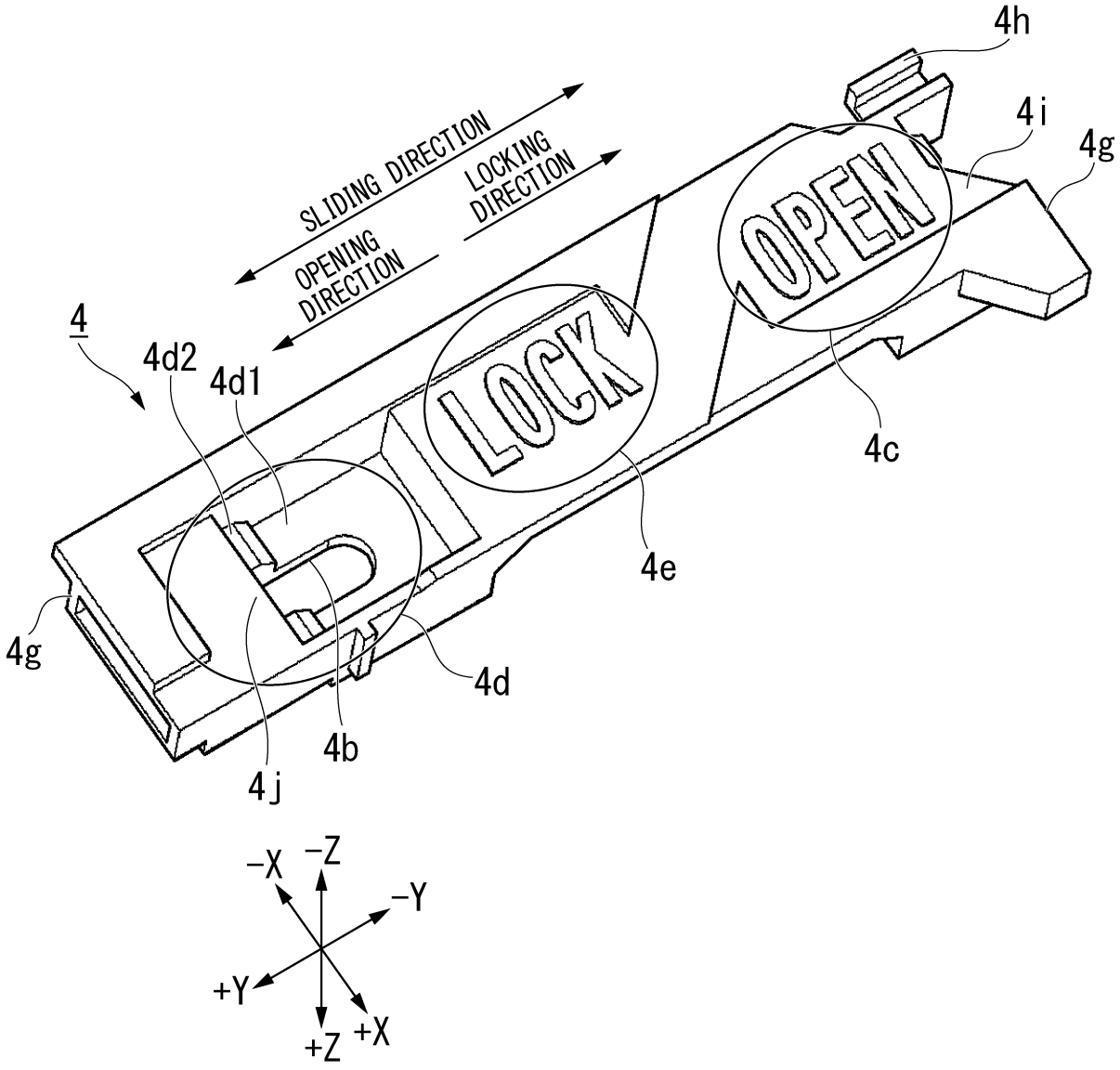

4h
4i
4g
SLIDING DIRECTION
OPENING DIRECTION
LOCKING DIRECTION
OPEN
LOCK
4
4d2
4d1
4c
4e
4g
4d
4b
4j
−X
−Z
−Y
+Y
+Z
+X

FIG. 7

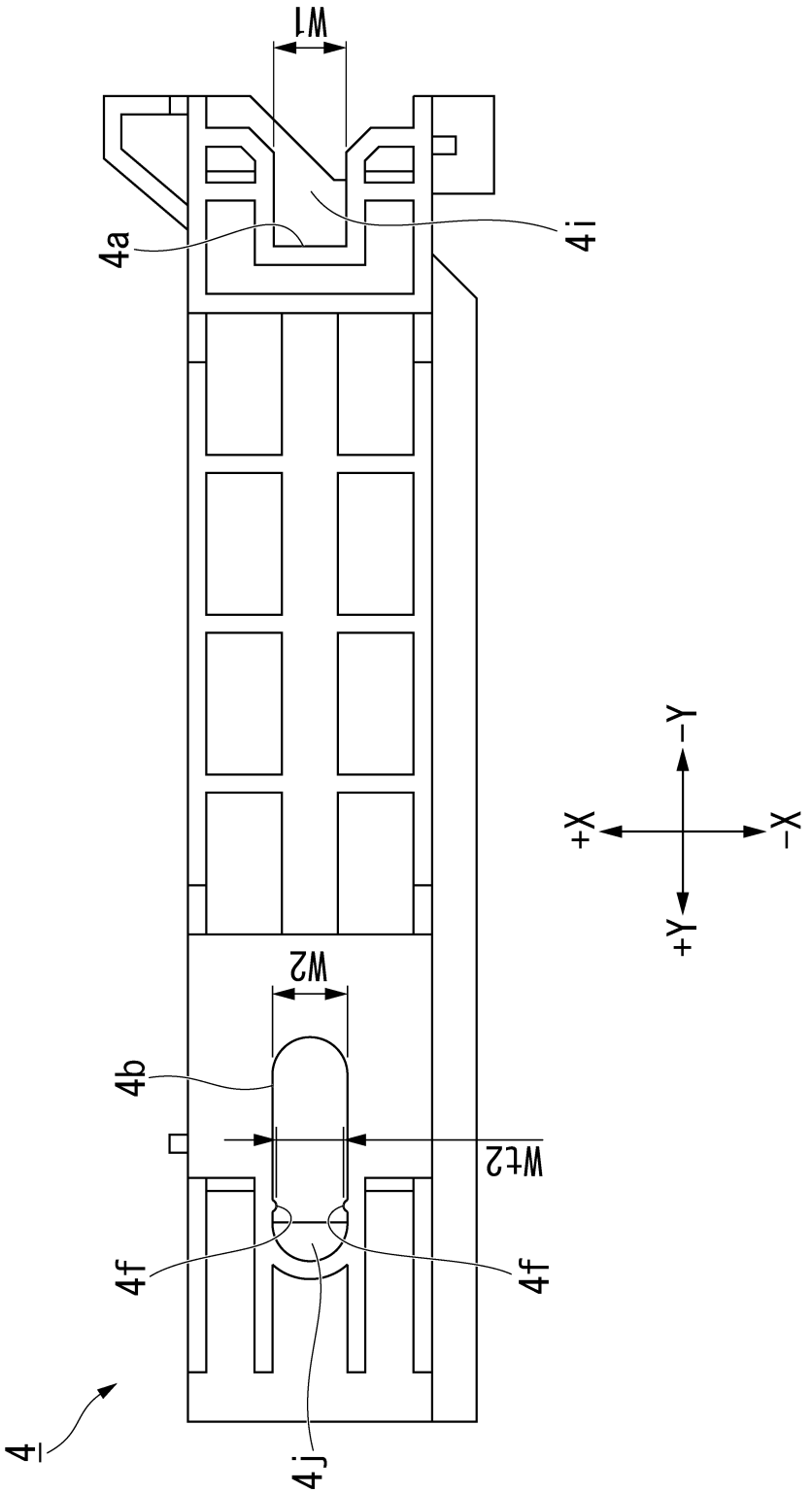


FIG. 8

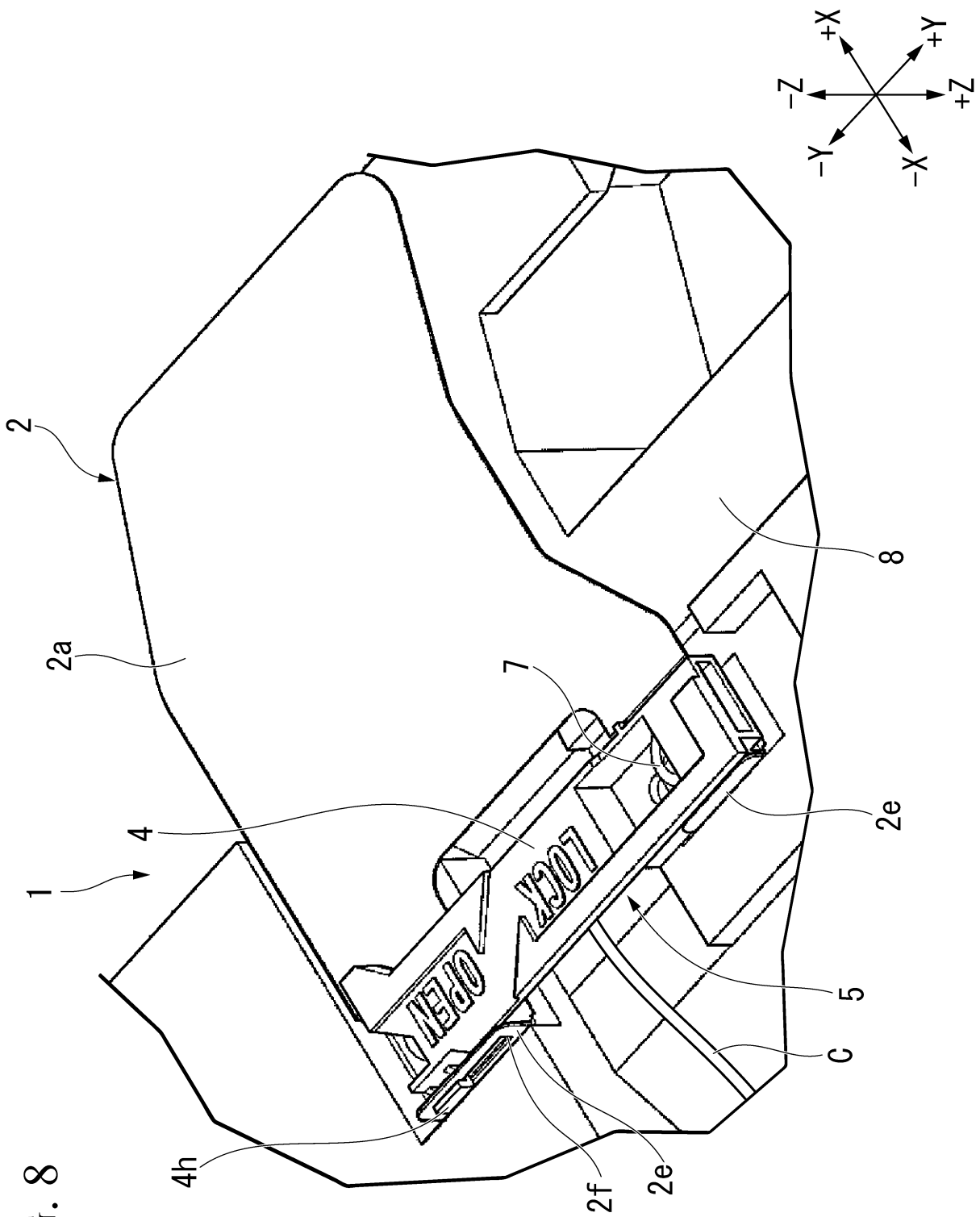


FIG. 9

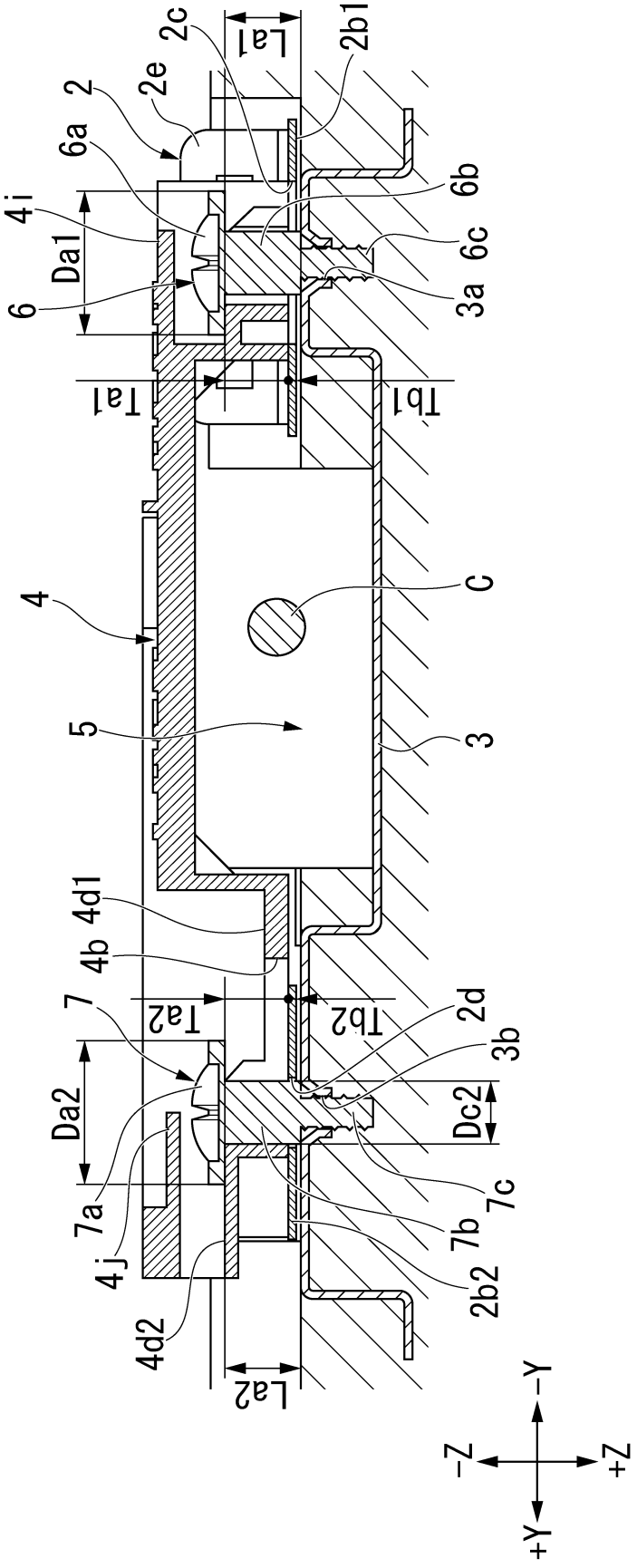

La1
2c
2e
2
6a
4i
Da1
6
Ta1
2b1
6b
6c
3a
Tb1
C
4
5
3
4d1
4b
7
Ta2
Tb2
2d
3b
Da2
Dc2
7a
4j
7c
7b
2b2
4d2
La2
-Z
+Z
-Y
+Y

FIG. 10

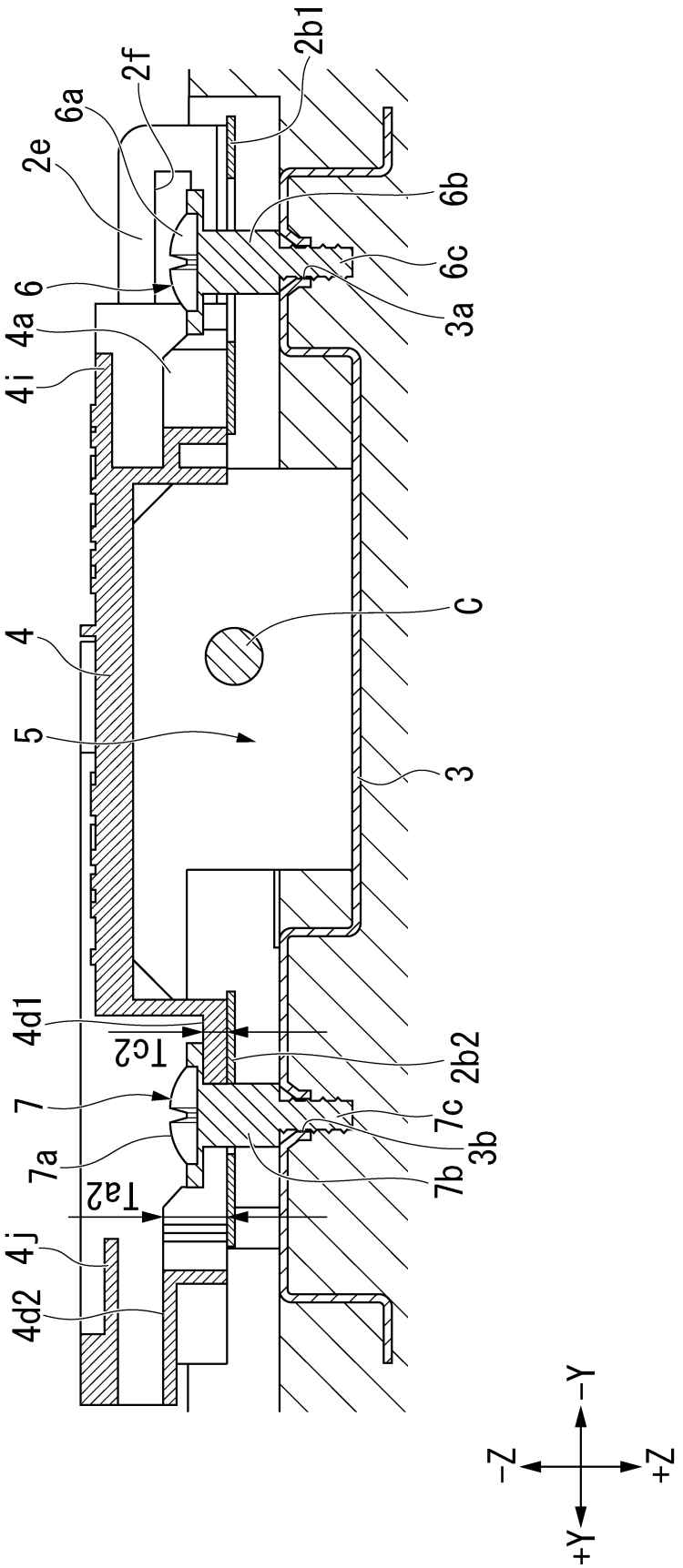

2b1
2f
6a
2e
6b
6c
3a
6
4a
4i
C
4
5
3
4d1
Tc2
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Ta2
4j
4d2
-Y
-Z
+Z
+Y

FIG. 11

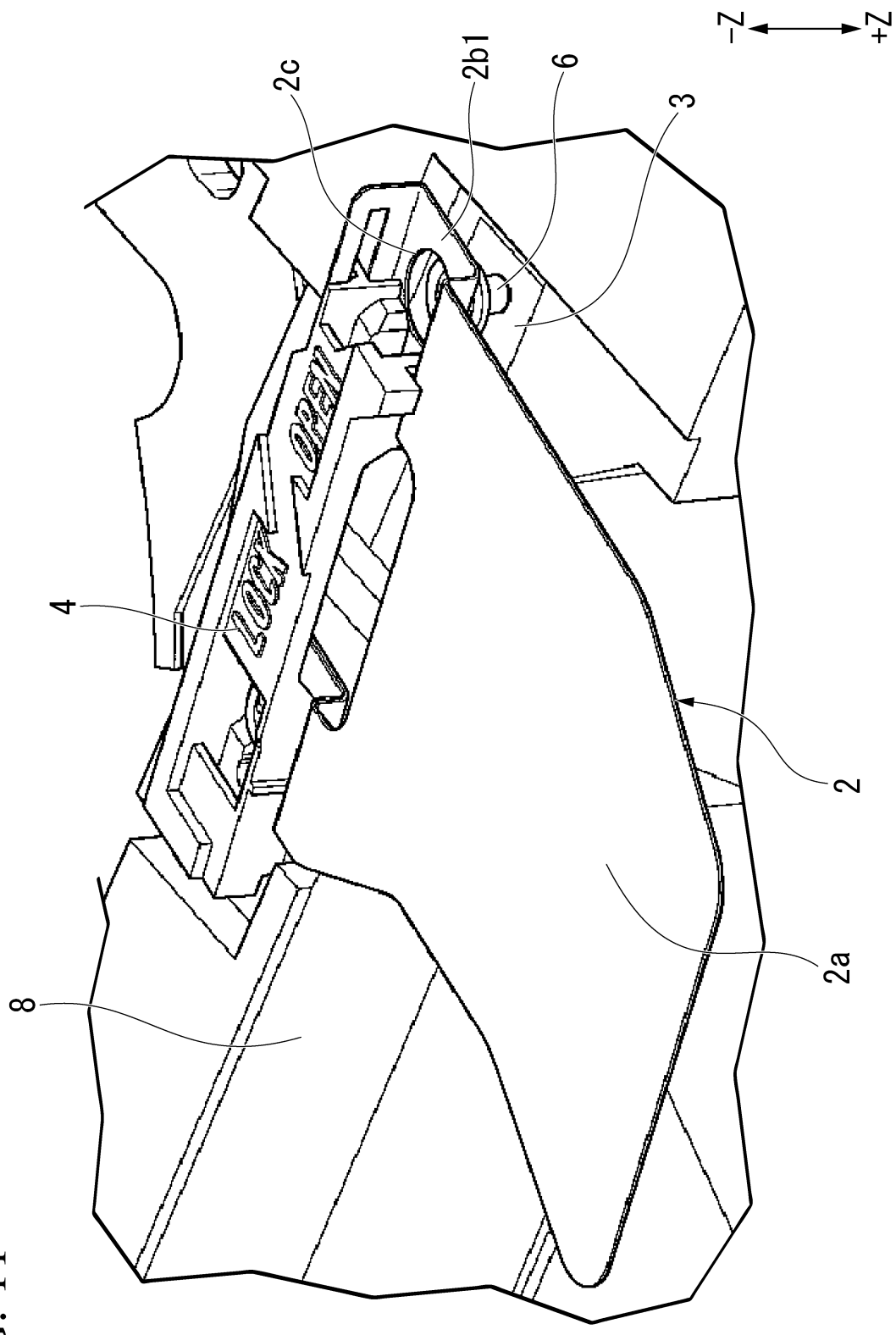


FIG. 12

