

(19)



(11)

**EP 3 418 581 B1**

(12)

**EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:  
**17.03.2021 Bulletin 2021/11**

(51) Int Cl.:  
**F04D 29/66<sup>(2006.01)</sup> F25D 17/06<sup>(2006.01)</sup>**

(21) Application number: **18176205.5**

(22) Date of filing: **06.06.2018**

**(54) REFRIGERATOR AND FAN ASSEMBLY THEREOF**

KÜHLSCHRANK UND GEBLÄSEANORDNUNG DAFÜR

RÉFRIGÉRATEUR ET SON ENSEMBLE DE VENTILATEUR

(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**

(30) Priority: **20.06.2017 CN 201720716475 U**

(43) Date of publication of application:  
**26.12.2018 Bulletin 2018/52**

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## Description

[0001] The present invention relates to the field of refrigeration devices, and in particular, to a refrigerator and a fan assembly of the refrigerator.

[0002] As most common appliance products in homes, refrigerators undertake daily works of retaining food freshness for users.

[0003] To resolve a problem of nonuniform cooling of a static cooling refrigerator, a fan is additionally disposed in a storage room of an existing refrigerator, cold air circulation within the storage room is strengthened by using the fan, thereby implementing a more uniform temperature of the storage room. High-speed operation of the fan easily generates noise. How to better resolve the noise problem is always concerned by a person skilled in the art. A refrigerator and a fan assembly therefore according to the preambles of claims 7 and 1, respectively, is disclosed in DE 20 2005 014370 U1.

[0004] According to this prior art, the first connecting member of the housing is either a tubular member sleeved on a first part of the vibration reduction element, or it is a pin engaging a passage of the vibration reduction element, and a second connecting member is a hole engaged by a second part of the vibration reduction element. In the first case, there is no form-fitting engagement between the vibration reduction element and the housing, and there is a risk of both being displaceable with respect to each other. In the second case, a form-fitting engagement is achieved by a barbed hook formed at the distal end of the pin, but the barbed hook makes the connection difficult to detach again.

[0005] Compared with the prior art, the technical solutions of the present utility model have the following advantages:

The housing of the fan and a body of a refrigerator are indirectly flexibly connected by using the vibration reduction element without being directly rigidly connected any longer. Therefore, vibration energy of the housing of the fan is absorbed by the vibration reduction element without being directly transferred to the body of the refrigerator, thereby greatly reducing noise generated by high-speed operation of the fan.

[0006] The vibration reduction element is sleeved on the second connecting member, and the first connecting member is engaged with the vibration reduction element.

[0007] At least a part of the second connecting member passes through the vibration reduction element and exceeds a preset length of an end portion that is of the vibration reduction element and that is far away from the reinforcement member.

[0008] The second connecting member includes a fastener and a gasket connected to the fastener, the vibration reduction element is sleeved on the gasket, and at least a part of the gasket passes through the vibration reduction element and exceeds the preset length of the end portion that is of the vibration reduction element and that is far away from the reinforcement member.

[0009] Optionally, the reinforcement member further includes a body plate, and the fastener is located at one side that is of the body plate and that faces the housing.

5 [0010] Optionally, the fastener and a plate surface of the body plate are intersected, the fastener is provided with a through hole extending along a length direction, and the through hole runs through the body plate.

10 [0011] Optionally, the screw has a limiting step, and after the screw is driven into the through hole, the limiting step abuts against a hole edge of the through hole, to implement a limitation.

15 [0012] Another aspect of the present application provides an improved refrigerator, to resolve at least one of the foregoing technical problems. The refrigerator includes a body having a storage room and the fan assembly according to any one of the foregoing implementations, and the fan assembly is located in the storage room and is fastened to the body by using the mounting base.

## 20 BRIEF DESCRIPTION OF THE DRAWINGS

### [0013]

25 FIG. 1 is a schematic diagram of an inner structure of a refrigerator in a square view direction according to an embodiment of the present application;

30 FIG. 2 is a schematic diagram of an inner structure of a refrigerator in a right view direction according to an embodiment of the present application;

35 FIG. 3 is a schematic structural diagram of a fan assembly in a refrigerator according to a first embodiment of the present application;

40 FIG. 4 is a schematic exploded view of the fan assembly in FIG. 3;

45 FIG. 5 is a schematic exploded view of a fan assembly according to a second embodiment of the present application; and

FIG. 6 is a schematic exploded view of a fan assembly according to a third embodiment of the present application;

## DETAILED DESCRIPTION

50 [0014] To make the above objectives, features, and advantages of the present application clearer and more comprehensible, specific embodiments of the present application are described below in detail with reference to the accompanying drawings.

55 [0015] Referring to FIG. 1 and FIG. 2, the present application provides a refrigerator 1 and a fan assembly 10 disposed in the refrigerator 1. FIG. 2 is a diagram of an inner structure of the refrigerator 1 in FIG. 1 in a right view direction. The refrigerator 1 includes a body 3 having

one or more storage rooms 2, and the fan assembly 10 is disposed in the storage room 2, and is generally disposed at one side that is of the storage room 2 and that is far away from a door of the refrigerator, that is, at an inner side of the storage room 2.

**[0016]** Referring to FIG. 3 and FIG. 4, the fan assembly 10 includes a mounting base 20 and a fan 30 that is fastened to the mounting base 20. The fan assembly 10 is fastened to the body 3 by using the mounting base 20. The mounting base 20 includes a housing 21 accommodating the fan 30, and a reinforcement member 22 that fastens the housing 21 to a to-be-mounted structure; the housing 21 is provided with a first connecting member 211 and the reinforcement member 22 is provided with a second connecting member 221 that matches and that is connected to the first connecting member 211; and the first connecting member 211 is indirectly connected to the second connecting member 221 by using a vibration reduction element 40.

**[0017]** An advantage of the solution is that the housing of the fan and the body of the refrigerator are indirectly flexibly connected by using the vibration reduction element without being directly rigidly connected any longer. Therefore, vibration energy of the housing of the fan is absorbed by the vibration reduction element without being directly transferred to the body of the refrigerator, thereby greatly reducing noise generated by high-speed operation of the fan.

**[0018]** In the fan assembly 10, a function of the fan 30 is accelerating air flowing in the storage room 2, so that temperature distribution within the storage room 2 is more uniform. Generally, an air exhaust vent of the fan 30 is close to an inner wall of the storage room 2, and an air intake vent faces a relatively large space, so that air in the storage room 2 flows towards the air intake vent, enters the fan 30 from the air intake vent, and flows out from the air exhaust vent after being mixed by the fan 30, thereby achieving a uniform air temperature. Therefore, it can be understood that when a user opens the door, one side of the air exhaust vent of the fan 30 is located at a relatively concealed location and is not easily seen.

**[0019]** It can be learned from the embodiment shown in FIG. 2 that, the fan assembly 10 is located at the inner side of the storage room 2, and an air intake vent 10a of the fan 30 is located at one side that is of the door and that faces the refrigerator 1, and an air exhaust vent 10b is located at one side that is of the door and that is away from the refrigerator 1. In this way, when a user opens the door, the user can see the air intake vent 10a of the fan 30, but cannot see the air exhaust vent 10b of the fan 30.

**[0020]** As shown in FIG. 3 and FIG. 4, the mounting base 20 includes the housing 21 accommodating the fan 30, and the reinforcement member 22 that fastens the housing 21 to the to-be-mounted structure. The reinforcement member 22 includes a body plate 222 and the second connecting member 221. In this embodiment, the

second connecting member 221 includes a fastener 221a and a gasket 221b that may be connected together. In a process of mounting or dismounting the mounting base 20, the fastener 221a and the gasket 221b may be separated from each other.

**[0021]** The fastener 221a extends towards one side that is of the body plate 222 and that faces the housing 1. The fastener 221a and a plate surface of the body plate 222 are intersected. The plate surface of the body plate 222 has a first surface facing the housing 21, and a second surface away from the housing 21. The gasket 221 b has an end portion that is close to the body plate 222 and an end portion that is far away from the body plate 222. Particularly, the radial width of the end portion that is of the gasket 221b and that is close to the body plate 222 is greater than that of the end portion that is far away from the body plate 222. The end portion that is of the gasket 221b and that is close to the body plate 222 is connected to the fastener 221a. The end portion that is of the gasket 221b and that is far away from the body plate 222 passes through the vibration reduction element 40, that is, the vibration reduction element 40 is sleeved on the end portion that is of the gasket 221b and that is far away from the body plate 222. Preferably, the vibration reduction element 40 is made of a silica gel material and has a good vibration isolation effect. The first connecting member 211 of the housing 21 is engaged with the vibration reduction element 40. In this way, the first connecting member 211 is indirectly connected to the second connecting member 221 by using the vibration reduction element 40, so that the housing of the fan and the body of the refrigerator are indirectly flexibly connected by using the vibration reduction element without being directly rigidly connected any longer. Therefore, vibration energy of the housing of the fan is absorbed by the vibration reduction element without being directly transferred to the body of the refrigerator, thereby greatly reducing noise generated by high-speed operation of the fan.

**[0022]** Both the fastener 221a and the gasket 221b are provided with through holes that extend along a length direction and that are communicated with each other, and a screw 50 is driven into the through hole, to better implement a fixed connection between the housing 21 and the reinforcement member 22. Preferably, the end portion that is of the gasket 221b and that is far away from the body plate 222 exceeds a preset length, for example, 2-3 millimeters, of an end portion that is of the vibration reduction element 40 and that is far away from the body plate 222. In this way, after the screw 50 is driven into the gasket 221b, a head of the screw 50 may be prevented from pressing against the vibration reduction element 40, thereby ensuring that vibration isolation performance of the vibration reduction element 40 is not affected. Preferably, a gasket 51 is further disposed on the end portion that is of the vibration reduction element 40 and that is far away from the body plate 222, to further prevent the head of the screw 50 from excessively press-

ing against the vibration reduction element 40.

**[0023]** FIG. 5 is a schematic exploded view of a fan assembly according to a second embodiment of the present application. A difference between this embodiment and the first embodiment at least lies in that the second connecting member of the reinforcement member 22 is formed by extending the fastener 221a' through the vibration reduction element 40 to the side that is of the body plate 222 and that faces the housing 1. That is, in this embodiment, the second connecting member is basically formed by extending the fastener 221a', so that disposition of the gasket 221b is omitted. Preferably, the end portion that is of the fastener 221a' and that is far away from the body plate 222 exceeds the preset length, for example, 2-3 millimeters, of the end portion that is of the vibration reduction element 40 and that is far away from the body plate 222. In this way, after the screw 50 is driven into the fastener 221a', the head of the screw 50 may be prevented from excessively pressing against the vibration reduction element 40, thereby ensuring that vibration isolation performance of the vibration reduction element 40 is not affected.

**[0024]** FIG. 6 is a schematic exploded view of a fan assembly according to a third embodiment of the present application. A difference between this embodiment and the first embodiment at least lies in that the second connecting member of the reinforcement member 22 is basically directly formed by using the fastener 221a in FIG. 4, so that disposition of the gasket 221b is omitted. In addition, a screw 50' has a limiting step 52', and after the screw 50' directly passes through the vibration reduction element 40 and is driven into the through hole of the fastener 221a, the limiting step 52' of the screw 50' abuts against a hole edge 221c of the through hole of the fastener 221a, to implement a limitation, so that the screw 50' is prevented from further being driven into the through hole, and the head of the screw 50' may be prevented from excessively pressing against the vibration reduction element 40, thereby ensuring that vibration isolation performance of the vibration reduction element 40 is not affected.

**[0025]** Although the present application has been disclosed above, the present application is not limited thereto. Any person skilled in the art can make various modifications and changes without departing from the scope of the present application. Therefore, the protection scope of the present application should be subject to the scope defined by the appended claims.

## Claims

1. A fan assembly (10), comprising a mounting base (20), wherein the mounting base (20) comprises a housing (21) accommodating a fan (30), and a reinforcement member (22) that fastens the housing (21) to a to-be-mounted structure; the housing (21) is provided with a first connecting

member (211) and the reinforcement member (22) is provided with a second connecting member (221) that matches and that is connected to the first connecting member (211), and the first connecting member (211) is indirectly connected to the second connecting member (221) by using a vibration reduction element (40),

**characterized in that** the vibration reduction element (40) is sleeved on the second connecting member (221), the first connecting member (211) is engaged with the vibration reduction element (40), at least a part passes through the vibration reduction element (40) and exceeds a preset length of an end portion of the vibration reduction element (40) that is far away from the reinforcement member (22), the fan assembly (10) further comprising a screw (50) driven into a through hole of second connecting member (221), the part of the second connecting member (221) which exceeds the end portion of the vibration reduction element (40) preventing a head of the screw (50) from excessively pressing against the vibration reduction element (40).

2. The fan assembly according to claim 1, **characterized in that** the second connecting member (221) comprises a fastener (221a) and a gasket (221b) connected to the fastener (221a), the vibration reduction element (40) is sleeved on the gasket (221b), and at least a part of the gasket (221b) forms said part of the second connecting member that passes through the vibration reduction element (40) and exceeds the preset length of the end portion of the vibration reduction element (40) and is far away from the reinforcement member (22).
3. The fan assembly according to claim 1, **characterized in that** the second connecting member comprises a fastener (221a'), and at least a part of the fastener (221a') forms said part of the second connecting member that passes through the vibration reduction element (40) and exceeds the preset length of the end portion of the vibration reduction element (40) that is far away from the reinforcement member (22).
4. The fan assembly according to claim 1, **characterized in that** the second connecting member comprises a fastener (221a\221a'), the reinforcement member (22) further comprises a body plate (222), and the fastener (221a\221a') is located at one side of the body plate (222) that faces the housing (21).
5. The fan assembly according to claim 4, **characterized in that** the fastener (221a\221a') and a plate surface of the body plate (222) are intersected, the fastener (221a\221a') is provided with a through hole extending along a length direction, and the through hole runs through the body plate (222).

6. The fan assembly according to claim 5, **characterized in that** the screw (50') has a limiting step (52'), and after the screw (50') is driven into the through hole, the limiting step (52') abuts against a hole edge (221c) of the through hole, to implement a limitation.
7. A refrigerator (1) comprising a body (3) having a storage room (2), **characterized in that** the refrigerator (1) comprises a fan assembly (10) according to any one of claims 1 to 6, and the fan assembly (10) is located in the storage room (2) and is fastened to the body (3) by using the amounting base (20).

#### Patentansprüche

1. Ventilatorbaugruppe (10), die einen Grundrahmen (20) umfasst, wobei der Grundrahmen (20) ein Gehäuse (21), in dem ein Ventilator (30) untergebracht ist, und ein Verstärkungselement (22) zum Befestigen des Gehäuses (21) an einer Anbaukonstruktion umfasst, wobei das Gehäuse (21) mit einem ersten Verbindungselement (211) und das Verstärkungselement (22) mit einem zweiten Verbindungselement (221) versehen ist, das auf das erste Verbindungselement (211) abgestimmt und damit verbunden ist, und das erste Verbindungselement (211) mithilfe eines Schwingungsdämpferelements (40) indirekt mit dem zweiten Verbindungselement (221) verbunden ist, **dadurch gekennzeichnet, dass** das Schwingungsdämpferelement (40) auf das zweite Verbindungselement (221) aufgesteckt ist, das erste Verbindungselement (211) das Schwingungsdämpferelement (40) in Eingriff nimmt, zumindest ein Teil durch das Schwingungsdämpferelement (40) hindurch und über eine vorgegebene Länge über einen von dem Verstärkungselement (22) entfernt liegenden Endabschnitt des Schwingungsdämpferelements (40) hinaus verläuft, wobei die Ventilatorbaugruppe (10) ferner eine Schraube (50) umfasst, die in eine Durchgangsbohrung im zweiten Verbindungselement (221) geschraubt ist, wobei der Teil des zweiten Verbindungselements (221), der über den Endabschnitt des Schwingungsdämpferelements (40) hinaus verläuft, verhindert, dass ein Kopf der Schraube (50) zu stark auf das Schwingungsdämpferelement (40) drückt.
2. Ventilatorbaugruppe nach Anspruch 1, **dadurch gekennzeichnet, dass** das zweite Verbindungselement (221) ein Befestigungselement (221a) und eine mit dem Befestigungselement (221a) verbundene Dichtung (221b) umfasst, das Schwingungsdämpferelement (40) auf die Dichtung (221b) aufgesteckt ist und zumindest ein Teil der Dichtung (221b) den Teil des zweiten Verbindungselements bildet, der

durch das Schwingungsdämpferelement (40) hindurch und über die vorgegebene Länge über den von dem Verstärkungselement (22) entfernt liegenden Endabschnitt des Schwingungsdämpferelements (40) hinaus verläuft.

3. Ventilatorbaugruppe nach Anspruch 1, **dadurch gekennzeichnet, dass** das zweite Verbindungselement ein Befestigungselement (221a') umfasst und zumindest ein Teil des Befestigungselements (221a') den Teil des zweiten Verbindungselements bildet, der durch das Schwingungsdämpferelement (40) hindurch und über die vorgegebene Länge über den von dem Verstärkungselement (22) entfernt liegenden Endabschnitt des Schwingungsdämpferelements (40) hinaus verläuft.
4. Ventilatorbaugruppe nach Anspruch 1, **dadurch gekennzeichnet, dass** das zweite Verbindungselement ein Befestigungselement (221a\221a') umfasst, das Verstärkungselement (22) ferner eine Grundplatte (222) umfasst und sich das Befestigungselement (221a\221a') auf einer Seite der Grundplatte (222) befindet, die zum Gehäuse (21) weist.
5. Ventilatorbaugruppe nach Anspruch 4, **dadurch gekennzeichnet, dass** sich das Befestigungselement (221a\221a') und eine Plattenoberfläche der Grundplatte (222) überschneiden, das Befestigungselement (221a\221a') mit einer in einer Längsrichtung verlaufenden Durchgangsbohrung versehen ist und die Durchgangsbohrung durch die Grundplatte (222) hindurch verläuft.
6. Ventilatorbaugruppe nach Anspruch 5, **dadurch gekennzeichnet, dass** die Schraube (50') einen Begrenzungsabsatz (52') aufweist und der Begrenzungsabsatz (52'), wenn die Schraube (50') in die Durchgangsbohrung geschraubt ist, an einem Bohrungsrand (221c) der Durchgangsbohrung anliegt und so eine Begrenzung darstellt.
7. Kühlschrank (1), der einen Korpus (3) mit einem Aufbewahrungsfach (2) umfasst, **dadurch gekennzeichnet, dass** der Kühlschrank (1) eine Ventilatorbaugruppe (10) nach einem der Ansprüche 1 bis 6 umfasst und sich die Ventilatorbaugruppe (10) in dem Aufbewahrungsfach (2) befindet und mithilfe des Grundrahmens (20) an dem Korpus (3) befestigt ist.

#### Revendications

1. Ensemble de ventilateur (10), comprenant une base de montage (20), dans lequel la base de montage (20) comprend un boîtier (21) hébergeant un venti-

lateur (30), et un organe de renfort (22) qui attache le boîtier (21) à une structure destinée à être montée ;

le boîtier (21) est muni d'un premier organe de liaison (211) et l'organe de renfort (22) est muni d'un second organe de liaison (221) qui concorde avec le premier organe de liaison (211) et qui est relié à celui-ci, et le premier organe de liaison (211) est indirectement relié au second organe de liaison (221) en utilisant un élément de réduction des vibrations (40),

**caractérisé en ce que** l'élément de réduction des vibrations (40) est emmanché sur le second organe de liaison (221), le premier organe de liaison (211) est en prise avec l'élément de réduction des vibrations (40), au moins une partie traverse l'élément de réduction des vibrations (40) et dépasse une longueur prédéfinie d'une partie d'extrémité de l'élément de réduction des vibrations (40) qui est éloignée de l'organe de renfort (22),

l'ensemble de ventilateur (10) comprenant en outre une vis (50) entraînée dans un trou traversant du second organe de liaison (221), la partie du second organe de liaison (221) qui dépasse la partie d'extrémité de l'élément de réduction des vibrations (40) empêchant une tête de la vis (50) de presser excessivement contre l'élément de réduction des vibrations (40).

2. Ensemble de ventilateur selon la revendication 1, **caractérisé en ce que** le second organe de liaison (221) comprend une attache (221a) et un joint (221b) relié à l'attache (221a), l'élément de réduction des vibrations (40) est emmanché sur le joint (221b), et au moins une partie du joint (221b) forme ladite partie du second organe de liaison qui traverse l'élément de réduction des vibrations (40) et dépasse la longueur prédéfinie de la partie d'extrémité de l'élément de réduction des vibrations (40) et est éloignée de l'organe de renfort (22).
3. Ensemble de ventilateur selon la revendication 1, **caractérisé en ce que** le second organe de liaison comprend une attache (221a'), et au moins une partie de l'attache (221a') forme ladite partie du second organe de liaison qui traverse l'élément de réduction des vibrations (40) et dépasse la longueur prédéfinie de la partie d'extrémité de l'élément de réduction des vibrations (40) qui est éloignée de l'organe de renfort (22).
4. Ensemble de ventilateur selon la revendication 1, **caractérisé en ce que** le second organe de liaison comprend une attache (221a\221a'), l'organe de renfort (22) comprend en outre une plaque de corps (222), et l'attache (221a\221a') est située sur un côté de la plaque de corps (222) qui fait face au boîtier (21).

5. Ensemble de ventilateur selon la revendication 4, **caractérisé en ce que** l'attache (221a\221a') et une surface de plaque de la plaque de corps (222) se croisent, l'attache (221a\221a') est munie d'un trou traversant s'étendant le long d'une direction de longueur, et le trou traversant s'étend à travers la plaque de corps (222).

6. Ensemble de ventilateur selon la revendication 5, **caractérisé en ce que** la vis (50') possède un épaulement de limitation (52'), et après que la vis (50') est entraînée dans le trou traversant, l'épaulement de limitation (52') vient en butée contre un bord de trou (221c) du trou traversant, pour mettre en œuvre une limitation.

7. Réfrigérateur (1) comprenant un corps (3) ayant une chambre de stockage (2), **caractérisé en ce que** le réfrigérateur (1) comprend un ensemble de ventilateur (10) selon l'une quelconque des revendications 1 à 6, et l'ensemble de ventilateur (10) est situé dans la chambre de stockage (2) et est attaché au corps (3) en utilisant la base de montage (20).

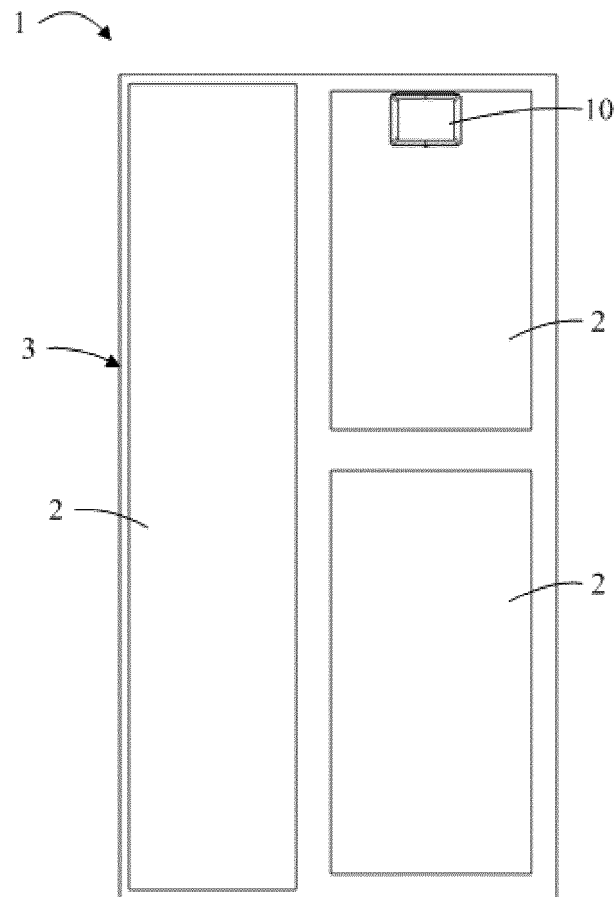


FIG. 1

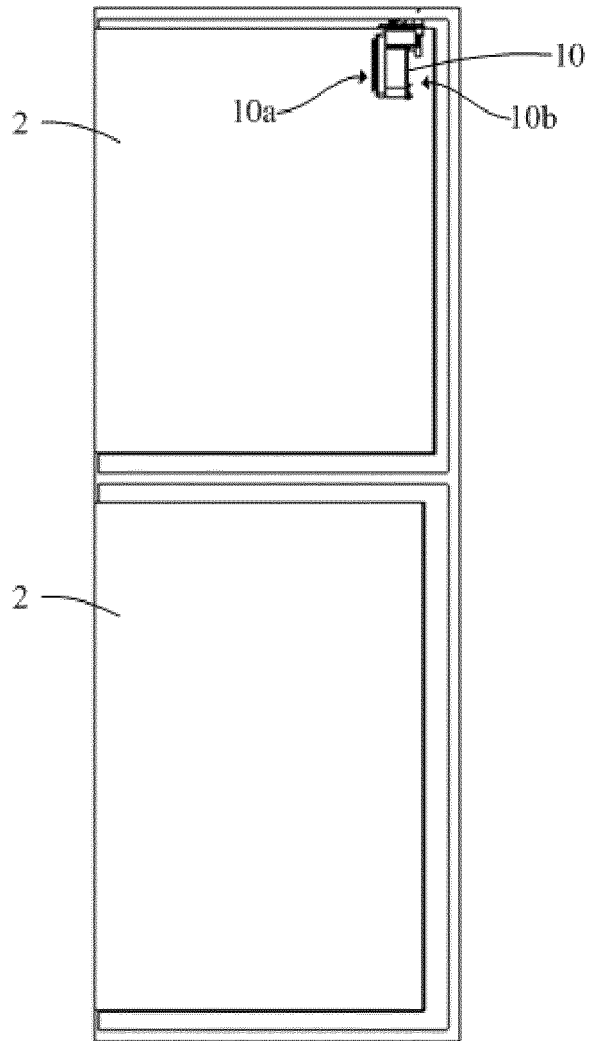


FIG. 2

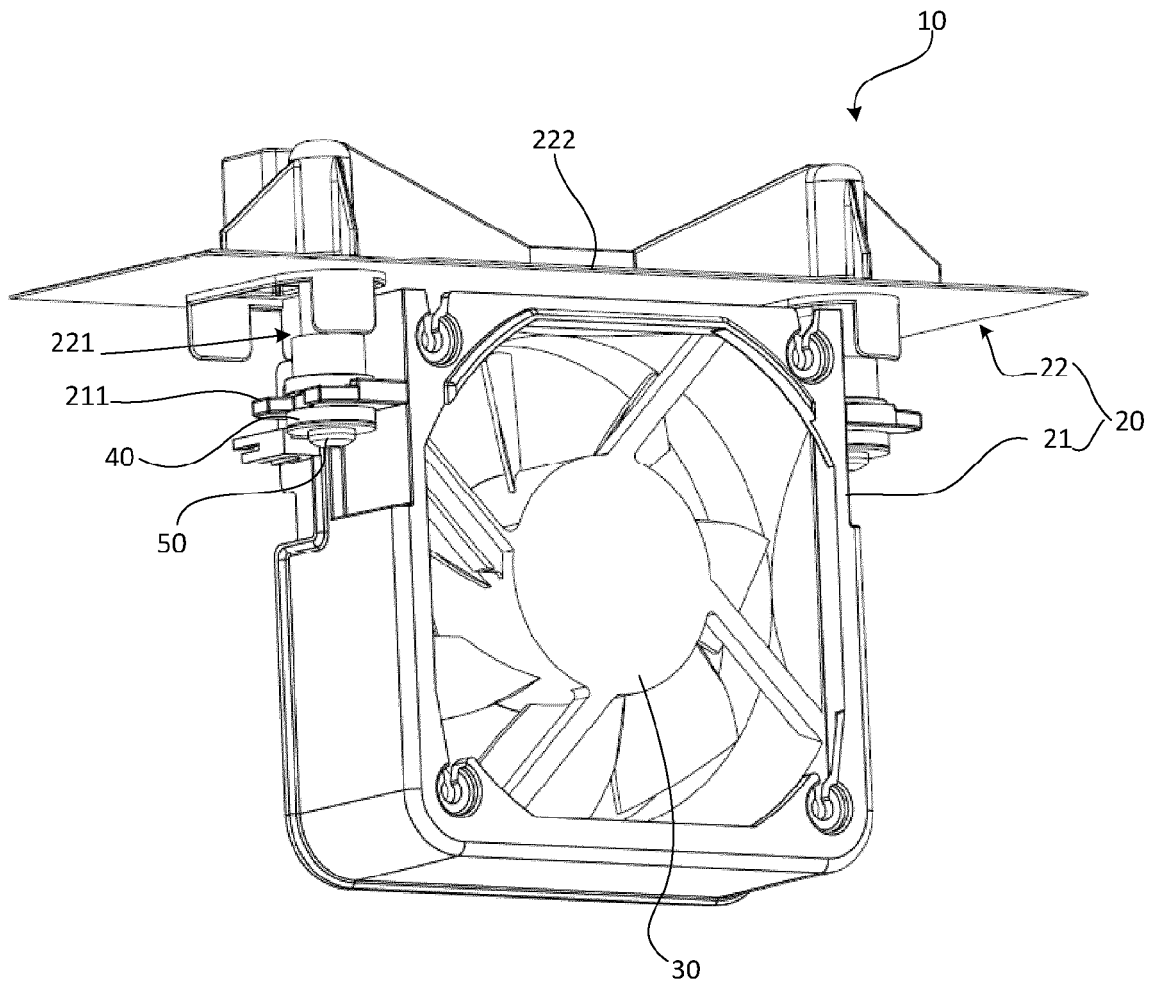


FIG. 3

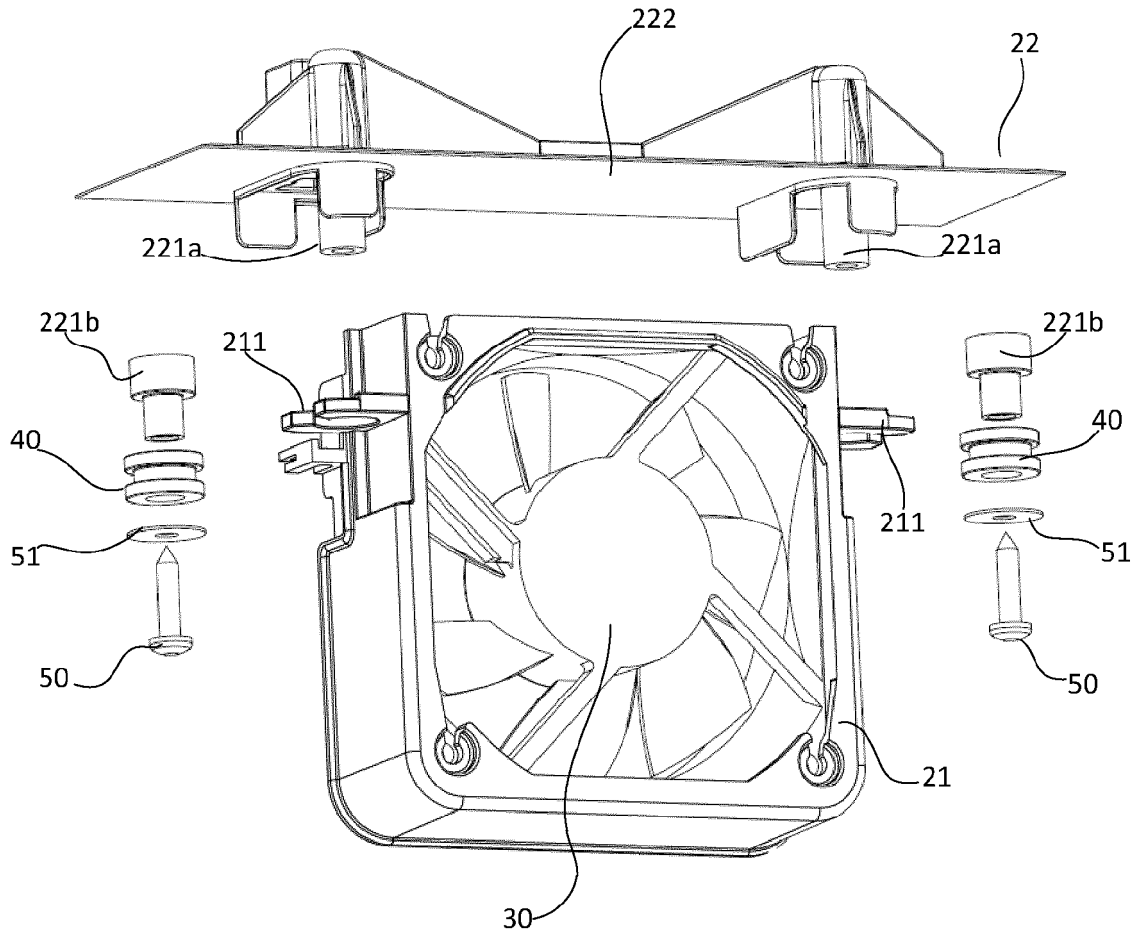


FIG. 4

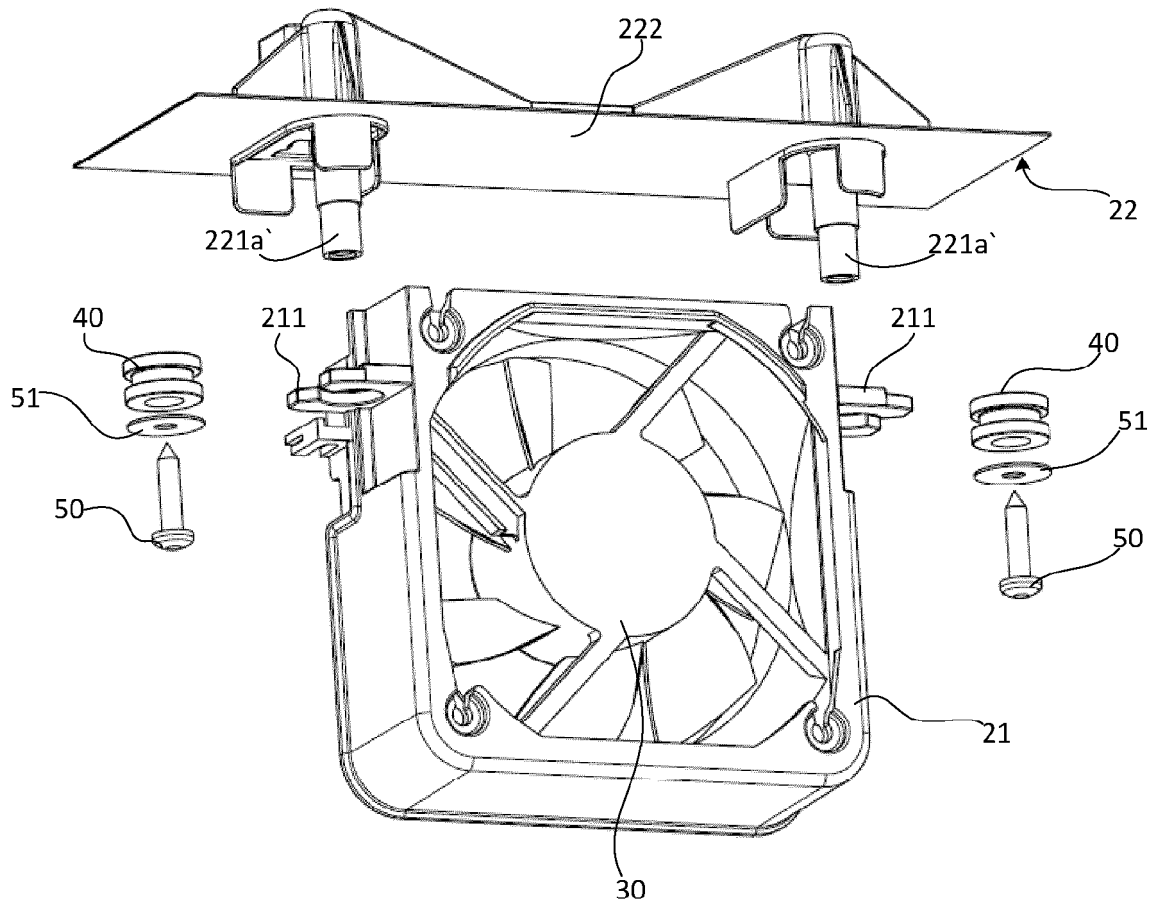


FIG. 5

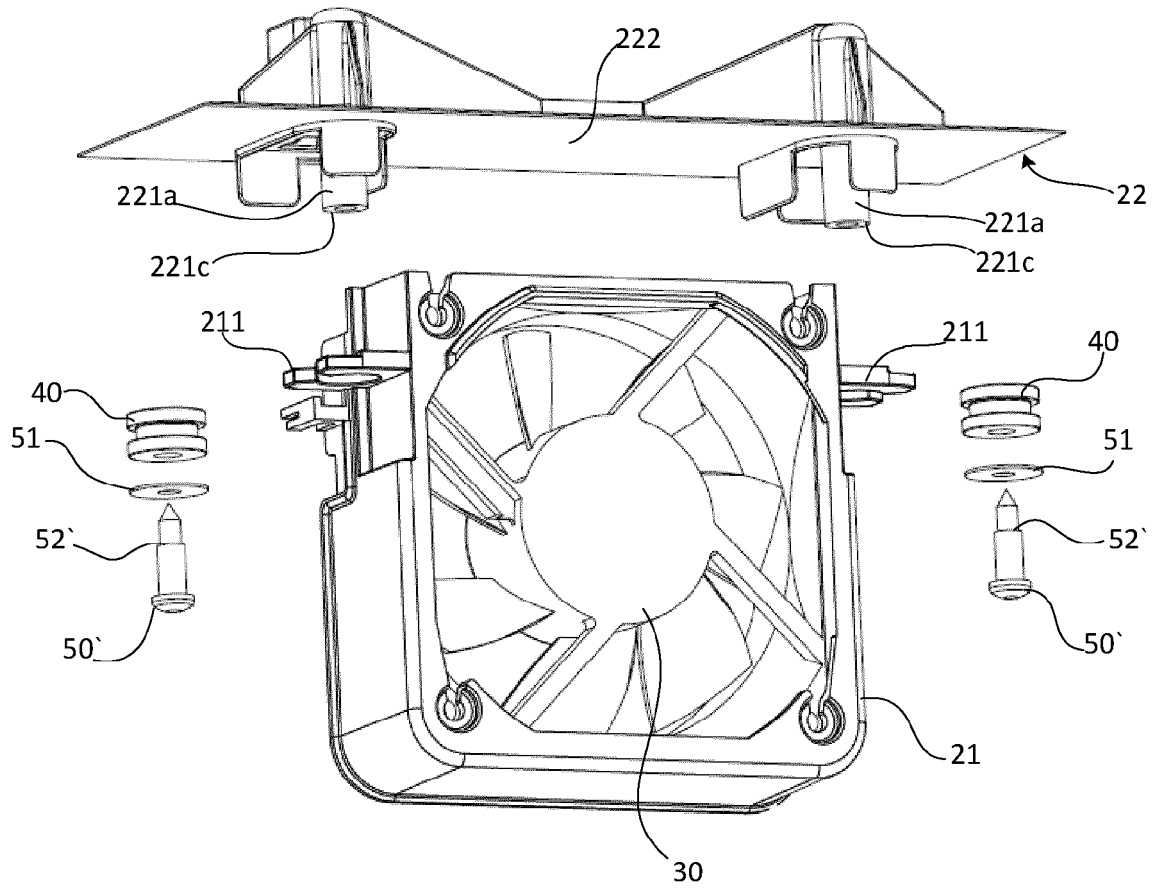


FIG. 6

**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

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