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(71) Applicant: **Gree Electric Appliances, Inc. of Zhuhai**
Zhuhai, Guangdong 519070 (CN)

(72) Inventors:
- **XIANG, Li**
  Zhuhai City, Guangdong 519070 (CN)
- **WANG, Fuan**
  Zhuhai City, Guangdong 519070 (CN)
- **YANG, Pan**
  Zhuhai City, Guangdong 519070 (CN)
- **LIN, Qinghui**
  Zhuhai City, Guangdong 519070 (CN)
- **SI, Zishu**
  Zhuhai City, Guangdong 519070 (CN)

(74) Representative: **V.O.**
P.O. Box 87930
2508 DH Den Haag (NL)

(54) BEARING RUBBER RING ASSEMBLY AND AIR CONDITIONER HAVING SAME

(57) The invention discloses a bearing rubber ring assembly used for supporting a cross-flow blade. The cross-flow blade is provided with a connection shaft (11) that is connected with a motor, an outer surface of the connection shaft (11) is provided with a fastener (20) used for fastening the connection shaft (11) and the motor. The bearing rubber ring assembly includes a body portion (30), wherein the body portion (30) is provided with an installing hole (31) through which the connection shaft (11) passes, and the body portion (30) is provided with an avoidance groove (32), the avoidance groove (32) is communicated with the installing hole (31); herein, when the connection shaft (11) passes through the installing hole (31) and is connected with the motor, the fastener (20) passes through the avoidance groove (32) and is configured outside the installing hole (31). The disclosure further relates to an air conditioner having the bearing rubber ring assembly.

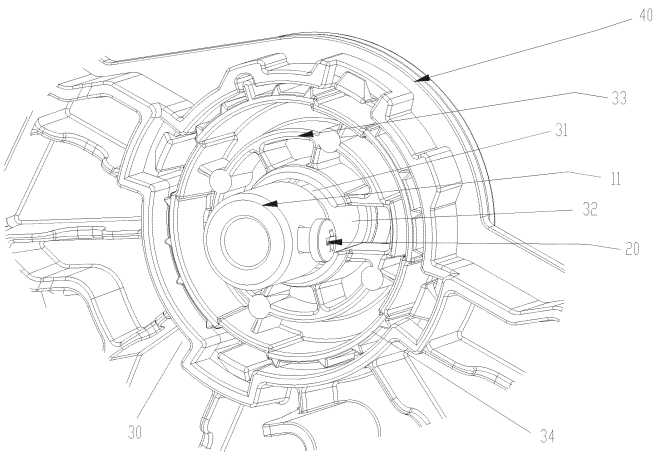


Fig. 1

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Description

Technical Field

[0001] The invention relates to a field of an air conditioner, and in particular to a bearing rubber ring assembly and an air conditioner with the bearing rubber ring assembly.

Background

[0002] A bearing rubber ring assembly known to inventors is formed by a bearing rubber ring base and a bearing rubber ring, and two parts are assembled into the bearing rubber ring assembly which is installed on a bottom housing, and has an effect of supporting a cross-flow blade.

[0003] Because there is a fastening bolt on a bush (a portion used to connect with a motor) of the cross-flow blade when the cross-flow blade leaves a factory, and it is not completely screwed into a bolt hole, when the cross-flow blade is installed, it needs to pass through an installing hole of the bearing rubber ring assembly, the fastening bolt needs to be unscrewed firstly to prevent the fastening bolt from limiting the cross-flow blade to pass through the installing hole, after the cross-flow blade is installed in position, finally the bolt is screwed into the bolt hole again. Correspondingly, the fastening bolt must be unscrewed when the cross-flow blade is detached.

[0004] In view of three steps in assembling and detaching process, waste of action is seriously caused, a production cost is increased, and a production period is prolonged. In addition, when the fastening bolt is screwed into a bolt hole again finally, the fastening bolt is easily slantwise screwed because there is not a guiding structure, a thread damage of the bolt hole of the bush of the cross-flow blade is caused, once the thread damage of the bolt hole of the bush is caused, the cross-flow blade is only carried back to an original factory or directly scrapped, thus the production cost is increased.

Summary

[0005] A main purpose of the invention is to provide a bearing rubber ring assembly and an air conditioner having the same, as to solve a problem in a related art that a working procedure of installing a cross-flow blade on the bearing rubber ring assembly is more complicated.

[0006] Some embodiments of the present invention provide a bearing rubber ring assembly, and the bearing rubber ring assembly is used for supporting a cross-flow blade, the cross-flow blade is provided with a connection shaft that is connected with a motor, an outer surface of the connection shaft is provided with a fastener used for fastening the connection shaft and the motor, the bearing rubber ring assembly includes: a body portion, the body portion is provided with an installing hole through which the connection shaft passes, and the body portion is provided with an avoidance groove, the avoidance groove is communicated with the installing hole; wherein, when the connection shaft passes through the installing hole and is connected with the motor, the fastener passes through the avoidance groove and is disposed outside the installing hole.

[0007] In some embodiments, there is an arc transition between the avoidance groove and the installing hole.

[0008] In some embodiments, the avoidance groove is a U-shaped groove, an opening of the avoidance groove is communicated with the installing hole.

[0009] In some embodiments, the body portion includes: a bearing rubber ring, the avoidance groove and the installing hole are disposed on the bearing rubber ring; and a bearing rubber ring base, the bearing rubber ring is disposed on the bearing rubber ring base.

[0010] In some embodiments, the bearing rubber ring is detachably connected with the bearing rubber ring base.

[0011] In some embodiments, the bearing rubber ring is made of rubber or plastic, and/or the bearing rubber ring base is made of the rubber or the plastic.

[0012] In some embodiments, the bearing rubber ring and the bearing rubber ring base are integrally formed.

[0013] In some embodiments, the bearing rubber ring and the bearing rubber ring base are integrally injection-formed.

[0014] In some embodiments, the body portion is integrally injection-formed.

[0015] Some embodiments of the present invention an air conditioner, the air conditioner includes the above bearing rubber ring assembly.

[0016] In some embodiments, the air conditioner further includes: a cross-flow blade, the cross-flow blade is provided with a connection shaft; a bottom housing, the bearing rubber ring assembly is disposed on the bottom housing; and a motor, the connection shaft passes through an installing hole of the bearing rubber ring assembly and is connected with the motor.

[0017] The bearing rubber ring assembly of the invention is capable of, through configuring the avoidance groove on the body portion, enabling the connection shaft and the fastener on the connection shaft to directly pass through the body portion when the cross-flow blade is installed, thereby improving assembling efficiency. In a specific installing process, the connection shaft of the cross-flow blade passes through the installing hole and is connected with the motor, in a specific penetrating process, because of the existence of the avoidance groove, the fastener is not taken off from the connection shaft, the fastener passes through the avoidance groove and is inserted to a side close to the motor, thus subsequent fastening is achieved. The bearing rubber ring assembly of the invention is capable of, through configuring the avoidance groove on the body portion, enabling the connection shaft and the fastener on the connection shaft to directly pass through the body portion without taking off and re-installing it when the cross-flow blade is installed, thereby improving the assembling efficiency, as

to solve a problem in the related art that a working procedure of installing the cross-flow blade on the bearing rubber ring assembly is more complicated.

Brief Description of the Drawings

[0018] The accompanying drawings, which constitute a part of the present application, are used to provide a further understanding of the invention, and the exemplary embodiments of the invention and the description thereof are used to explain the invention, but do not constitute improper limitations to the invention. In the drawings:

Fig. 1 illustrates an application structure schematic diagram of a bearing rubber ring assembly according to the invention;
Fig. 2 illustrates a structure schematic diagram of a first perspective of an embodiment of the bearing rubber ring assembly according to the invention; and
Fig. 3 illustrates a structure schematic diagram of a second perspective of the embodiment of the bearing rubber ring assembly according to the invention.

[0019] Herein, the above drawings include the following drawing reference signs:
11. connection shaft; 20. fastener; 30. body portion; 31. installing hole; 32. avoidance groove; 33. bearing rubber ring; 34. bearing rubber ring base; and 40. bottom housing.

Detailed Description of the Embodiments

[0020] It should be noted that the embodiments in the present invention and the features in the embodiments is combined with each other without conflict. The invention will be described in detail below with reference to the accompanying drawings and in conjunction with the embodiments.

[0021] It should be pointed out that the following detailed descriptions are all illustrative and are intended to provide further descriptions of the present invention. Unless otherwise specified, all technical and scientific terms used in the text have the same meaning as that in the present invention commonly understood by those of ordinary skill in the art.

[0022] It should be noted that terms used here are only used for describing specific implementation modes, and are not intended to limit the exemplary implementation modes according to the present application. As used herein, unless clearly specified otherwise in the context, a singular form is also intended to include a plural form. In addition, it should also be understood that when the terms "comprising" and/or "including" are used in the description, it is indicated that there are features, steps, operations, devices, components and/or combinations thereof.

[0023] Some embodiments of the present invention provides a bearing rubber ring assembly, reference to Fig. 1 to Fig. 3, the bearing rubber ring assembly is used for supporting a cross-flow blade, the cross-flow blade is provided with a connection shaft 11 that is connected with a motor, an outer surface of the connection shaft 11 is provided with a fastener 20 used for fastening the connection shaft 11 and the motor, the bearing rubber ring assembly includes: a body portion 30, wherein the body portion 30 is provided with an installing hole 31 through which the connection shaft 11 passes, and the body portion 30 is provided with an avoidance groove 32, the avoidance groove 32 is communicated with the installing hole 31; herein, when the connection shaft 11 passes through the installing hole 31 and is connected with the motor, the fastener 20 passes through the avoidance groove 32 and is disposed outside the installing hole 31.

[0024] The bearing rubber ring assembly of the invention is capable of, through disposing the avoidance groove 32 on the body portion 30, enabling the connection shaft 11 and the fastener 20 on the connection shaft 11 to directly pass through the body portion 30 when the cross-flow blade is installed, thereby improving assembling efficiency. In a specific installing process, the connection shaft 11 of the cross-flow blade passes through the installing hole 31 and is connected with the motor, in a specific penetrating process, because of an existence of the avoidance groove 32, the fastener 20 is not taken off from the connection shaft 11, the fastener 20 passes through the avoidance groove 32 and is inserted to a side close to the motor, thus subsequent fastening is achieved. The bearing rubber ring assembly of the invention is capable of, through configuring the avoidance groove 32 on the body portion 30, enabling the connection shaft 11 and the fastener 20 on the connection shaft 11 to directly pass through the body portion 30 without taking off and re-installing it when the cross-flow blade is installed, thereby improving the assembling efficiency, as to solve a problem in the art known to inventors that a working procedure of installing the cross-flow blade on the bearing rubber ring assembly is more complicated.

[0025] In order to reduce stress concentration, there is an arc transition between the avoidance groove 32 and the installing hole 31.

[0026] In some embodiments, the installing hole 31 is a circular hole matched with the connection shaft 11, there is the arc transition between the avoidance groove 32 and the installing hole 31, thus the stress concentration is prevented.

[0027] In allusion to a specific structure of the avoidance groove 32, the avoidance groove 32 is a U-shaped groove, an opening of the avoidance groove 32 is communicated with the installing hole 31.

[0028] In some embodiments, through enabling the avoidance groove 32 to be disposed as the U-shaped groove, the fastener 20 conveniently passes through the avoidance groove 32, and a collision phenomenon is avoided.

[0029] In some embodiments, the opening of the U-shaped groove faces to the installing hole 31, namely the

opening of the U-shaped groove is communicated with the installing hole 31.

[0030] In allusion to a specific structure of the body portion 30, as shown in Fig. 1 and Fig. 2, the body portion 30 includes: a bearing rubber ring 33, the avoidance groove 32 and the installing hole 31 are disposed on the bearing rubber ring 33; and a bearing rubber ring base 34, the bearing rubber ring 33 is disposed on the bearing rubber ring base 34.

[0031] In some embodiments, the body portion 30 includes the bearing rubber ring 33 and the bearing rubber ring base 34, the bearing rubber ring 33 is disposed on the bearing rubber ring base 34. Herein, the bearing rubber ring base 34 is used for installing on the bottom housing 40, the avoidance groove 32 and the installing hole 31 are disposed on the bearing rubber ring 33, namely the connection shaft 11 of the cross-flow blade is disposed on the bearing rubber ring 33.

[0032] In allusion to a first cooperation mode of the bearing rubber ring 33 and the bearing rubber ring base 34, the bearing rubber ring 33 is detachably connected with the bearing rubber ring base 34.

[0033] In some embodiments, the bearing rubber ring 33 is made of rubber or plastic, and/or the bearing rubber ring base 34 is made of rubber or plastic.

[0034] In allusion to a second cooperation mode of the bearing rubber ring 33 and the bearing rubber ring base 34, the bearing rubber ring 33 and the bearing rubber ring base 34 are integrally formed.

[0035] In some embodiments, the bearing rubber ring 33 and the bearing rubber ring base 34 are integrally injection-formed.

[0036] In some embodiments, the body portion 30 is integrally injection-formed.

[0037] In some embodiments, through enabling the body portion 30 to be integrally injection-formed, not only machining efficiency is improved, but also structure stability of the bearing rubber ring assembly also is guaranteed.

[0038] Based on the bearing rubber ring assembly of some embodiments in the present invention, the bearing rubber ring base 34 and the bearing rubber ring 33 are combined into one, and there is a bolt groove (avoidance groove 32) on the bearing rubber ring base, when the cross-flow blade is installed, a bolt (fastener 20) on a bush directly passes through the bolt groove, and the bolt does not need to be unscrewed. Correspondingly, a process is a same too when the cross-flow blade is detached, installing and detaching processes of the cross-flow blade are greatly simplified, a production period is shortened, and the production cost is saved.

[0039] Some embodiments of the present invention further provides an air conditioner, including the above bearing rubber ring assembly.

[0040] In some embodiments, the air conditioner further includes: a cross-flow blade, the cross-flow blade is provided with a connection shaft 11; a bottom housing 40, the bearing rubber ring assembly being disposed on the bottom housing 40; and a motor, the connection shaft 11 penetrating through an installing hole 31 of the bearing rubber ring assembly and being connected with the motor.

[0041] In some embodiments, the connection shaft 11 passes with the fastener 20 and is inserted to a side close to the motor, and then the connection shaft is fixedly connected with the motor by the fastener 20.

[0042] It is observed from the above description that the above embodiments of the invention achieve the following technical effects.

[0043] The bearing rubber ring assembly of the invention is capable of, through disposing the avoidance groove 32 on the body portion 30, enabling the connection shaft 11 and the fastener 20 on the connection shaft 11 to directly pass through the body portion 30 when the cross-flow blade is installed, thereby improving assembling efficiency. In a specific installing process, the connection shaft 11 of the cross-flow blade passes through the installing hole 31 and is connected with the motor, in a specific penetrating process, because of an existence of the avoidance groove 32, the fastener 20 is not taken off from the connection shaft 11, the fastener 20 passes through the avoidance groove 32 and is inserted to a side close to the motor, thus subsequent fastening is achieved. The bearing rubber ring assembly of the invention is capable of, through configuring the avoidance groove 32 on the body portion 30, enabling the connection shaft 11 and the fastener 20 on the connection shaft 11 to directly pass through the body portion 30 without taking off and re-installing it when the cross-flow blade is installed, thereby improving the assembling efficiency, as to solve a problem in the art known to inventors that a working procedure of installing the cross-flow blade on the bearing rubber ring assembly is more complicated.

[0044] It should be noted that the terms "first", "second", and the like in the specification and claims of the present application and in the above drawings are used to distinguish similar objects and are not necessarily used to describe a specific sequence or order. It will be appreciated that the data used in this way may be interchanged where appropriate, so that the implementation manners of the present application described herein can be implemented, for example, in an order other than those illustrated or described herein. In addition, the terms "include" and "have" and any variations thereof are intended to cover non-exclusive inclusions. For example, a process, method, system, product, or equipment that comprises a series of steps or units need not be limited to those steps or units that are explicitly listed, and may instead include other steps or units that are not explicitly listed or inherent to these processes, methods, products or equipment.

[0045] For ease of description, spatially relative terms such as "on", "over", "on an upper surface", "above", etc. are used herein to describe a spatial position relationship between one device or feature as shown in the figures and other devices or features. It will be appreciated that

the spatially relative terms are intended to comprise different orientations of the device in use or operation in addition to the orientation of the device described in the figures. For example, if the device in the figures is turned upside down, the device described as "over other devices or configurations" or "on other devices or configurations" will be positioned "below other devices or configurations" or "under other devices or configurations". Thus, the exemplary term "over" includes both "above" and "below". The device also is positioned in other different manners (rotated for 90 degrees or at other orientations), and the spatially relative descriptors used herein are interpreted accordingly.

[0046] The foregoing descriptions are merely some embodiments of the invention and are not intended to limit the invention. For those skilled in the art, the invention may have various changes and modifications. Any modifications, equivalent replacements and improvements made within the spirit and principle of the invention shall fall within the protection scope of the invention.

Claims

1. A bearing rubber ring assembly, used for supporting a cross-flow blade, wherein the cross-flow blade is provided with a connection shaft (11) that is connected with a motor, an outer surface of the connection shaft (11) is provided with a fastener (20) used for fastening the connection shaft (11) and the motor, wherein the bearing rubber ring assembly comprises:

   a body portion (30), wherein the body portion (30) is provided with an installing hole (31) through which the connection shaft (11) passes, and the body portion (30) is provided with an avoidance groove (32), the avoidance groove (32) is communicated with the installing hole (31);
   wherein, when the connection shaft (11) passes through the installing hole (31) and is connected with the motor, the fastener (20) passes through the avoidance groove (32) and is disposed outside the installing hole (31).

2. The bearing rubber ring assembly as claimed in claim 1, wherein there is an arc transition between the avoidance groove (32) and the installing hole (31).

3. The bearing rubber ring assembly as claimed in claim 1, wherein the avoidance groove (32) is a U-shaped groove, an opening of the avoidance groove (32) is communicated with the installing hole (31).

4. The bearing rubber ring assembly as claimed in claim 1, wherein the body portion (30) comprises:

   a bearing rubber ring (33), the avoidance groove (32) and the installing hole (31) are disposed on the bearing rubber ring (33); and
   a bearing rubber ring base (34), the bearing rubber ring (33) is disposed on the bearing rubber ring base (34).

5. The bearing rubber ring assembly as claimed in claim 4, wherein the bearing rubber ring (33) is detachably connected with the bearing rubber ring base (34).

6. The bearing rubber ring assembly as claimed in claim 5, wherein the bearing rubber ring (33) is made of rubber or plastic, and/or the bearing rubber ring base (34) is made of rubber or plastic.

7. The bearing rubber ring assembly as claimed in claim 4, wherein the bearing rubber ring (33) and the bearing rubber ring base (34) are integrally formed.

8. The bearing rubber ring assembly as claimed in claim 4, wherein the bearing rubber ring (33) and the bearing rubber ring base (34) are integrally injection-formed.

9. The bearing rubber ring assembly as claimed in claim 1, wherein the body portion (30) is integrally injection-formed.

10. An air conditioner, comprising the bearing rubber ring assembly as claimed in any one of claims 1 to 9.

11. The air conditioner as claimed in claim 10, wherein the air conditioner further comprises:

   a cross-flow blade, the cross-flow blade being provided with the connection shaft (11);
   a bottom housing (40), the bearing rubber ring assembly being disposed on the bottom housing (40); and
   a motor, the connection shaft (11) passing through an installing hole (31) of the bearing rubber ring assembly and being connected with the motor.

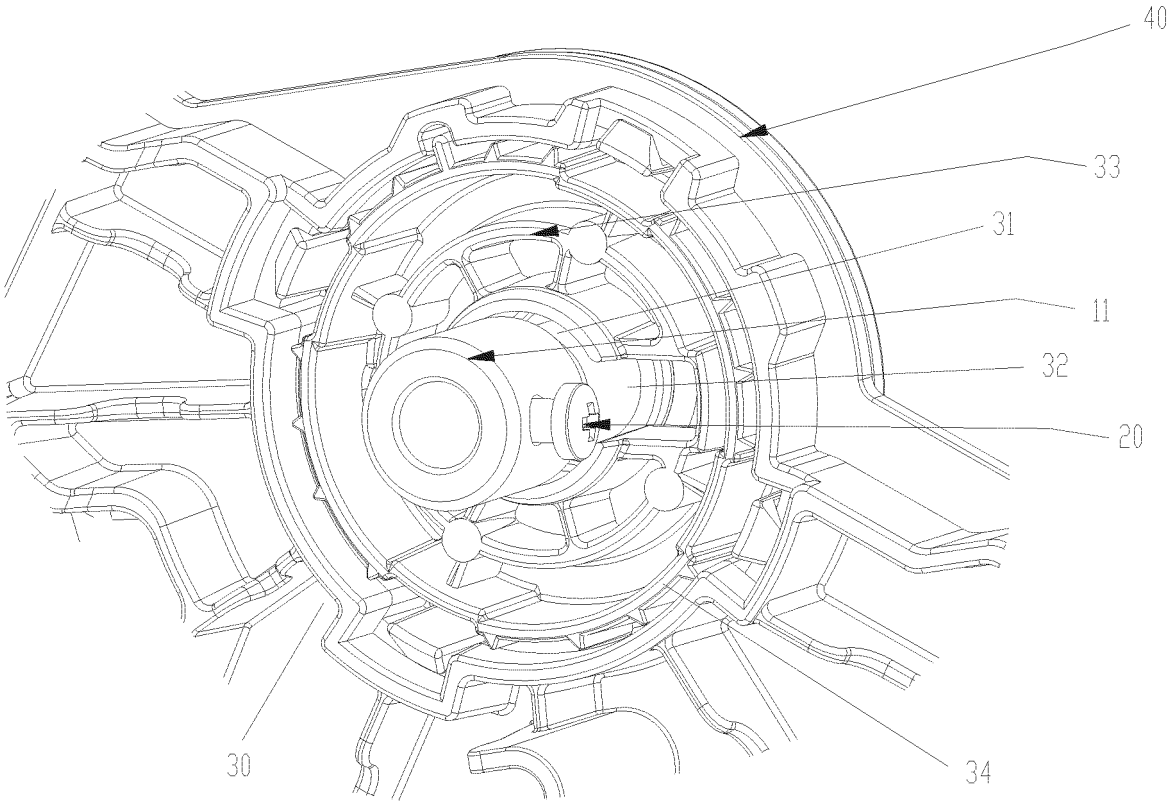


Fig. 1

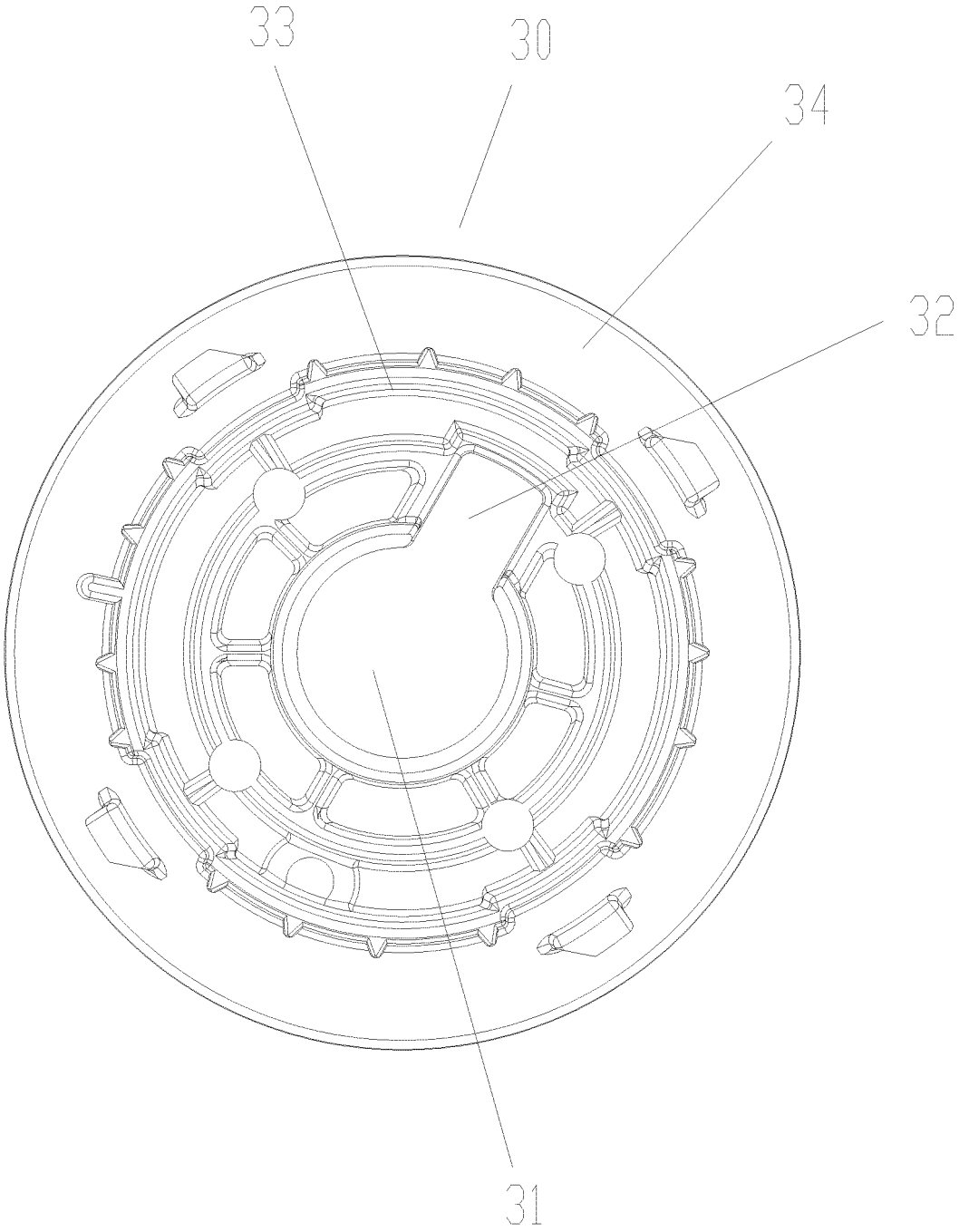


Fig. 2

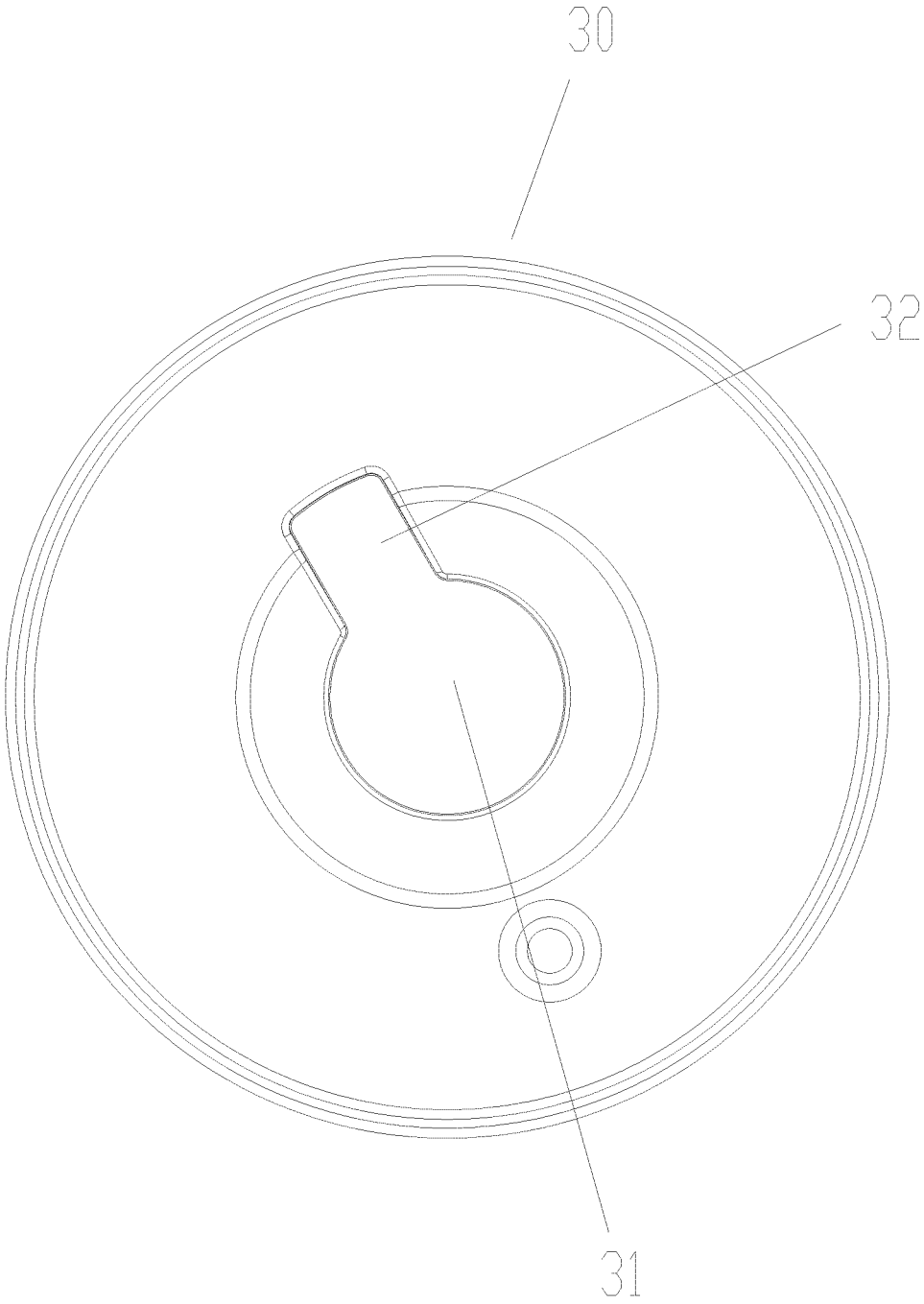


Fig. 3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2018/120384

A. CLASSIFICATION OF SUBJECT MATTER

F24F 1/00(2019.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F24F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNABS, CNTXT, CNKI, DWPI, VEN: 空调, 空气调节, 轴承, 电机, 风叶, 叶片, 连接轴, 紧固件, 螺钉, 胶圈, 避让, 槽, 安装孔, air, conditioning, bearing, motor, blade, connecting, shaft, bolt, fixed, rubber, ring, avoiding, grove, mounting, hole

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	CN 201875815 U (GREE ELECTRIC APPLIANCES, INC. OF ZHUHAI) 22 June 2011 (2011-06-22) entire document	1-11
A	CN 102230655 A (TCL AIR CONDITIONER (ZHONGSHAN) CO., LTD.) 02 November 2011 (2011-11-02) entire document	1-11
A	CN 107525246 A (GREE ELECTRIC APPLIANCES, INC. OF ZHUHAI) 29 December 2017 (2017-12-29) entire document	1-11
A	CN 106369781 A (SHENZHEN SKYWORTH AIR CONDITIONING TECHNOLOGY CO., LTD.) 01 February 2017 (2017-02-01) entire document	1-11
A	CN 2823621 Y (GREE ELECTRIC APPLIANCES, INC. OF ZHUHAI) 04 October 2006 (2006-10-04) entire document	1-11

☑ Further documents are listed in the continuation of Box C. ☑ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
16 April 2019	**26 April 2019**

Name and mailing address of the ISA/CN	Authorized officer
China National Intellectual Property Administration (ISA/CN) **No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088** **China**	
Facsimile No. **(86-10)62019451**	Telephone No.

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2018/120384

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	JP H0345838 A (SANYO ELECTRIC CO., LTD.) 27 February 1991 (1991-02-27) entire document	1-11
A	WO 2014141588 A1 (DENSO CORPORATION) 18 September 2014 (2014-09-18) entire document	1-11
PX	CN 108775627 A (FUNAI ELECTRIC CO., LTD.) 29 September 1998 (1998-09-29) claims 1-11	1-11

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2018/120384

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
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CN	102230655	A	02 November 2011	CN	102230655	B	19 June 2013
CN	107525246	A	29 December 2017		None		
CN	106369781	A	01 February 2017		None		
CN	2823621	Y	04 October 2006		None		
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Form PCT/ISA/210 (patent family annex) (January 2015)