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

INNENRAUMEINHEIT FÜR KLIMAANLAGE

UNITÉ INTÉRIEURE POUR CLIMATISEUR

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(74) Representative: **Gramm, Lins & Partner**

Patent- und Rechtsanwälte PartGmbB
Frankfurter Straße 3 C
38122 Braunschweig (DE)

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(73) Proprietor: **Carrier Japan Corporation**

Tokyo 141-0032 (JP)

(72) Inventor: **KAMATA, Kenji**

Fuji-shi, Shizuoka 416-8521 (JP)

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Description

Technical Field

[0001] An embodiment of the present invention relates to an indoor unit for air conditioner.

Background Art

[0002] As disclosed in Patent Literature 1, for example, an indoor unit for air conditioner configured such that a cross flow fan for forming an air flow is driven by a fan motor is adapted to hold the fan motor inside a holding case, incorporate the holding case inside the indoor unit, and fix a portion of the holding case on an opposite side of a motor shaft through screwing, for example. With this configuration, it is possible to easily perform an operation of attaching the fan motor to the inside of the indoor unit and to improve manufacturability of the indoor unit. In addition, it is also possible to easily perform an operation of detaching the fan motor from the inside of the indoor unit and to improve maintenance properties of the indoor unit.

Citation List

Patent Literature

[0003] Patent Literature 1: Japanese Patent Laid-Open No. 2012-112546

[0004] JP 2008 089197 A discloses an indoor unit for air conditioner according to the preamble of claim 1, comprising a cross flow fan that forms an air flow of suctioning indoor air from an air inlet port and blowing out the air from an air outlet port; a fan motor that drives the cross flow fan; a holding case that holds the fan motor therein; a fitting portion to which the holding case holding the fan motor therein is fitted; a vibration damping member that is accommodated inside the holding case along with the fan motor and absorbs vibration generated when the fan motor is driven.

[0005] JP 2007 212042 A discloses an air conditioner comprising an indoor unit exchanging heat with the indoor air. The indoor unit comprises a transverse flow fan distributing the air indoors, a fan motor driving the transverse flow fan, a motor installation space receiving the fan motor, and a ventilation space receiving the transverse flow fan. The fan motor comprises a shaft extending from the motor main body to the ventilation space and connected with the transverse fan received in the ventilation space, and a vibration control rubber disposed around the rotating shaft. A vibration control rubber fixing wall is further disposed to control the movement of the vibration control rubber.

Summary of Invention

Technical Problem

[0006] However, although the fan motor is strongly fixed at the portion of the holding case on the opposite side of the motor shaft, the fan motor is not sufficiently fixed at a portion of the holding case on the side of the motor shaft in the configuration in the related art. There is thus a concern that vibration generated when the fan motor is driven cannot sufficiently be absorbed, and there is also a concern that noise generated due to the vibration of the fan motor cannot sufficiently be curbed.

[0007] Thus, the present embodiment provides an indoor unit for air conditioner capable of sufficiently curbing vibration and noise generated when a fan motor is driven.

Solution to Problem

[0008] An indoor unit for air conditioner according to the present invention is defined in claim 1 and includes: a cross flow fan that forms an air flow of suctioning indoor air from an air inlet port and blowing out the air from an air outlet port; a fan motor that drives the cross flow fan; a holding case that holds the fan motor therein; a fitting portion to which the holding case holding the fan motor therein is fitted; a vibration damping member that is accommodated inside the holding case along with the fan motor and absorbs vibration generated when the fan motor is driven; and a compressing section that compresses the vibration damping member inside the holding case with the holding case holding the fan motor therein being fitted to the fitting portion. Finally, the compressing section comprises slits.

[0009] The dependent claims define preferred embodiments of the invention.

Brief Description of Drawings

[0010]

[Figure 1] Figure 1 is a front view schematically illustrating a configuration example of inside of an indoor unit for air conditioner according to the present embodiment.

[Figure 2] Figure 2 is an enlarged view schematically illustrating a configuration example of a fan motor and a surrounding part thereof according to the present embodiment and illustrating an exemplary state in which the fan motor has been attached.

[Figure 3] Figure 3 is a perspective view schematically illustrating a configuration example of the fan motor according to the present embodiment.

[Figure 4] Figure 4 is an enlarged view schematically illustrating a configuration example of the fan motor and the surrounding part thereof according to the present embodiment and illustrating an exemplary state in which the fan motor has been detached.

Description of Embodiment

[0011] Hereinafter, an embodiment according to an

indoor unit for air conditioner will be described with reference to the drawings. An indoor unit 10 for air conditioner illustrated as an example in Figure 1 constitutes an air conditioner along with an outdoor unit provided outdoor, which is not illustrated. The indoor unit 10 includes a cross flow fan 12 and the like inside a rectangular indoor unit main body section 11 constituting an outline thereof. An air inlet port 13 is provided at an upper portion of the indoor unit main body section 11, and an air outlet port 14 is provided at a lower portion of the indoor unit main body section 11. Also, a blowing passage 15 is provided inside the indoor unit main body section 11 from the air inlet port 13 to the air outlet port 14. An air filter, which is not illustrated, a heat exchanger, which is not illustrated, the cross flow fan 12, a louver 16, and the like are provided inside the blowing passage 15 from an upstream side, which is a side of the air inlet port 13, toward a downstream side, which is a side of the air outlet port 14.

[0012] The air filter captures foreign matters included in air suctioned from the air inlet port 13. The heat exchanger performs heat exchange with the air suctioned from the air inlet port 13 and heats or cools the air. The cross flow fan 12 forms an air flow of suctioning indoor air from the air inlet port 13 and blowing out the air from the air outlet port 14 through the blowing passage 15. The louver 16 adjusts a direction of the air blown out from the air outlet port 14.

[0013] Also, a fan motor 100 for driving the cross flow fan 12 is included inside the indoor unit main body section 11. In this case, the fan motor 100 is included inside a machine chamber 17 provided on the right side of the blowing passage 15 when seen from the front side of the indoor unit 10, inside the indoor unit main body section 11.

[0014] Next, a configuration example of the fan motor 100 will be described in detail. As illustrated as an example in Figure 2 as well, the fan motor 100 includes a substantially columnar-shaped motor main body section 101 and a motor shaft 102. A stator and a rotor, which are not illustrated, are accommodated inside the motor main body section 101. The motor main body section 101 has a known configuration in which a columnar-shaped rotor is rotatably included inside the annular-shaped stator. The motor shaft 102 is included to rotate integrally with the rotor as a rotation center shaft of the rotor. The motor shaft 102 is configured to project from one end surface of the fan motor 100 in an axial direction, in this case, the end surface on the left side when seen from the front side of the indoor unit 10 but not to project from the other end surface of the fan motor 100 in the axial direction, in this case, the end surface on the right side when seen from the front side of the indoor unit 10.

[0015] Also, as illustrated as an example in Figure 3, the fan motor 100 is adapted to be incorporated inside the machine chamber 17 in a state in which the fan motor 100 is held inside a holding case 200. The entire holding case 200 is made of a resin material, for example. The holding case 200 has substantially a circular shape and accommodates the entire motor main body section 101 of the

fan motor 100. The holding case 200 is formed by a combination of a plurality of, in this case, two case forming members 201A and 201B.

[0016] At a part of the holding case 200 on one end side in the axial direction, in this case, the part on the left side when seen from the front side of the indoor unit 10, a locking projection 202A provided at the case forming member 201A is locked at a locking frame portion 202B provided at the case forming member 201B. In this manner, a state in which the case forming member 201A and the case forming member 201B are assembled is maintained.

[0017] Also, at a part of the holding case 200 on the other end side in the axial direction, in this case, the part on the right side when seen from the front side of the indoor unit 10, a screw hole portion 203A provided at the case forming member 201A and a screw hole portion 203B provided at the case forming member 201B are fastened together with a screw 204. In this manner, the state in which the case forming member 201A and the case forming member 201B are assembled is maintained.

[0018] Also, a plurality of window portions 205 are provided in a circumferential surface of the holding case 200. In this case, the window portions 205 are hole portions opened in a rectangular shape. Note that this can be implemented with the shape, the size, the number, and the like of the window portions 205 appropriately changed. The window portions 205 are in a state in which a side circumferential surface of the motor main body section 101 of the fan motor 100 is exposed therefrom. Therefore, the holding case 200 can discharge heat generated from the fan motor 100, particularly from the motor main body section 101 at the time of driving to outside through the window portions 205. Thus, the heat generated from the fan motor 100 is unlikely to be held inside the holding case 200.

[0019] Also, a compressing section 206 is provided at a center location of one end surface of the holding case 200 in the axial direction, in this case, the end surface on the left side when seen from the front side of the indoor unit 10. Preferably, the compressing section 206 is included integrally with the one end surface of the holding case 200 in the axial direction and projects in substantially a circular shape from the one end surface of the holding case 200 in the axial direction toward the left side. According to the invention, the compressing section 206 has a plurality of slits. As in this case, four slits 206a in an outer edge portion thereof are provided. Preferably, the plurality of slits 206a are disposed at equal intervals at the outer edge portion of the compressing section 206.

[0020] The compressing section 206a may have a plurality of, in this case, four compressing piece portions 206b between the slits 206a by having the plurality of slits 206a. The plurality of compressing piece portions 206b can be elastically deformed inward in the radial direction of the compressing section 206 in response to an application of external force. Also, pressing portions 206c for

pressing vibration damping rubbers 300, which will be described later, are provided at distal end portions of the plurality of compressing piece portions 206b. The plurality of pressing portions 206c are disposed in an annular shape around the motor shaft 102.

[0021] Also, the vibration damping rubbers 300 are accommodated inside the holding case 200 along with the motor main body section 101 of the fan motor 100. The vibration damping rubbers 300 are an example of the vibration damping member, and in this case, the vibration damping rubbers 300 are accommodated inside the compressing section 206 of the holding case 200. The vibration damping rubbers 300 have an annular shape and are disposed inside the compressing section 206 to surround the motor shaft 102 of the fan motor 100. The vibration damping rubbers 300 mainly have a function of absorbing vibration generated when the fan motor is driven.

[0022] Note that the vibration damping rubbers 300 are accommodated not only on the side of the motor shaft 102 but also on the opposite side of the motor shaft 102 inside the motor case 200. In this case, the vibration damping rubbers 300 on the opposite side of the motor shaft 102 are formed of the same material as that of the vibration damping rubbers 300 on the side of the motor shaft 102 and are formed into the same size, the same shape, and the same thickness. However, the vibration damping rubbers 300 on the opposite side of the motor shaft 102 may be formed of a different material from that of the vibration damping rubbers 300 on the side of the motor shaft 102 or may be formed into a different size, a different shape, and a different thickness.

[0023] Also, as illustrated as an example in Figure 2, a partitioning wall section 19 that partitions the blowing passage 15 and the machine chamber 17 is provided inside the indoor unit main body section 11. The partitioning wall section 19 is a wall section of multiple layers, in this case, double layers, and includes a blowing passage-side wall section 19A and a machine chamber-side wall section 19B. The blowing passage-side wall section 19A is provided with a shaft insertion hole 20A opened in a circular shape. The motor shaft 102 of the fan motor 100 is inserted into the shaft insertion hole 20A from the side of the machine chamber 17 toward the side of the blowing passage 15. Then, a distal end portion of the motor shaft 102 of the fan motor 100 inserted into the shaft insertion hole 20A is coupled to the cross flow fan 12 inside the blowing passage 15. In this manner, the fan motor 100 is configured to be able to rotate the cross flow fan 12 via the motor shaft 102.

[0024] On the other hand, the machine chamber-side wall section 19B is provided with a fitting hole portion 400 opened in a circular shape. The fitting hole portion 400 is an example of the fitting portion. An opening diameter of the fitting hole portion 400 is larger than an opening diameter of the shaft insertion hole 20A. Also, the axial center of the fitting hole portion 400 is configured to conform to the axial center of the shaft insertion hole

20A. The compressing section 206 of the holding case 200 holding the motor main body section 101 of the fan motor 100 therein is fitted into the fitting hole portion 400.

[0025] Here, as illustrated as an example in Figure 4, a size DA, that is, a diameter dimension DA of the fitting hole portion 400 is slightly smaller than a size DB of the compressing section 206 in a natural state in which the compressing section 206 is not fitted into the fitting hole portion 400, in other words, the size DB, that is, the diameter dimension DB of the compressing section 206 in a state in which the plurality of compressing piece portions 206b are not elastically deformed. In this case, the size DA of the fitting hole portion 400 is at least slightly smaller than the size DB of the distal end portion of the compressing section 206 in the natural state. Note that it is only necessary for the size DA of the fitting hole portion 400 to be smaller than the diameter dimension of any site between the distal end portion and the proximal end portion of the compressing section 206 in the natural state.

[0026] With the aforementioned configuration, the plurality of compressing piece portions 206b are pressed against an inner circumferential surface of the fitting hole portion 400, and the compressing piece portions 206b are elastically deformed inward in the radial direction, with the compressing section 206 of the holding case 200 being fitted into the fitting hole portion 400. In this manner, the vibration damping rubbers 300 inside the compressing section 206 are pressed and compressed by the plurality of compressing piece portions 206b.

[0027] Also, a side circumferential surface of the compressing section 206, that is, side surfaces of the plurality of compressing piece portions 206b may have a tapered shape that gradually becomes thinner toward the side of the fitting hole portion 400, that is, from the proximal end portion toward the distal end portion. Therefore, the plurality of compressing piece portions 206b are further elastically deformed inward in the radial direction with the compressing section 206 being fitted into the fitting hole portion 400, and it is thus possible to further enhance compression strength of the vibration damping rubbers 300.

[0028] According to the indoor unit 10 for air conditioner in the present embodiment, it is possible to compress the vibration damping rubbers 300 inside the compressing section 206 of the holding case 200 with the elastically deforming compressing section 206 with the compressing section 206 of the holding case 200 holding the motor main body section 101 of the fan motor 100 therein being fitted into the fitting hole portion 400. With this configuration, it is possible to enhance fixing strength on the side of the motor shaft 102 of the fan motor 100 with the compressed vibration damping rubbers 300. Therefore, according to the indoor unit 10, it is possible to sufficiently fix the fan motor 100 not only at a part on the opposite side of the motor shaft 102 fixed with the screw 204 but also at a part of the holding case 200 on the side of the motor shaft 102 and to sufficiently curb vibra-

tion and noise generated when the fan motor 100 is driven, as compared with the configuration in the related art.

[0029] Also, according to the indoor unit 10, the compressing section 206 may be included integrally with the holding case 200. With this configuration, it is possible to fit the compressing section 206 into the fitting hole portion 400 at the same time with the attachment of the holding case 200 holding the motor main body section 101 of the fan motor 100 therein to the inside of the indoor unit main body section 11. Therefore, it is possible to easily perform the operation of attaching the fan motor 100 to the inside of the indoor unit main body section 11 and thus to improve manufacturability of the indoor unit 10.

[0030] According to the indoor unit 10 of the invention, the compressing section 206 has the plurality of slits 206a. With this configuration, it is possible to easily cause the compressing section 206 to be elastically deformed when the compressing section 206 is fitted into the fitting hole portion 400 and to further efficiently perform the compression of the vibration damping rubbers 300.

[0031] Also, according to the indoor unit 10, the plurality of slits 206a may be disposed at equal intervals at the outer edge portion of the compressing section 206. With this configuration, it is possible to uniformly perform the compression of the vibration damping rubbers 300 with the compressing section 206 from the outer circumferential portions of the vibration damping rubbers 300 and to perform absorption of vibration through the vibration damping rubbers 300 in an unbiased manner.

[0032] Also, according to the indoor unit 10, the side circumferential surface of the compressing section 206, that is, the surface abutting on the inner circumferential surface of the fitting hole portion 400 when the fan motor 100 is assembled may have a tapered shape that gradually becomes thinner toward the side of the fitting hole portion 400. With this configuration, it is possible to enhance compression strength of the vibration damping rubbers 300 with the compressing section 206 and to further reliably perform the compression of the vibration damping rubbers 300 by the compressing section 206 being fitted into the fitting hole portion 400.

[0033] Also, according to the indoor unit 10, the size of the fitting hole portion 400 may be slightly smaller than the size of the compressing section 206 in the natural state in which the compressing section 206 is not fitted into the fitting hole portion 400. With this configuration, it is possible to enhance compression strength of the vibration damping rubbers 300 with the compressing section 206 and to further reliably perform the compression of the vibration damping rubbers 300 by the compressing section 206 being fitted into the fitting hole portion 400.

[0034] Note that the present embodiment is not limited to the aforementioned embodiment and can be variously modified or expanded without departing from the scope of the invention as defined in the appended claims. For example, the vibration damping member is not limited to the vibration damping rubbers configured of a rubber

material, and various materials can be applied as long as the materials have a characteristic of absorbing vibration.

[0035] For example, it is only necessary for the compression of the vibration damping rubbers 300 to be achieved by about 1 mm in a case in which the diameter of the vibration damping rubbers 300 is 42 mm, for example. In this case, the compression rate of the vibration damping rubbers 300 is 1 mm/42 mm, which is about 2%. Also, the compression rate of the vibration damping rubbers 300 can be set in some range, and for example, the compression rate is preferably set between about 1% to about 3%. In order to realize such a compression rate, it is only necessary to set a configuration of each component, such as the size and the shape of the compressing section 206, the number and the interval of the slits 206a, the number, the shape, the size, and the disposition position of the compressing piece portions 206b, the size and the shape of the fitting hole portion 400, and the size and the shape of the vibration damping rubbers 300, for example.

[0036] Also, the number of the plurality of slits 206a provided at the compressing section 206 can be appropriately changed, and may be three or less, or may be five or more. Also, the intervals of the slits 206a may not be equal intervals, and a configuration in which intervals of the plurality of slits 206a are not uniform may also be employed. Moreover, the holding case 200 may be configured of a metal material, for example, at least as long as the compressing section 206 can be configured to be elastically deformable.

[0037] Also, the compressing section 206 is not limited to the circular shape and can be implemented with the shape appropriately changed to, for example, a triangular shape, a quadrangular shape, an oval shape, or a polygonal shape. Also, the fitting hole portion 400 is not limited to the circular shape and can be implemented with the shape appropriately changed to, for example, a triangular shape, a quadrangular shape, an oval shape, or a polygonal shape. In addition, the shapes of the compressing section 206 and the fitting hole portion 400 are not necessarily the same and may be different. Thus, a configuration in which a quadrangular compressing section 206 is fitted into a circular fitting hole portion 400, for example, may be employed.

[0038] Note that the present embodiment has been presented as an example and is not intended to limit the scope of the invention. The novel embodiment can be implemented in other various forms, without departing from the scope of the invention defined in the claims.

Claims

1. An indoor unit (10) for air conditioner comprising:

a cross flow fan (12) configured to form an air flow of suctioning indoor air from an air inlet port

- (13) and blowing out the air from an air outlet port (14);
 a fan motor (100) adapted to drive the cross flow fan (12);
 a holding case (200) configured to hold the fan motor (100) therein;
 a fitting portion (400) to which the holding case (200) holding the fan motor (100) therein is fitted;
 a vibration damping member (300) that is accommodated inside the holding case (200) along with the fan motor (100) and adapted to absorb vibration generated when the fan motor (100) is driven;
 a compressing section (206) that adapted to compress the vibration damping member (300) inside the holding case (200) with the holding case (200) holding the fan motor (100) therein being fitted to the fitting portion (400);
characterized in that
 the compressing section (206) having slits (206a).
2. The indoor unit (10) for air conditioner according to claim 1, **characterized in that** the compressing section (206) is included integrally with the holding case (200).
 3. The indoor unit (10) for air conditioner according to claim 1, **characterized in that** the slits (206a) are disposed at equal intervals at an outer edge portion of the compressing section (206).
 4. The indoor unit (10) for air conditioner according to any one of claims 1 to 3, **characterized in that** the compressing section (206) has a tapered shape that gradually becomes thinner toward a side of the fitting portion (400).
 5. The indoor unit (10) for air conditioner according to any one of claims 1 to 4, **characterized in that** a size of the fitting portion (400) is smaller than a size of the compressing section (206) in a natural state in which the compressing section (206) is not fitted to the fitting portion (400).

Patentansprüche

1. Eine Innenraumeinheit (10) für eine Klimaanlage, umfassend:
 einen Querstromventilator (12), der so konfiguriert ist, dass er einen Luftstrom aus angesaugter Innenraumluft an einer Lufteinlassöffnung (13) bildet und die Luft von einer Luftauslassöffnung (14) ausbläst;
 einen Ventilatormotor (100), der so konfiguriert ist, dass er den Querstromventilator (12) antreibt;

ein Haltegehäuse (200) das ausgebildet ist, den Ventilatormotor (100) darin zu halten;
 ein Befestigungsabschnitt (400), an dem das Haltegehäuse (200), das den Ventilatormotor (100) darin hält, befestigt ist;
 ein Schwingungsdämpfungselement (300), das zusammen mit dem Ventilatormotor (100) im Haltegehäuse (200) untergebracht ist und ausgebildet ist, Schwingungen zu absorbieren, die beim Antrieb des Ventilatormotors (100) entstehen;
 einen Kompressionsabschnitt (206), angepasst, um das Schwingungsdämpfungselement (300) im Inneren des Haltegehäuses (200) zu komprimieren, mit dem Haltegehäuse (200), das den Ventilatormotor (100) darin hält, an dem Befestigungsabschnitt (400) befestigt ist;
dadurch gekennzeichnet, dass der Kompressionsabschnitt (206) Schlitze (206a) aufweist.

2. Die Innenraumeinheit (10) für eine Klimaanlage nach Anspruch 1, **dadurch gekennzeichnet, dass** der Kompressionsabschnitt (206) integral an dem Haltegehäuse (200) vorgesehen ist.
3. Die Innenraumeinheit (10) für eine Klimaanlage gemäß Anspruch 1, **dadurch gekennzeichnet, dass** die Schlitze (206a) in gleichen Abständen an einem äußeren Randabschnitt des Kompressionsabschnitts (206) angeordnet sind.
4. Die Innenraumeinheit (10) für eine Klimaanlage gemäß einem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** der Kompressionsabschnitt (206) eine konische Form aufweist, die zu einer Seite des Befestigungsabschnitts (400) hin allmählich dünner wird.
5. Die Innenraumeinheit (10) für eine Klimaanlage gemäß einem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass** eine Größe des Befestigungsabschnitts (400) kleiner ist als eine Größe des Kompressionsabschnitts (206) in einem Ruhezustand, in dem der Kompressionsabschnitt (206) nicht an den Befestigungsabschnitt (400) befestigt ist.

Revendications

1. Unité (10) interne pour un appareil de conditionnement d'air comprenant :
 un ventilateur (12) à flux transversal configuré pour former un flux d'air constitué d'une aspiration d'air interne depuis un orifice (13) d'entrée d'air et d'un soufflage de l'air depuis un orifice (14) de sortie d'air ;
 un moteur (100) de ventilateur configuré pour

entraîner le ventilateur (12) à flux transversal ;
 un boîtier (200) de maintien configuré pour maintenir le moteur (100) de ventilateur à l'intérieur de celui-ci ;
 une portion (400) de montage sur laquelle est fixé le boîtier (200) de maintien qui maintient le moteur (100) de ventilateur à l'intérieur de celui-ci ;
 un élément (300) d'amortissement de vibration qui est logé à l'intérieur du boîtier (200) de maintien conjointement avec le moteur (100) de ventilateur et qui est adapté pour absorber une vibration générée quand le moteur (100) de ventilateur est entraîné ;
 une section (206) de compression qui est adaptée pour comprimer l'élément (300) d'amortissement de vibration à l'intérieur du boîtier (200) de maintien, le boîtier (200) de maintien, qui maintient le moteur (100) de ventilateur à l'intérieur de celui-ci, étant monté sur la portion (400) de montage ;
caractérisée en ce que la section (206) de compression a des fentes (206a).

2. Unité (10) interne pour un appareil de conditionnement d'air selon la revendication 1, **caractérisée en ce que** la section (206) de compression est incluse de manière intégrale avec le boîtier (200) de maintien.
3. Unité (10) interne pour un appareil de conditionnement d'air selon la revendication 1, **caractérisée en ce que** les fentes (206a) sont disposées à intervalles égaux au niveau d'une portion de bord extérieure de la section (206) de compression.
4. Unité (10) interne pour un appareil de conditionnement d'air selon l'une quelconque des revendications 1 à 3, **caractérisée en ce que** la section (206) de compression a une forme effilée qui devient graduellement plus mince vers un côté de la portion (400) de montage.
5. Unité (10) interne pour un appareil de conditionnement d'air selon l'une quelconque des revendications 1 à 4, **caractérisée en ce qu'**une taille de la portion (400) de montage est inférieure à une taille de la section (206) de compression dans un état naturel dans lequel la section (206) de compression n'est pas montée sur la portion (400) de montage.

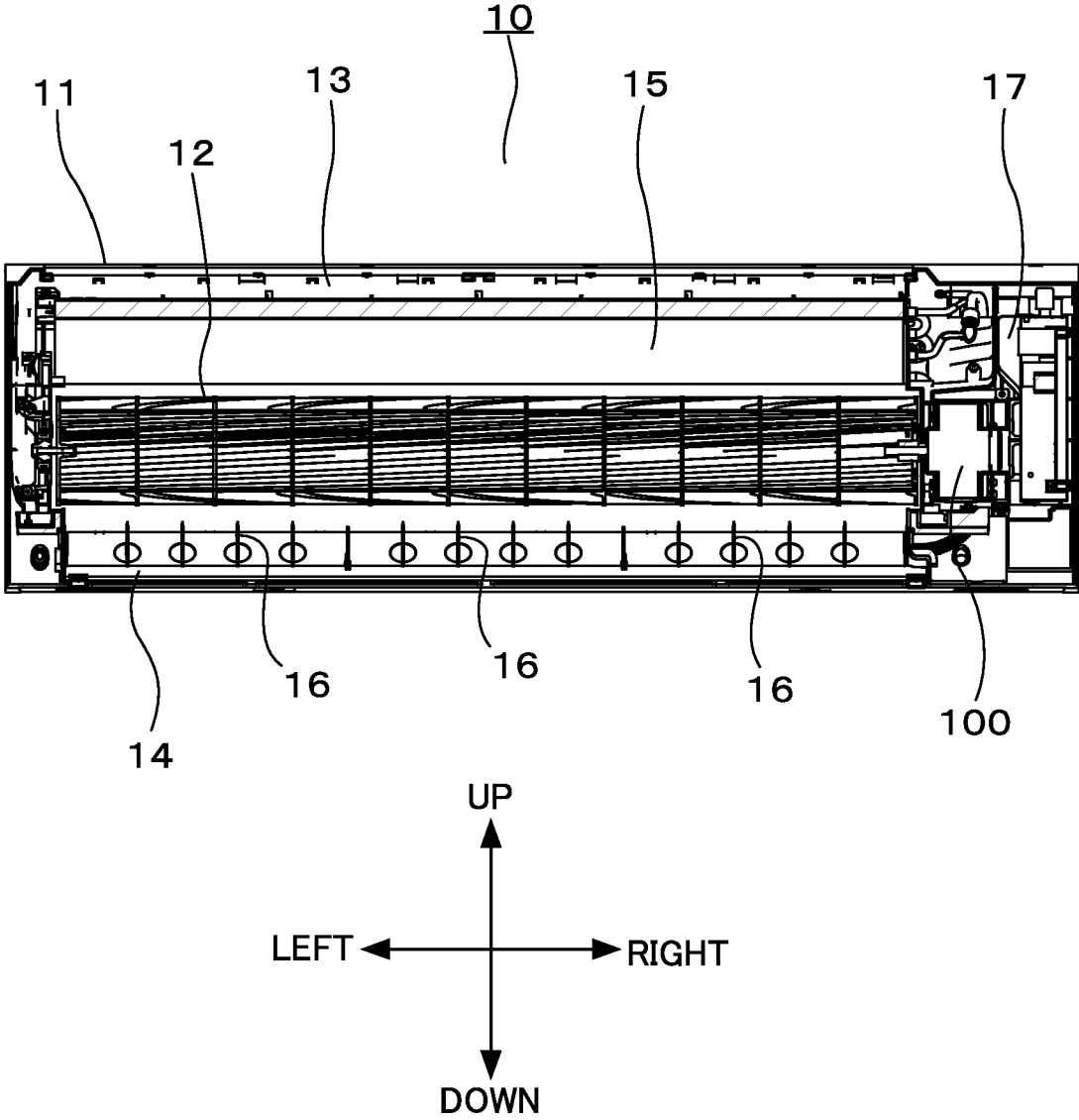


Fig.1

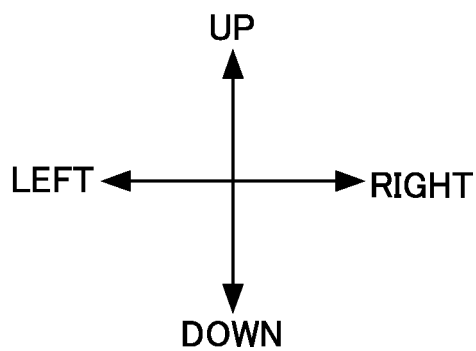
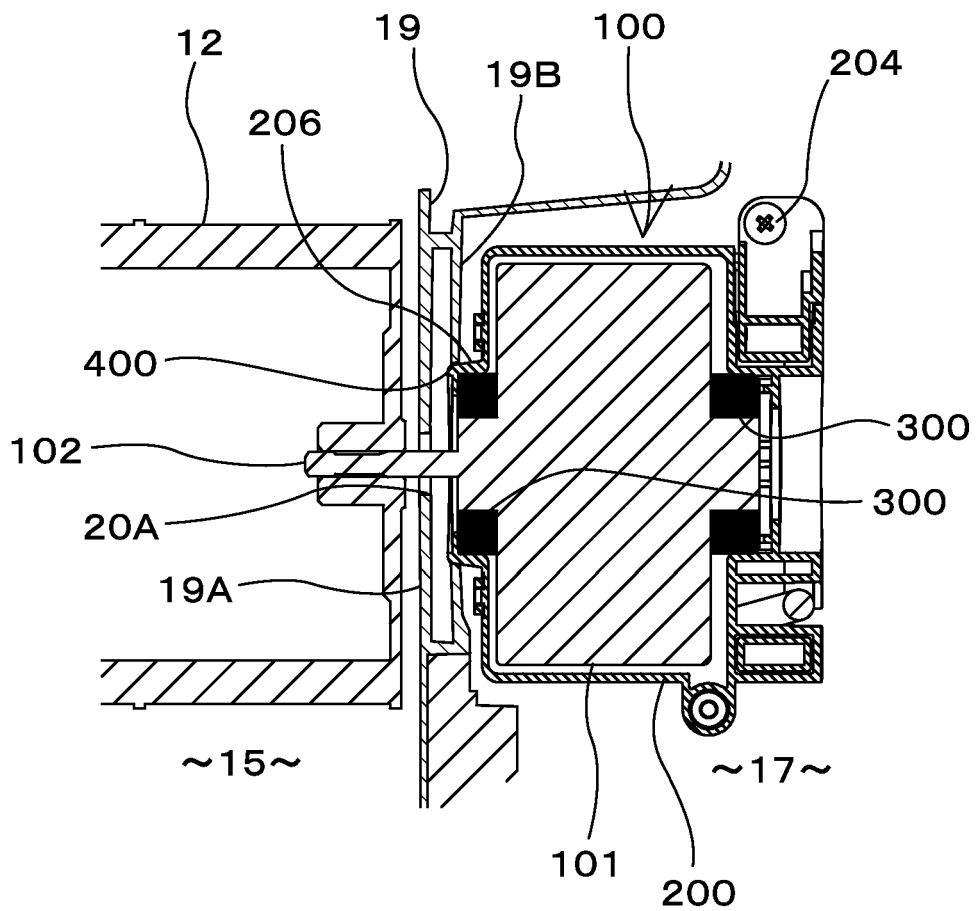


Fig.2

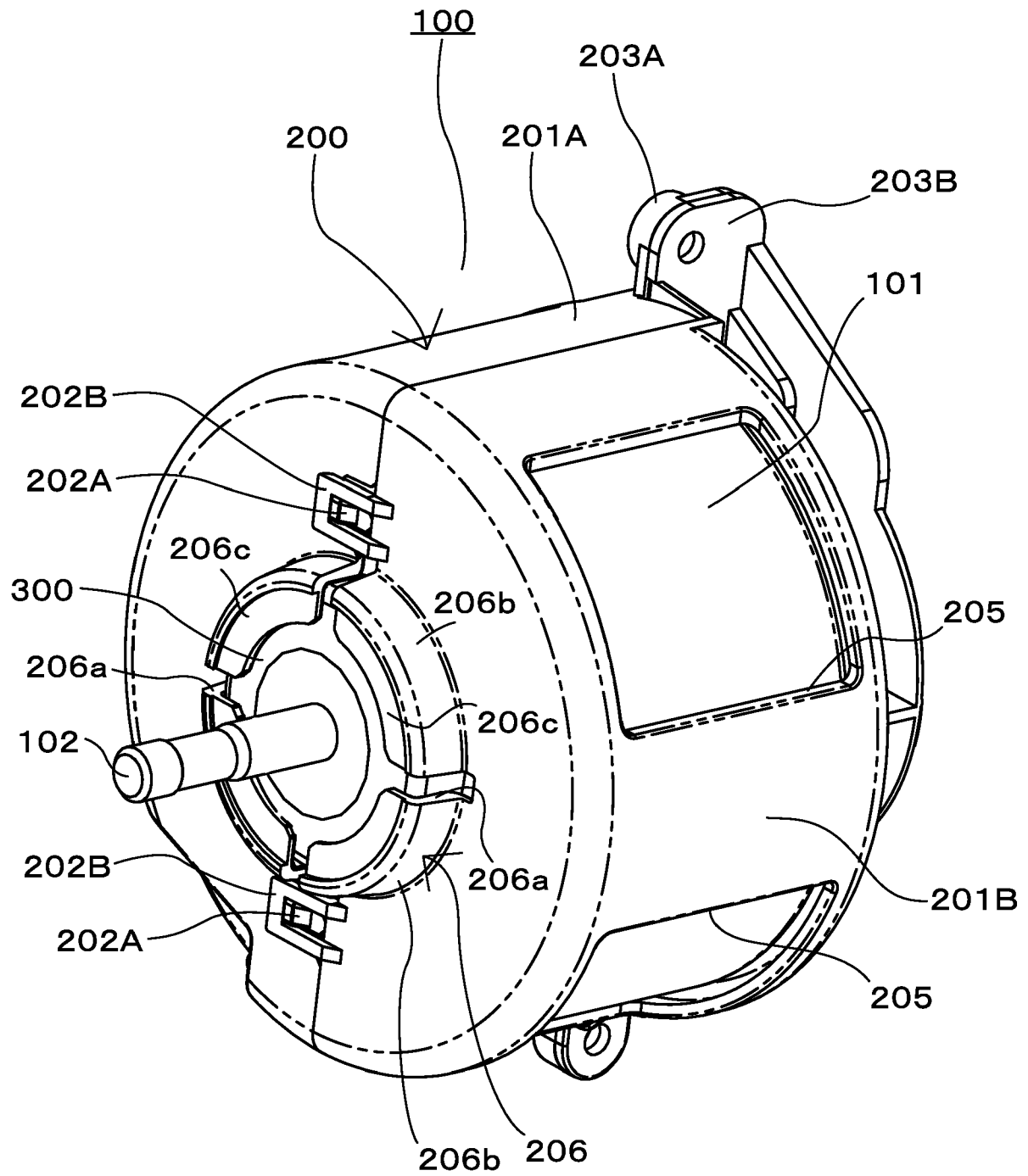


Fig.3

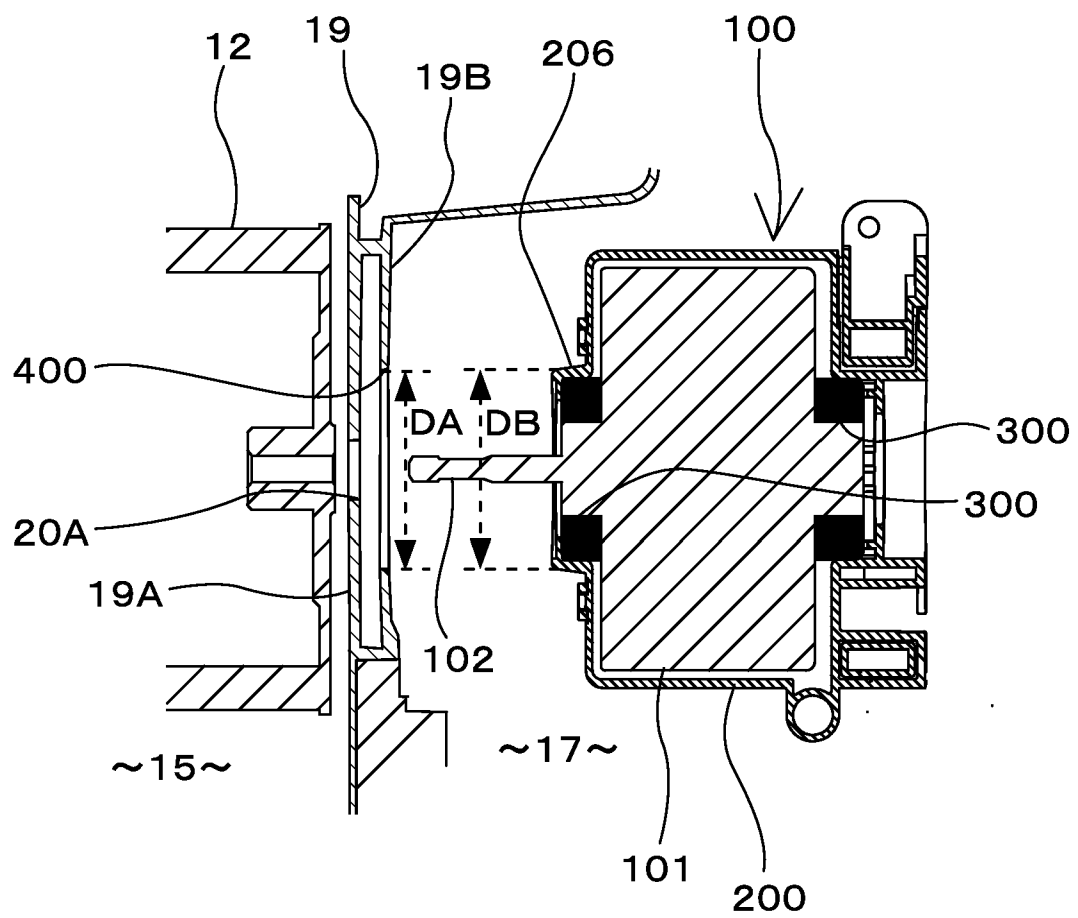


Fig.4

REFERENCES CITED IN THE DESCRIPTION

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