



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
27.04.2016 Bulletin 2016/17

(51) Int Cl.:
F24F 1/00 (2011.01)

(21) Application number: **15177807.3**

(22) Date of filing: **22.07.2015**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA

(72) Inventors:
• **Nunome, Yoshinori**
Tokyo, 108-8215 (JP)
• **Ito, Shingo**
Tokyo, 108-8215 (JP)
• **Higashiura, Kunihiro**
Tokyo, 108-8215 (JP)

(30) Priority: **31.07.2014 JP 2014156369**

(74) Representative: **Henkel, Breuer & Partner**
Patentanwälte
Maximiliansplatz 21
80333 München (DE)

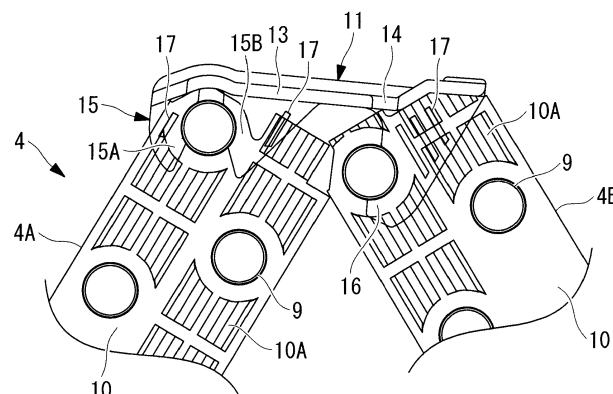
(71) Applicant: **MITSUBISHI HEAVY INDUSTRIES, LTD.**
Tokyo 108-8215 (JP)

(54) **AIR CONDITIONER INDOOR UNIT**

(57) To provide an air conditioner indoor unit in which a wind shielding member installed in a folding part or a division part of an indoor heat exchanger can be mounted so as not to be positionally shifted or detached by integrally provided locking claws without using a support component. An air conditioner indoor unit including an indoor heat exchanger (4) provided inside a unit body, and disposed by being folded or divided into at least a first heat exchanger (4A) and a second heat exchanger (4B); and a wind shielding member (11) provided in the folding part or the division part between the first heat exchanger (4A) and the second heat exchanger (4B),

wherein the wind shielding member (11) is provided integrally with locking members (15) (locking claws 15A and 15B) and 16 locked to heat transfer tubes (9) of the first heat exchanger (4A) and the second heat exchanger (4B) at a plurality of places at predetermined intervals along a lengthwise direction, and each of the locking members (15) (the locking claws 15A and 15B) and (16) is provided with at least one protrusion (17) engaged with plate fins (10) of each of the first heat exchanger (4A) and the second heat exchanger (4B) on a side surface thereof.

FIG. 3



Description

{Summary of Invention}

{Technical Field}

{Technical Problem}

[0001] The present invention relates to an air conditioner indoor unit provided with a wind shielding member at a folding part or a division part of an indoor heat exchanger disposed inside a unit body.

{Background Art}

[0002] Heretofore, there has been widely known an air conditioner indoor unit in which an indoor heat exchanger is folded or divided into a plurality of heat exchangers; namely, a first heat exchanger and a second heat exchanger, and these heat exchangers are disposed on a front surface side and a rear surface side of the unit body, for example, in a Λ (lambda) shape, in order to dispose the indoor heat exchanger having a relatively large area in an air duct inside a unit body. In this case, a wind shielding member made of resin is installed in a folding part or a division part, in order to prevent an airflow from passing through the folding part or the division part of the indoor heat exchanger and bypassing the heat exchangers, for example, as shown in PTL 1 to PTL 3.

[0003] As an installation structure of such a wind shielding member, PTL 1 provides an installation structure in which wire clips are provided at a plurality of places on a wind shielding member across heat transfer tubes of the heat exchanger, and the wind shielding member is pressed and supported. PTL 2 provides an installation structure in which a plurality of claws provided in a wind shielding member at predetermined intervals is locked to heat transfer tubes of the heat exchanger, and a pair of locking parts having curved parts is furthermore locked and mounted on the ends of the heat transfer tubes on both ends of the heat exchanger. PTL 3 provides an installation structure in which a pair of claws that is provided in a wind shielding member at predetermined intervals, and that interposes heat transfer tubes of a heat exchanger therebetween from both sides is provided at positions shifted by a multiple of the pitch of plate fins, and is locked and mounted on the heat transfer tubes.

{Patent Literature}

[0004]

{PTL 1} Japanese Unexamined Patent Application, Publication No. 2002-81679

{PTL 2} Japanese Unexamined Patent Application, Publication No. 2005-24223

{PTL 3} Japanese Unexamined Patent Application, Publication No. 2014-77612

[0005] As shown in PTL 1, in the structure in which the wind shielding member is supported by using the wire clips, a plurality of wire clips that are separate components need to be prepared in addition to the wind shielding member. As a result, the number of components disadvantageously increases and assembling performance disadvantageously degrades. Therefore, the structure as shown in each of PTL 2 and PTL 3 becomes the mainstream structure. That is, a plurality of locking claws are provided integrally with the wind shielding member at predetermined intervals, and the locking claws are inserted between plate fins of the heat exchanger to be locked to the heat transfer tubes, thereby mounting and installing the wind shielding member.

[0006] However, in the locking structure by the locking claws, there is a limit to mounting strength even if claw shapes or the like are variously designed. Additionally, in a drop test (test for confirming that assembly components are not detached and damaged even when a unit drops during packing or transportation), the wind shielding member may be positionally shifted or detached. Actually, therefore, the number of claws increases or a clip component made of metal is simultaneously used as a support component.

[0007] The present invention has been made in view of such circumstances, and an object of the invention is to provide an air conditioner indoor unit in which a wind shielding member installed in a folding part or a division part of an indoor heat exchanger can be mounted by integrally provided locking claws so as not to be positionally shifted or be detached without using a support component.

[0008] In order to solve the above problems, an air conditioner indoor unit of the present invention employs the following solutions.

[0009] That is, an air conditioner indoor unit according to the first aspect of the present invention includes: an indoor heat exchanger provided inside a unit body, and disposed by being folded or divided into at least a first heat exchanger and a second heat exchanger; and a wind shielding member provided in a folding part or a division part between the first heat exchanger and the second heat exchanger, wherein the wind shielding member is provided integrally with a first locking member locked to heat transfer tube of the first heat exchanger and a second locking member locked to heat transfer tube of the second heat exchanger, at a plurality of places at predetermined intervals along a lengthwise direction, and wherein each of the locking members is provided with at least one protrusion engaged with plate fins of each of the first heat exchanger and the second heat exchanger on a side surface thereof.

[0010] According to the first aspect of the present invention, the wind shielding member provided in the fold-

ing part or the division part of the first heat exchanger and the second heat exchanger is provided integrally with the locking members (a first locking member and a second locking member) locked to the heat transfer tubes of each heat exchanger at a plurality of places at predetermined intervals along the lengthwise direction, and each of the locking members is provided with at least one protrusion engaged with plate fins of each of the first heat exchanger and the second heat exchanger on a side surface thereof. Therefore, wind can be shielded by shielding the folding part or the division part between the first heat exchanger and the second heat exchanger by the wind shielding member, and it is possible to prevent an airflow from bypassing the first and second heat exchangers. Additionally, the wind shielding member can be simply mounted and installed only by locking the locking members provided at the plurality of places in the lengthwise direction of the wind shielding member to the heat transfer tubes of the respective heat exchanger. Furthermore, when the locking members are inserted between the plate fins of the heat exchanger to be locked to the heat transfer tubes, the protrusions provided on the side surfaces are engaged with the plate fins. It is, therefore, possible to improve mounting strength of the wind shielding member for mounting the wind shielding member on each heat exchanger by the engaging force. Accordingly, even in a case where the indoor unit receives impact caused by drop during packing or transportation, only the locking of the locking members can prevent the wind shielding member from being positionally shifted or detached, and it is possible to omit a support component for preventing such shifting or detaching.

[0011] Furthermore, in the air conditioner indoor unit according to the second aspect of the present invention, each of the protrusions in the air conditioner indoor unit is an elongate protrusion having a constant length.

[0012] According to the second aspect of the present invention, since the protrusions are elongate protrusions each having the constant length, it is possible to secure necessary engaging force by the protrusions by engaging the protrusions each having the constant length with the plate fins. Accordingly, it is possible to enhance the mounting strength of the wind shielding member, to improve proof stress against impact caused by drop or the like, and to prevent the wind shielding member from being positionally shifted or detached.

[0013] Furthermore, in the air conditioner indoor unit according to the third aspect of the present invention, the protrusions are provided along a large number of heat transfer accelerating means provided in the plate fins, and are capable of being locked to the heat transfer accelerating means.

[0014] According to the third aspect of the present invention, the protrusions are provided along the heat transfer accelerating means provided in the plate fins, and are capable of being locked to the heat transfer accelerating means. Therefore, the protrusions provided along the heat transfer accelerating means such as a

louver of any of various types, slits, and irregularities provided in the plate fins are locked to the heat transfer accelerating means, so that it is possible to further increase the engaging force of the protrusions for engaging the protrusions with the plate fins. Accordingly, it is possible to further enhance the mounting strength of the wind shielding member, to improve proof stress against impact caused by drop or the like, to reliably prevent the wind shielding member from being positionally shifted or detached.

[0015] Furthermore, in the air conditioner indoor unit according to the forth aspect of the present invention, the locking members are provided close to each other in pairs at each of the plurality of places.

[0016] According to the forth aspect of the present invention, the locking members are provided close to each other in pairs at each of the plurality of places. Therefore, by providing the locking members provided at each of the plurality of places close to each other in pairs, it is possible to intensively receive stress in a lateral shifting direction received by the wind shielding member due to the impact during drop or the like, and to effectively improve the proof stress. That is, increase in the number of the locking members is effective in order to improve proof stress against impact during drop or the like. However, it is possible to effectively enhance proof stress against lateral shifting of the wind shielding member, not by narrowing placement intervals of the locking members to increase the number of disposed places, but by disposing the locking members close to each other in pairs at each place without increasing the number of disposed places so as to intensively receive stress. Accordingly, it is possible to enhance the mounting strength of the wind shielding member, to improve proof stress against impact caused by drop or the like, and to prevent the wind shielding member from being positionally shifted or detached.

[0017] Furthermore, an air conditioner indoor unit according to the fifth aspect of the present invention includes: an indoor heat exchanger provided inside a unit body, and disposed by being folded or divided into at least a first heat exchanger and a second heat exchanger; and a wind shielding member provided in a folding part or a division part between the first heat exchanger and the second heat exchanger, wherein the wind shielding member is provided integrally with a first locking member locked to heat transfer tube of the first heat exchanger and a second locking member locked to heat transfer tube of the second heat exchanger, at a plurality of places at predetermined intervals along a lengthwise direction, and wherein the locking members are provided close to each other in pairs at each of the plurality of places.

[0018] According to the fifth aspect the present invention, the wind shielding member provided in the folding part or the division part of the first heat exchanger and the second heat exchanger is provided integrally with the locking members (a first locking member and a second locking member) locked to the heat transfer tubes of the

respective heat exchangers, at a plurality of places at predetermined intervals along a lengthwise direction, and the locking members are provided close to each other in pairs at each of the plurality of places. Therefore, wind can be shielded by shielding the folding part or the division part between the first heat exchanger and the second heat exchanger by the wind shielding member, and it is possible to prevent an airflow from bypassing the first and second heat exchangers. Additionally, the wind shielding member can be simply mounted and installed only by locking the locking members provided at the plurality of places in the lengthwise direction of the wind shielding member to the heat transfer tubes of the respective heat exchangers. Furthermore, the locking members provided at each of the plurality of places in the lengthwise direction are provided close to each other in pairs. It is, therefore, possible to intensively receive stress in a lateral shifting direction received by the wind shielding member due to the impact during drop of the unit, and to improve the proof stress. That is, increase in the number of the locking members is effective in order to improve proof stress against impact during drop of the unit. However, at this time, it is possible to effectively enhance proof stress against lateral shifting of the wind shielding member, not by narrowing placement intervals of the locking members to increase the number of disposed places, but by disposing the locking members close to each other in pairs at each place without increasing the number of disposed places so as to intensively receive stress. Therefore, even in a case where the indoor unit receives impact caused by drop during packing or transportation or the like, only the locking of the locking members can prevent the wind shielding member from being positionally shifted or detached, and it is possible to omit a support component for preventing such shifting or detaching.

{Advantageous Effects of Invention}

[0019] According to the present invention, wind can be shield by shielding the folding part or the division part between the first heat exchanger and the second heat exchanger by the wind shielding member, and it is possible to prevent an airflow from bypassing the first and second heat exchangers. Additionally, the wind shielding member can be simply mounted and installed only by locking the locking members provided at the plurality of places in the lengthwise direction of the wind shielding member to the heat transfer tubes of the respective heat exchangers. Furthermore, when the locking members are inserted between the plate fins of the heat exchangers to be locked to the heat transfer tubes, the protrusions provided on the side surfaces are engaged with plate fins, so that it is possible to improve mounting strength of the wind shielding member for mounting the wind shielding member on each heat exchanger by the engaging force. Therefore, even in a case where the indoor unit receives impact caused by drop during packing or

transportation, only the locking of the locking members can prevent the wind shielding member from being positionally shifted or detached, and it is possible to omit a support component for preventing such shifting or detaching.

[0020] According to the present invention, wind can be shielded by shielding the folding part or the division part between the first heat exchanger and the second heat exchanger by the wind shielding member, and it is possible to prevent an airflow from bypassing the first and second heat exchangers. Additionally, the wind shielding member can be simply mounted and installed only by locking the locking members provided at the plurality of places in the lengthwise direction of the wind shielding member to the heat transfer tubes of the respective heat exchangers. Furthermore, the locking members are provided close to each other in pairs at each of the plurality of places in the lengthwise direction. It is, therefore, possible to intensively receive stress in a lateral shifting direction received by the wind shielding member due to the impact during drop of the unit, and to improve the proof stress. That is, increase in the number of the locking members is effective in order to improve proof stress against impact during drop of the unit. However, at this time, it is possible to effectively enhance proof stress against lateral shifting of the wind shielding member, not by narrowing placement intervals of the locking members to increase the number of disposed places, but by disposing the locking members close to each other in pairs at each places without increasing the number of disposed places so as to intensively receive stress. Therefore, even in a case where the indoor unit receives impact caused by drop during packing or transportation or the like, only the locking of the locking members can prevent the wind shielding member from being positionally shifted or detached, and it is possible to omit a support component for preventing such shifting or detaching.

{Brief Description of Drawings}

[0021]

{Fig. 1} Fig. 1 is a front view of an air conditioner indoor unit in a state of removing a front surface cover assembly according to an embodiment of the present invention.

{Fig. 2} Fig. 2 is a perspective view of the indoor unit in a state of viewing the indoor unit from a right front side.

{Fig. 3} Fig. 3 is an enlarged sectional view of a folding part of an indoor heat exchanger disposed in the indoor unit.

{Fig. 4} Fig. 4 is a plan view of a wind shielding member provided in the folding part of the indoor heat exchanger in a state of viewing the wind shielding member from a claw part side.

{Fig. 5} Fig. 5 is an A-A sectional view of Fig. 4.

{Fig. 6} Fig. 6 is a figure viewed from the arrow B of

Fig. 5 {Fig. 7} Fig. 7 is an enlarged perspective view of a pair of claw parts provided in the wind shielding member.

{Description of Embodiments}

[0022] Hereinafter, an embodiment of the present invention is described with reference to Fig. 1 to Fig. 7.

[0023] Fig. 1 is a front view of an air conditioner indoor unit in a state of removing a front surface cover assembly of according to an embodiment of the present invention. Fig. 2 is a perspective view thereof. Fig. 3 is an enlarged sectional view of a folding part of an indoor heat exchanger disposed in the indoor unit.

[0024] An air conditioner indoor unit 1 includes a unit body 2 configured from a base 3, and a front surface cover assembly (not shown) detachably assembled in the front surface of this base 3.

[0025] In the unit body 2, an indoor heat exchanger 4 disposed in a Λ (lambda) shape formed by folding or dividing indoor heat exchanger 4 along the front surface, the upper surface, and the rear surface of the unit body 2, an indoor fan (not shown) configured from a cross flow fan horizontally disposed on the downstream side of the indoor heat exchanger 4, a motor (not shown) that drives the indoor fan to rotate, and a drain pan 5 disposed at the lower part of the front surface of the indoor heat exchanger 4 are integrally provided. Furthermore, an air outlet assembly 7 into which a louver for wind direction adjustment and a flap 6 are integrally incorporated, a control box 8, and the like are assembled in the base 3 in a well-known manner.

[0026] The front surface cover assembly is assembled in the base 3 so as to cover the upper surfaces, the front surfaces, and the right and left side surfaces of the above apparatuses incorporated in the base 3. In this front surface cover assembly, a suction grill for suctioning indoor air in the unit body 2 is formed, and an air filter is incorporated on the rear surface side. In some of indoor units, an automatic filter cleaning mechanism for automatically cleaning the air filter is incorporated in the front surface cover assembly.

[0027] As shown in Fig. 3, the indoor heat exchanger 4 is a plate fin tube heat exchanger that is formed by stacking a large number of thin plate fins 10 made of aluminum alloy at a minute pitch, and disposed around a large number of heat transfer tubes 9 made of copper. The plate fin tube heat exchanger is folded or divided into at least a first heat exchanger 4A disposed on the front surface side of the inside of the unit body 2, and a second heat exchanger 4B disposed on the rear surface side, and is formed the folding part or the division part. The plate fin tube heat exchanger is disposed so as to have a so-called Λ shape in a side view. In a case of this embodiment, the first heat exchanger 4A has the bent part formed further bending to have a V-shape. The bent part is kind of folding part.

[0028] When the indoor heat exchanger 4 is folded or

divided into the first heat exchanger 4A and the second heat exchanger 4B to be disposed as described above, the plate fins 10 are partially removed, a clearance is generated in the folding part or the division part, and an airflow bypasses the first heat exchanger 4A and the second heat exchanger 4B through the clearance. In order to prevent this, the wind shielding members 11 and 12 are installed on the front surface of the folding part or the division part. The wind shielding member 11 provided in the folding part or the division part of the first heat exchanger 4A and the second heat exchanger 4B. The wind shielding member 12 provided in the bent part of the first heat exchanger 4A are formed in shapes in accordance with the respective clearances. The wind shielding member 11 and the wind shielding member 12 have a little difference in shape, but basically have the same function and the same mounting structure. Therefore, herein, a configuration of the wind shielding member 11 is hereinafter described in detail with reference to Fig. 3 to Fig. 7.

[0029] The wind shielding member 11 is made of a resin material, and is configured by a plate member 13. The plate member 13 has a width dimension and a length dimension (the same length as the length dimension of each of the heat exchangers 4A and 4B) covering the entire surface on the upstream side of the folding part or the division part of the first heat exchanger 4A and the second heat exchanger 4B. In this wind shielding member 11, the leading edge side and the trailing edge side of the plate member 13 are made to be a curved surface and a bent surface along the upper end surfaces of the first heat exchanger 4A and the second heat exchanger 4B, the upper surface is inclined downward to the second heat exchanger 4B side in a state where the upper surface is installed. A plurality of drain discharge holes 14 that discharge dew condensation water generated on the upper surface onto the second heat exchanger 4B are provided along the lengthwise direction at the lowest part.

[0030] Furthermore, on the lower surface on the leading edge side and the trailing edge side of the plate member 13, a locking member 15 (a first locking member) and a locking member 16 (a second locking member) that are locked to the heat transfer tubes 9 on the first heat exchanger 4A side and the heat transfer tubes 9 of the second heat exchanger 4B are integrally molded. Each locking member 15 and 16 have claw. As shown in Fig. 4, these locking members 15 and 16 are provided close to each other (e.g., about 1 cm to 1.5 cm) in pairs at five places at predetermined intervals (e.g., at an interval of 15 cm to 20 cm) along the lengthwise direction of the plate member 13. Each of the locking members 15 locked to the heat transfer tubes 9 on the first heat exchanger 4A side are configured by a pair of locking claws 15A and 15B that sandwich each heat transfer tube 9 therebetween from the front and back. The locking claws 15A and 15B are provided at positions shifted by the amount of multiple of a pitch P (e.g., 1 mm to 2 mm) of the plate fins 10.

[0031] On the other hand, each locking member 16 is

locked to the heat transfer tube 9 on the second heat exchanger 4B side. Each locking member 16 is configured by one claw that is locked to the heat transfer tube 9 from the rear surface side. Each locking member 16 is provided on the rear surface side at the same position as the locking claw 15A. Furthermore, Each of the locking claws 15A, 15B and the claw of the locking member 16 are inserted between a large number of the plate fins 10 to be locked to the heat transfer tube 9, and therefore the thickness is made to be slightly thinner than the pitch P of the plate fins 10. Particularly, the thickness of the tip is gradually made to be thinner toward the tip side so as to be about 1/2 of the thickness of the root side.

[0032] At least one protrusion 17 engaged with the surface of the plate fin 10 is provided on each of the side surfaces on the root sides of the locking claws 15A, 15B and the claw of the locking member 16. The protrusions 17 are elongate protrusions each having a constant length, and each having a triangular cross section with a pointed tip. The protrusions 17 are provided along a large number of cut-and-raised louvers (heat transfer accelerating means) 10A provided in the plate fins 10 when the protrusions are inserted between the plate fins 10, and configured so as to be locked to the louvers 10A.

[0033] The shape of each of the protrusions 17 provided on the side surfaces of the locking claws 15A, 15B and the claw of the locking member 16 is not limited to a protrusion having a triangular cross section or an elongate protrusion, but can be modified to various shapes. Additionally, the number of protrusions to be installed may be appropriately set in accordance with the size of the locking claws 15A, 15B and the claw of the locking member 16, the area of a surface engaged with the plate fin 10. In the case of this embodiment, one protrusion is provided on each of the locking claws 15A and 15B, and three protrusions are provided in parallel on each the claw of the locking member 16. Furthermore, the cut-and-raised louvers 10A provided in the plate fins 10 are provided as heat transfer accelerating means of the heat exchanger, and the heat transfer accelerating means are not limited to the cut-and-raised louver 10A, but may be slits, irregularities, or the like.

[0034] According to this embodiment, the following action and effects are produced by the above-described configuration.

[0035] When the air conditioner is operated, on the indoor unit 1 side, indoor air is suctioned in the unit body 2 through the indoor fan to pass through the indoor heat exchanger 4, and thereafter circulated so as to be blown out from a blowout port of the air outlet assembly 7 to the inside of the room through the louvers for wind direction adjustment and the flap 6. During this, heat of the indoor air is exchanged with a refrigerant flowing through the heat transfer tubes 9 of the indoor heat exchanger 4 through the heat transfer tubes 9 and the plate fins 10, and cooled or heated to be blown out in the room, thereby being used for cooling or heating of the inside of a room.

[0036] When the indoor air circulated through the in-

door heat exchanger 4 as described above passes through the first heat exchanger 4A and the second heat exchanger 4B that are folded or divided to be disposed in the Λ shape, the wind shielding members 11 and 12 are each installed in the folding part or the division part, and therefore passes through either the first heat exchanger 4A side or the second heat exchanger 4B side without bypassing the first heat exchanger 4A and the second heat exchanger 4B through the clearance formed in the folding part or the division part to flow. Accordingly, it is possible to implement comfortable air conditioning without heat exchange loss and temperature unevenness.

[0037] On the other hand, the wind shielding member 11 is mounted and installed in the folding part or the division part between the first heat exchanger 4A and the second heat exchanger 4B so as to cover the entire surface on the upstream side of the folding part or the division part, the locking members 15 (the locking claws 15A and 15B) and 16 provided close to each other in pairs at a plurality of places at predetermined intervals in the lengthwise direction of the wind shielding member 11 are inserted between the pitches P of the plate fins 10. The claws of locking members 16 are locked so as to be hooked to the heat transfer tubes 9 of the second heat exchanger 4B. The locking claws 15A and 15B are locked so as to sandwich the heat transfer tubes 9 of the first heat exchanger 4A therebetween. Therefore the wind shielding member 11 can be detachably mounted and installed between the first heat exchanger 4A and second heat exchanger 4A and 4B.

[0038] Accordingly, the wind shielding member 11 can be simply mounted and installed only by inserting the locking members 15 (the locking claws 15A and 15B) and 16 provided in pairs at a plurality of places in the lengthwise direction between the pitches P of the plate fins 10 of the first heat exchanger 4A and the second heat exchanger 4B, and locking the locking members 15 (the locking claws 15A and 15B) and 16 to the heat transfer tubes 9. The wind shielding member 12 mounted in the bent part of the first heat exchanger 4A can be installed in a similar manner.

[0039] At this time, each pair of the locking claws 15A and 15B that are locked so as to sandwich the heat transfer tube 9 provided in the wind shielding members 11 and 12 is provided at positions shifted by the amount of multiple of the pitch P of the plate fins 10 of the first heat exchanger 4A and the second heat exchanger 4B, and therefore the pair of locking claws 15A and 15B are inserted between the pitch P of the plate fins 10 at the position shifted by the pitch multiple amount of the plate fins 10, so that the wind shielding members 11 and 12 can be mounted.

[0040] Accordingly, it is possible to solve defect, for example, the wind shielding members 11 and 12 are incompletely mounted by inserting the locking claws 15A and 15B, which originally should be inserted between the same pitch P, between the adjacent different pitch P by

a minute positional shift, or modification of the plate fins 10 due to biting, so that it is possible to facilitate mounting of the wind shielding members 11 and 12. Additionally, it is possible to prevent deterioration of performance due to modification of the plate fins 10, or the like.

[0041] The locking members 15 (the locking claws 15A and 15B) and 16 are inserted between the plate fins 10 of the first heat exchanger 4A and the second heat exchanger 4B to be locked to the heat transfer tubes 9, and not only the wind shielding members 11 and 12 are mounted and held by the locking force, but also the protrusions 17 provided on the respective side surfaces of the locking members 15 (the locking claws 15A and 15B) and 16 are engaged with the plate fins 10, so that it is possible to enhance mounting strength to the first and second heat exchangers 4A and 4B of the wind shielding members 11 and 12 by the engaging force of the protrusions 17. Therefore, even in a case where the indoor unit 1 receives impact caused by drop during packing or transportation, only the locking of the locking members 15 (the locking claws 15A and 15B) and 16 can prevent the wind shielding members 11 and 12 from being positionally shifted or detached, and it is possible to omit a support component for preventing such shifting or detaching.

[0042] In addition, the protrusions 17 are elongate protrusions each having a constant length, and such protrusions 17 each having the constant length are engaged with the surfaces of the plate fins 10, so that it is possible to secure necessary engaging force. Consequently, it is possible to enhance the mounting strength of the wind shielding members 11 and 12, and therefore it is possible to improve proof stress against impact caused by drop or the like, to reliably prevent the wind shielding members 11 and 12 from being shifted or detached.

[0043] Furthermore, when the protrusions 17 are provided along the cut-and-raised louvers 10A that are the heat transfer accelerating means provided in the plate fins 10, and the locking members 15 (the locking claws 15A and 15B) and 16 are locked to the heat transfer tubes 9, it is possible to further increase engaging force of the protrusions 17 to the plate fins 10 because the protrusions 17 are formed so as to be locked to the cut-and-raised louvers 10A. Consequently, it is possible to further enhance the mounting strength of the wind shielding members 11 and 12 to improve proof stress against impact caused by drop or the like, and it is possible to reliably prevent the wind shielding members 11 and 12 from being shifted or detached.

[0044] The locking members 15 (the locking claws 15A and 15B) and 16 are provided close to each other in pairs at each of a plurality of places in the lengthwise direction of the wind shielding member 11 and 12. Thus, the locking members 15 (the locking claws 15A and 15B) and 16 provided at each of the plurality of places at predetermined intervals are provided close to each other in pairs, so that it is possible to intensively receive stress in a lateral shifting direction received by the wind shielding members 11 and 12 due to the impact during drop or the

like, and to effectively improve the proof stress.

[0045] That is, in the indoor unit 1, increase in the number of the locking members 15 (the locking claws 15A and 15B) and 16 is effective in order to improve the mounting strength of the wind shielding members 11 and 12 to the impact during drop. However, it is possible to effectively enhance proof stress against lateral shifting of the wind shielding members 11 and 12, not by narrowing placement intervals between the locking members 15 (the locking claws 15A and 15B) and 16 disposed at the plurality of places, and increasing the number of disposed places, but by disposing the locking members 15 (the locking claws 15A and 15B) and 16 close to each other in pairs at the respective places without increasing the number of disposed places so as to intensively receive force.

[0046] Accordingly, also with such a configuration, it is possible to enhance the mounting strength of the wind shielding members 11 and 12, and to improve proof stress of the indoor unit 1 to impact caused by drop or the like to prevent the wind shielding members 11 and 12 from being shifted or detached. Also in this case, only the locking of the locking members 15 (the locking claws 15A and 15B) and 16 can prevent the wind shielding members 11 and 12 from being shifted or detached in a case where the indoor unit 1 receives impact caused by drop during packing or transportation or the like, and it is possible to omit a support component for preventing such shifting or detaching.

[0047] The present invention is not limited to the above embodiment, and can be appropriately modified without departing from the scope of the present invention. For example, the protrusions 17 are provide only on one side of the side surfaces of the locking claws 15A, 15B and the claw of the locking member 16 in the above embodiment, but it is natural that the protrusions 17 may be provided on the both sides. Additionally, the first heat exchanger 4A is bent in a V-shape, and the wind shielding member 12 is disposed in the bent part in the above description, but the first heat exchanger 4A may be formed to have no bent part. In this case, the wind shielding member 12 becomes unnecessary.

[0048] Furthermore, It goes without saying that the specific shape of the plate member 13 configuring the wind shielding members 11 and 12, specific claw shapes of the locking claws 15A, 15B and the claw of the locking member 16 locked to the heat transfer tubes 9, the number of claws, the shapes and the placement configurations of the protrusions 17 provided on the side surfaces can employ various embodiments, and are not limited to the above embodiment.

{Reference Signs List}

[0049]

1	Indoor unit
2	Unit body

4	Indoor heat exchanger	
4A	First heat exchanger	
4B	Second heat exchanger	
9	Heat transfer tube	
10	Plate fin	5
10A	Cut-and-raised louver (heat transfer accelerating means)	
11, 12	Wind shielding member	
15	Locking member (first locking member)	
15A, 15B	Locking claw	10
16	Locking member (second locking member)	
17	Protrusion	

Claims 15

1. An air conditioner indoor unit comprising:

an indoor heat exchanger provided inside a unit body, and disposed by being folded or divided into at least a first heat exchanger and a second heat exchanger; and
a wind shielding member provided in a folding part or a division part between the first heat exchanger and the second heat exchanger, wherein the wind shielding member is provided integrally with a first locking member locked to heat transfer tube of the first heat exchanger and a second locking member locked to heat transfer tube of the second heat exchanger, at a plurality of places at predetermined intervals along a lengthwise direction, and
wherein each of the locking members is provided with at least one protrusion engaged with plate fins of each of the first heat exchanger and the second heat exchanger on a side surface thereof.

2. The air conditioner indoor unit according to claim 1, wherein
each of the protrusions is an elongate protrusion having a constant length.

3. The air conditioner indoor unit according to claim 1 or 2, wherein
the protrusions are provided along a large number of heat transfer accelerating means provided in the plate fins, and are capable of being locked to the heat transfer accelerating means.

4. The air conditioner indoor unit according to any of claims 1 to 3, wherein
the locking members are provided close to each other in pairs at each of the plurality of places.

5. An air conditioner indoor unit comprising:

an indoor heat exchanger provided inside a unit

body, and disposed by being folded or divided into at least a first heat exchanger and a second heat exchanger; and
a wind shielding member provided in a folding part or a division part between the first heat exchanger and the second heat exchanger, wherein the wind shielding member is provided integrally with a first locking member locked to heat transfer tube of the first heat exchanger and a second locking member locked to heat transfer tube of the second heat exchanger, at a plurality of places at predetermined intervals along a lengthwise direction, and
wherein the locking members are provided close to each other in pairs at each of the plurality of places.

FIG. 1

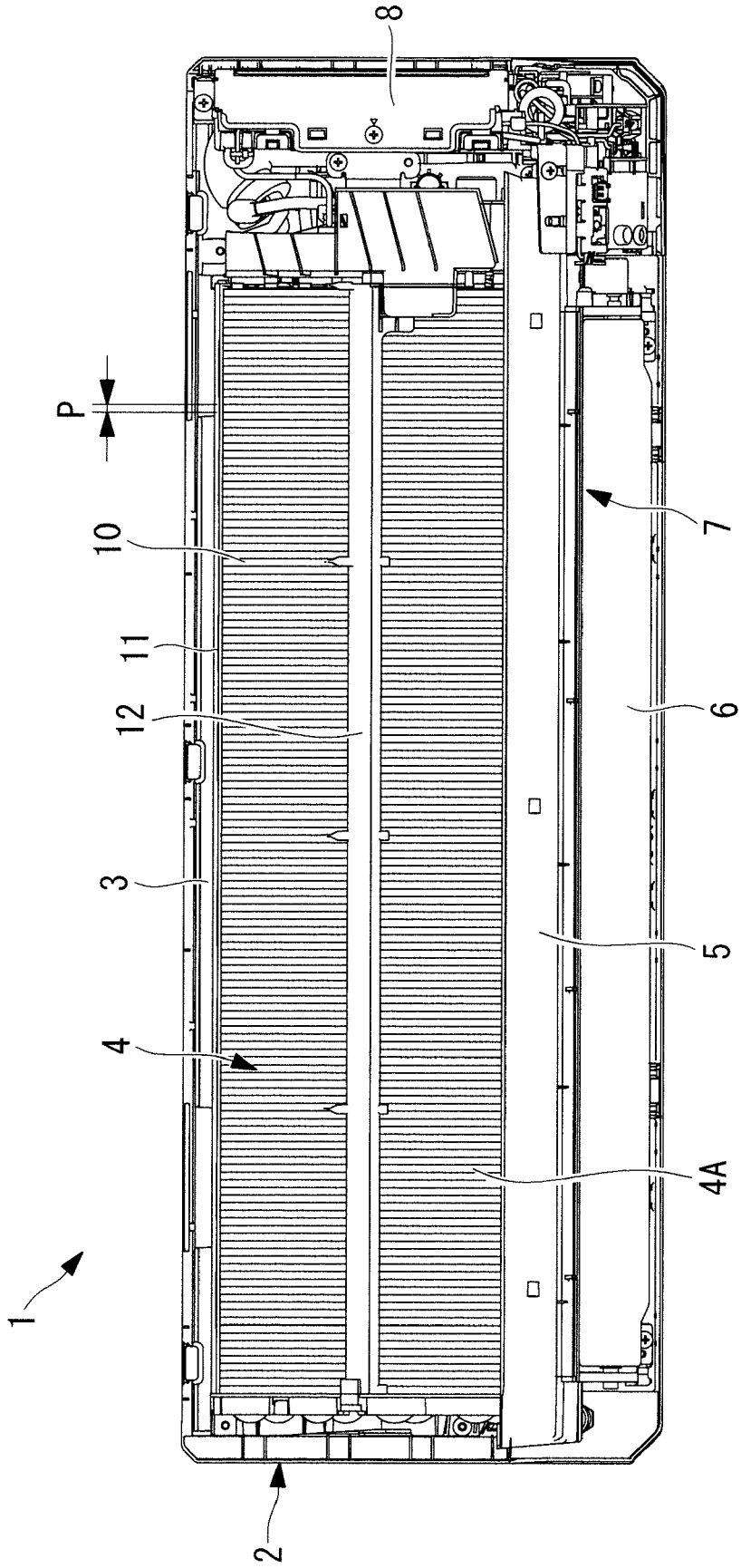


FIG. 2

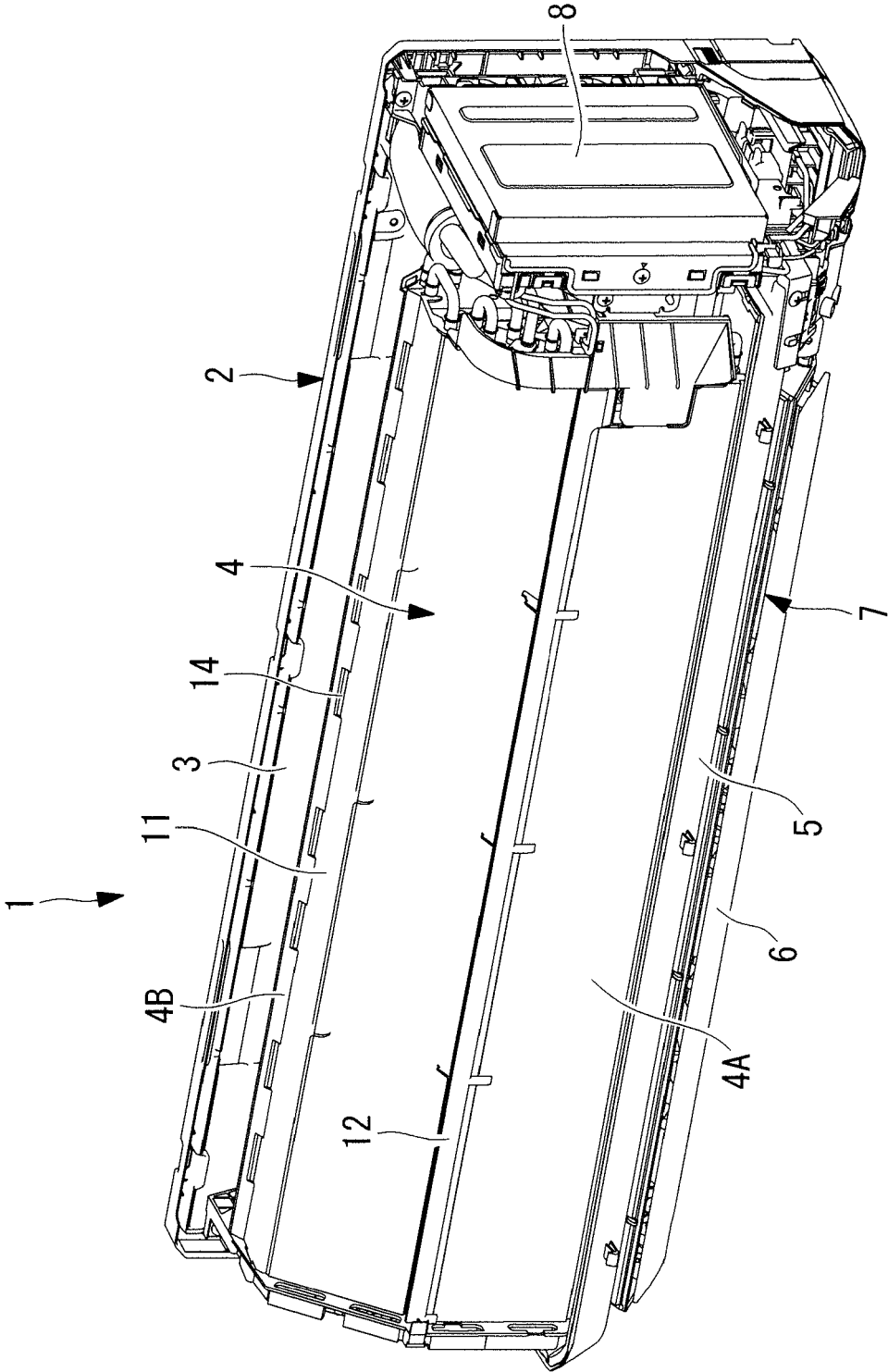


FIG. 3

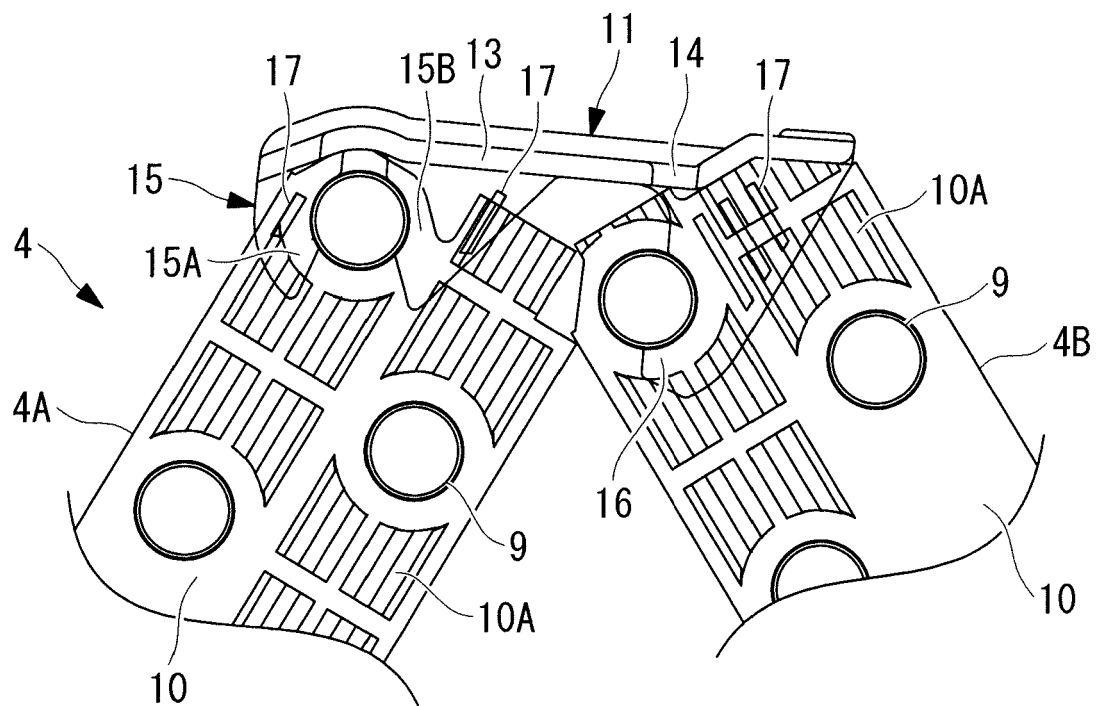


FIG. 4

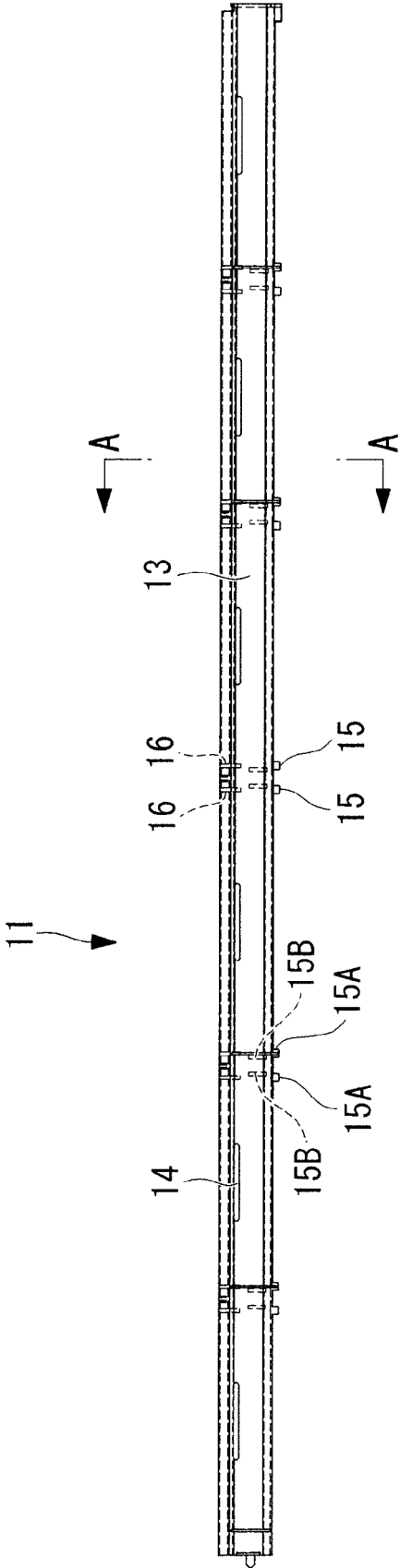


FIG. 5

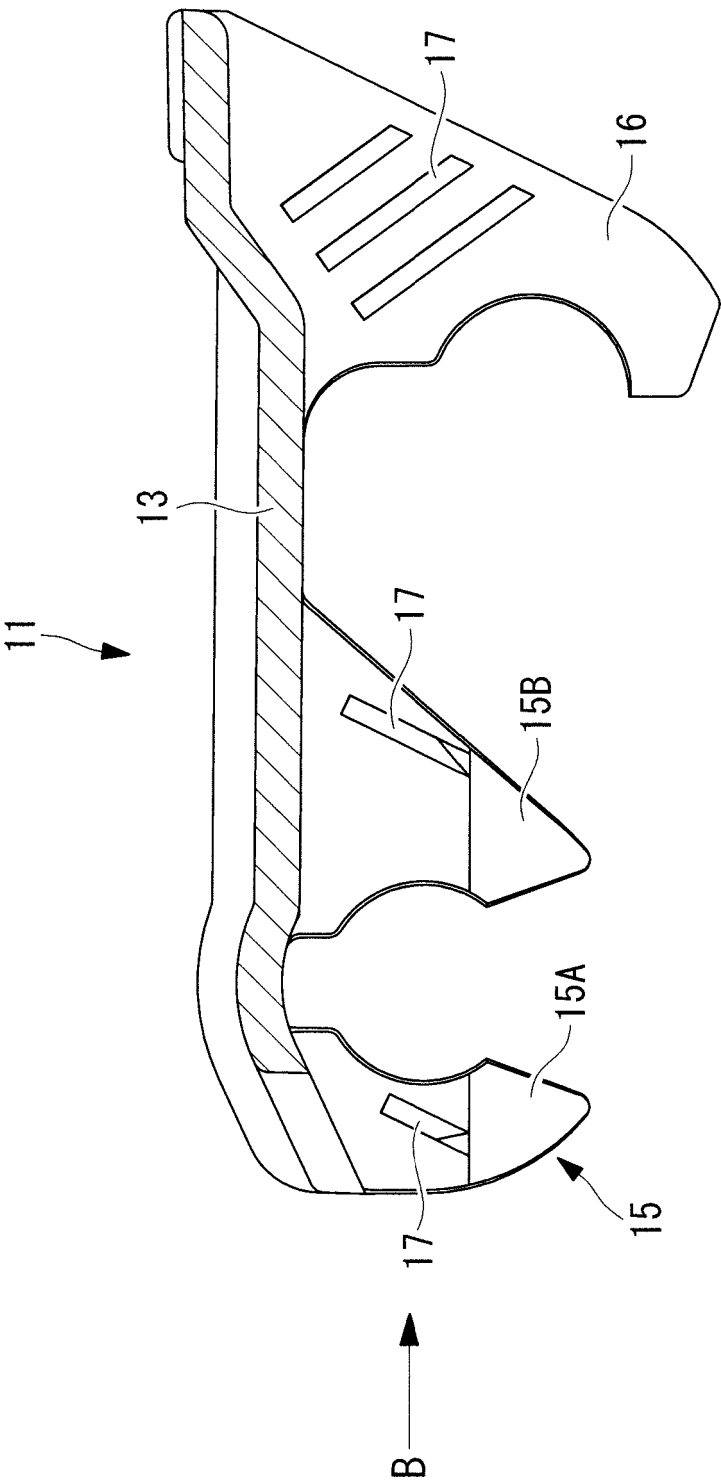


FIG. 6

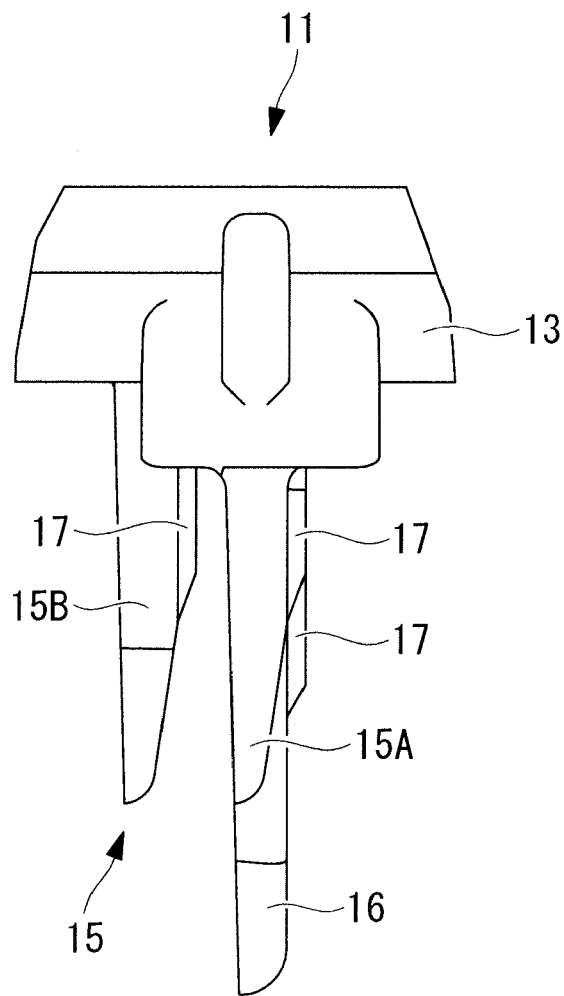
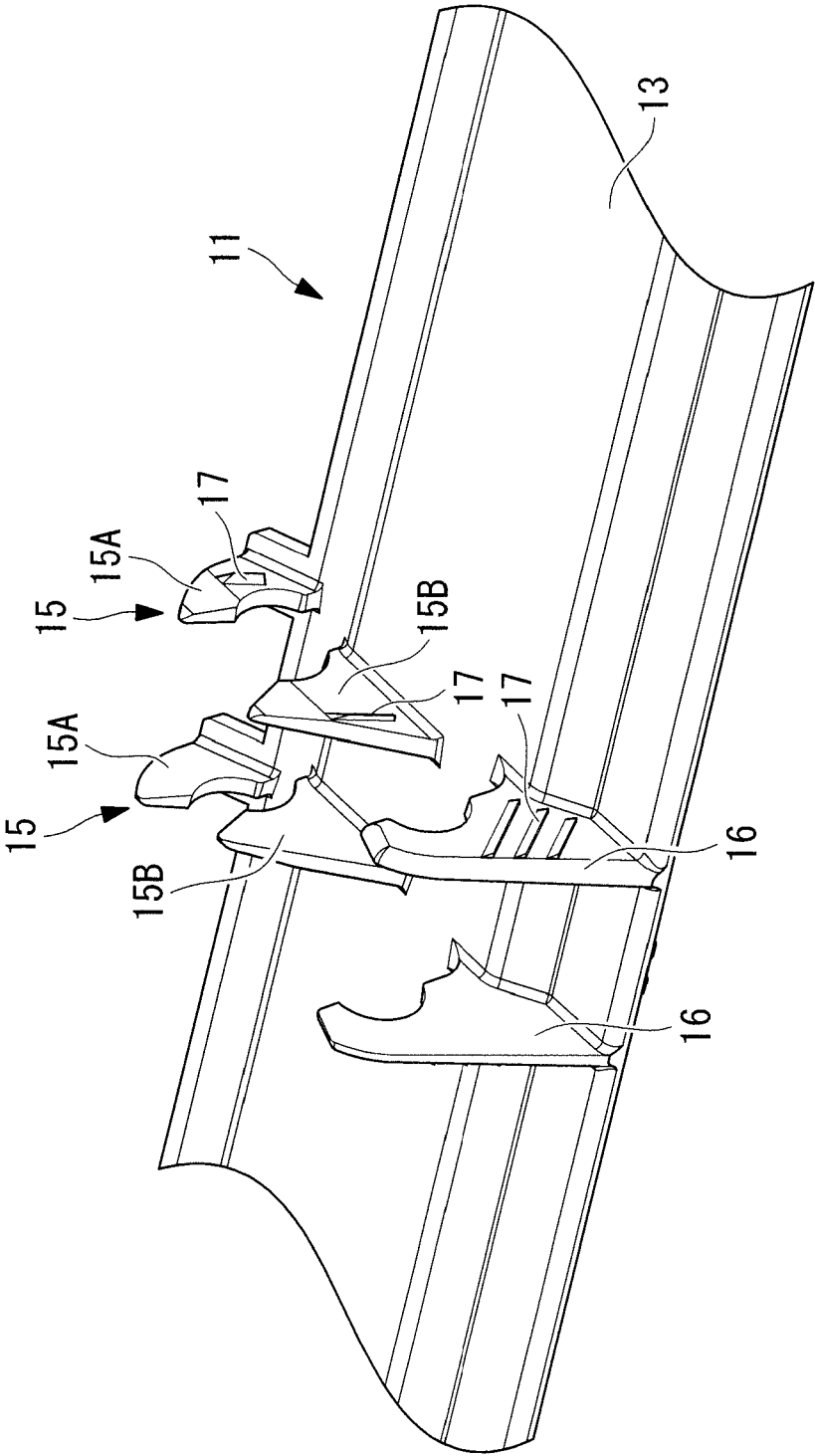


FIG. 7



REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- JP 2002081679 A [0004]
- JP 2005024223 A [0004]
- JP 2014077612 A [0004]