



US 20180266441A1

(19) **United States**

(12) **Patent Application Publication**

Shen et al.

(10) **Pub. No.: US 2018/0266441 A1**

(43) **Pub. Date: Sep. 20, 2018**

(54) **FAN IMPELLER STRUCTURE**

(52) **U.S. Cl.**

(71) Applicant: **ASIA VITAL COMPONENTS (CHINA) CO., LTD.**, Shenzhen (CN)

CPC **F04D 29/66** (2013.01); **F04D 29/281** (2013.01); **F04D 17/16** (2013.01)

(72) Inventors: **Meng Shen**, Shenzhen (CN);
Xiang-You Zeng, Shenzhen (CN)

(57) **ABSTRACT**

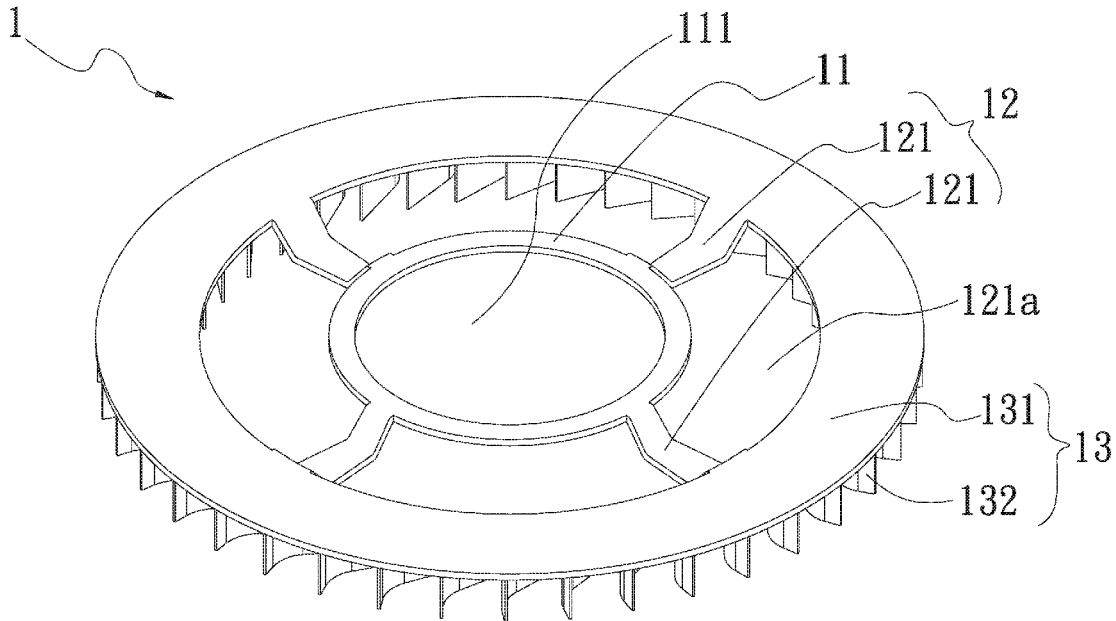
(21) Appl. No.: **15/461,449**

A fan impeller structure includes a main body having a central annular section, a connection section and a flow guide section. The central annular section has a through hole. The connection section has multiple connection members. Two ends of the connection members are respectively connected with the central annular section and the flow guide section. The flow guide section has a carrier annular body. Multiple fan blades are disposed on at least one side of the carrier annular body. The fan impeller structure is able to enhance the strength of the fan blades and lower the noise of the fan.

(22) Filed: **Mar. 16, 2017**

Publication Classification

(51) **Int. Cl.**
F04D 29/66 (2006.01)
F04D 17/16 (2006.01)
F04D 29/28 (2006.01)



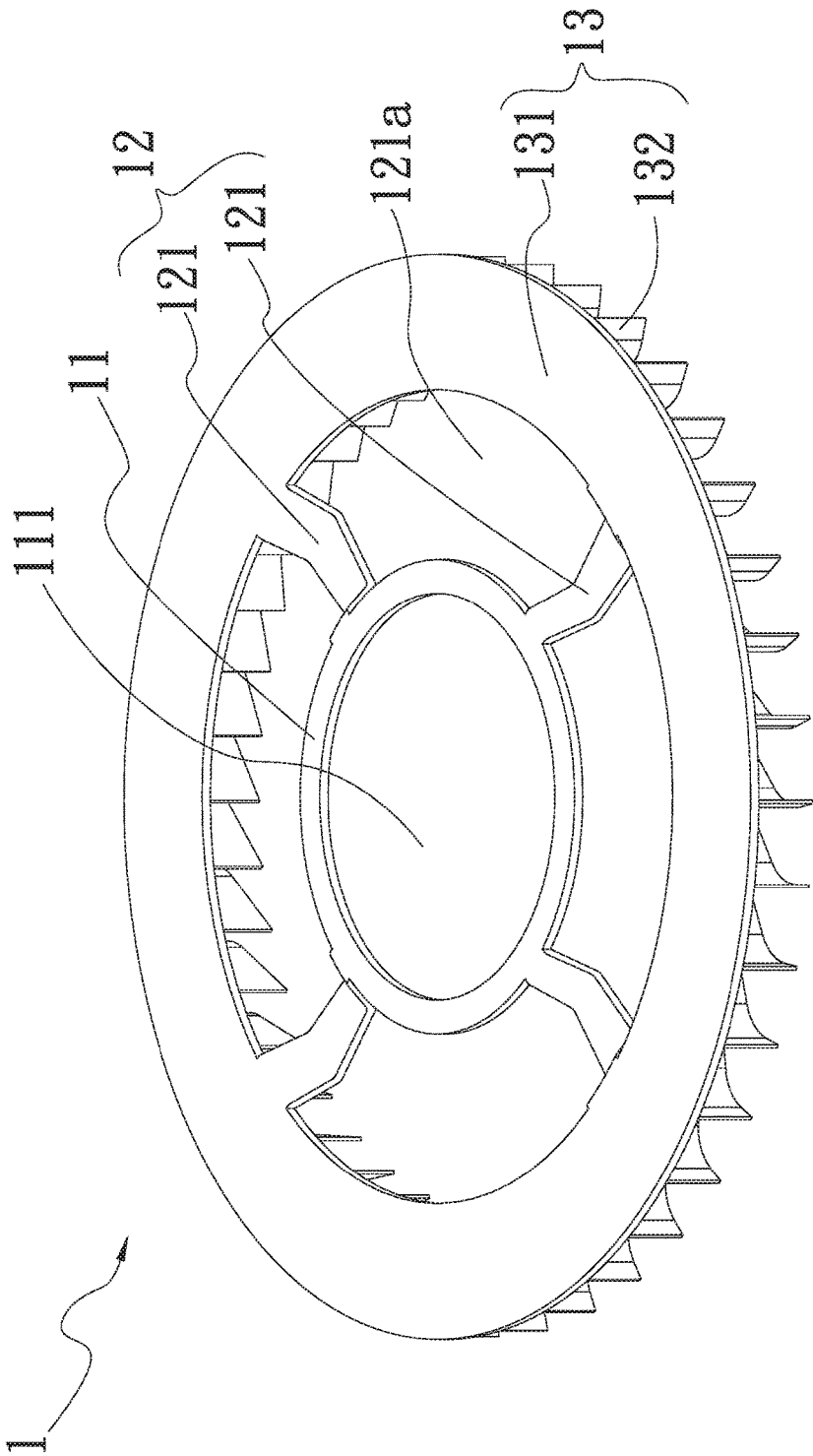


Fig. 1

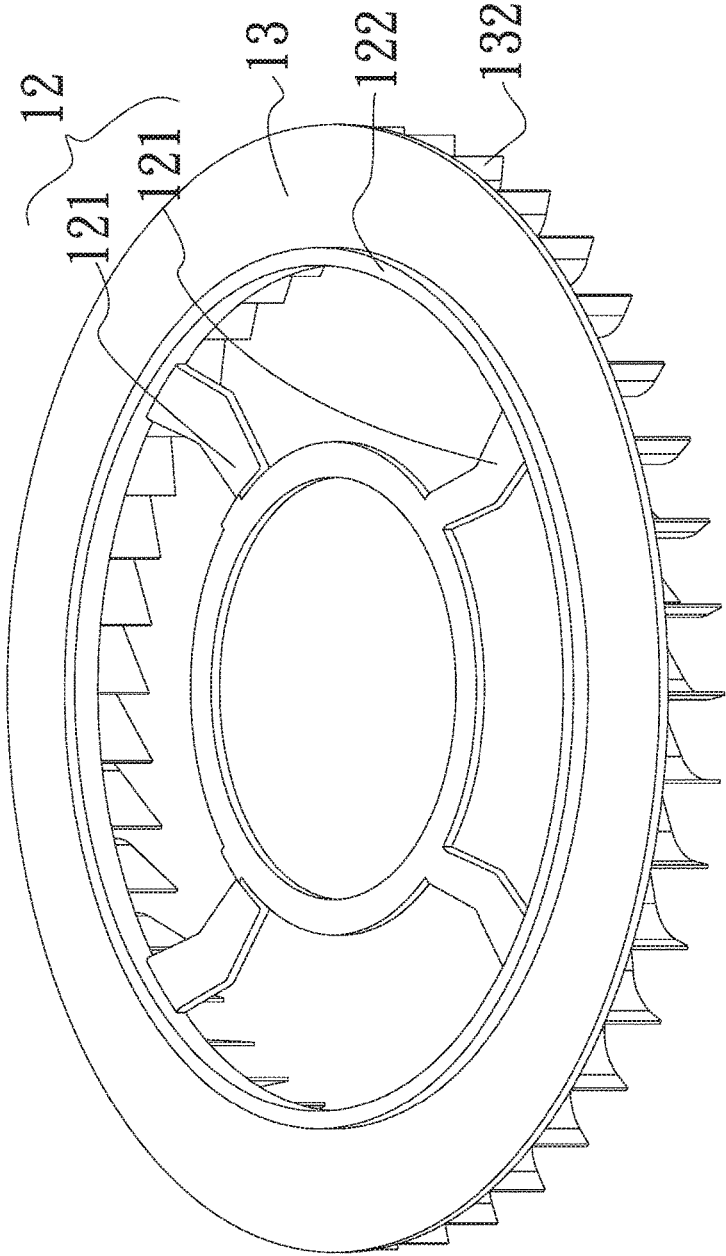


Fig. 2

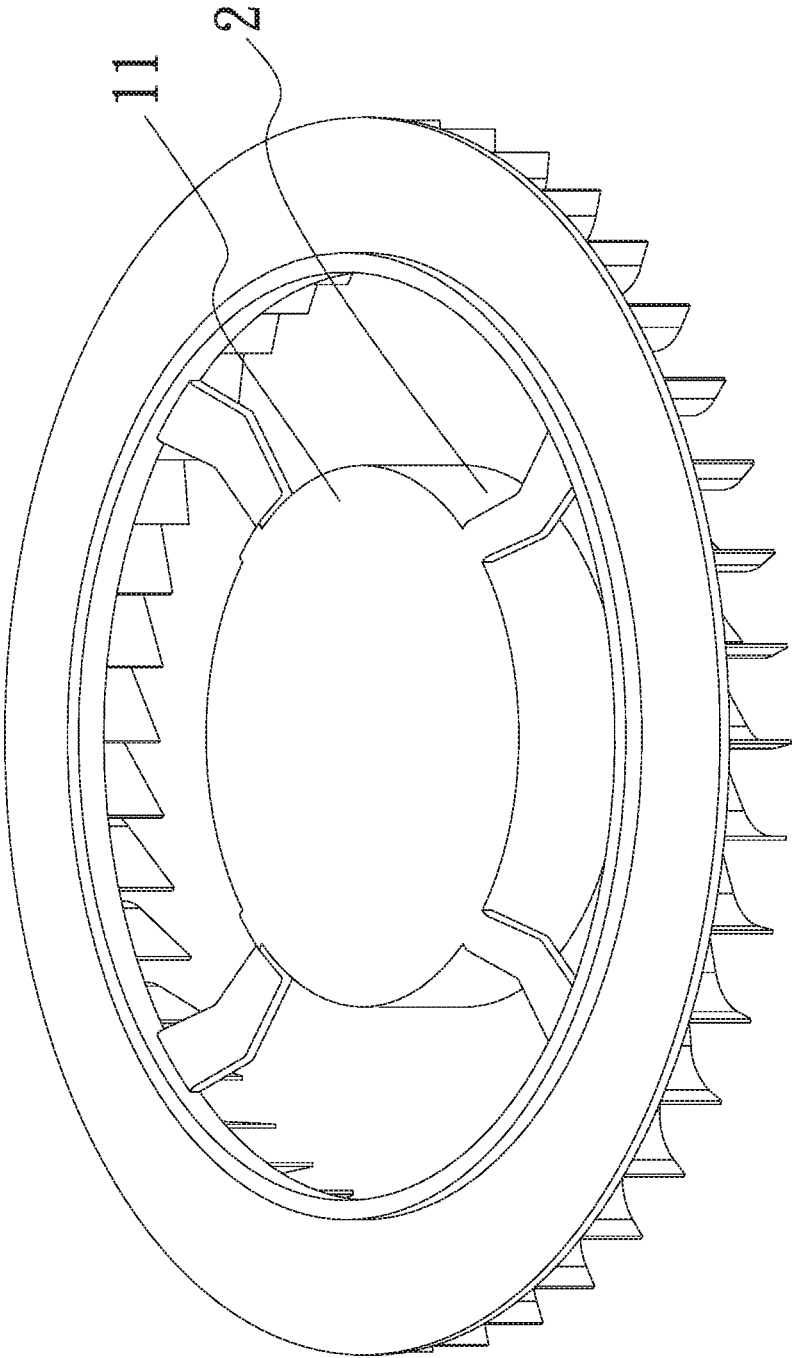


Fig. 3

FAN IMPELLER STRUCTURE

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates generally to a fan impeller structure, and more particularly to a fan impeller structure, which is able to lower the noise of the fan and enhance the strength of the fan blades.

2. Description of the Related Art

[0002] The conventional fans can be classified into two major types, that is, centrifugal fans and axial-flow fans. The two types of fans respectively have different forced airflow guiding effects and are applied to different sites. With respect to the axial-flow fan, the airflow goes from upper side of the fan into the fan and is guided by the fan impeller to flow out from the lower side of the fan. With respect to the centrifugal fan, the fan case or wind scoop can be such designed as to guide the airflow into the fan from one side and out of the fan from the other side or into the fan from the upper side of the fan and out of the fan from one side. A designer can design the centrifugal fan in accordance with the requirement. As aforesaid, the centrifugal fan can be such designed that the airflow goes into the fan from the upper side of the fan and out of the fan from one side or goes into the fan from one side and out of the fan from the other side.

[0003] Therefore, the centrifugal fan is applicable to a narrower space.

[0004] The fan blades of the conventional centrifugal fan are mainly made by means of injection molding (such as plastic integral injection molding or metal fan blade enclosure injection molding). One end of the fan blade is a free end, while the other end of the fan blade is connected with the fan hub. In operation, in order to prevent the fan blades from over-swinging, the centrifugal fan has a ring body connected with the free ends of the fan blades.

[0005] In operation, the conventional centrifugal fan has the following shortcomings:

[0006] 1. The conventional centrifugal fan will slightly vibrate.

[0007] 2. The fan impeller of the conventional centrifugal fan will severely axially skip.

[0008] 3. The fan blades of the conventional centrifugal fan will cut the windward side to make loud noise.

SUMMARY OF THE INVENTION

[0009] It is therefore a primary object of the present invention to provide a fan impeller structure, which is able to reduce the vibration and improve the problem of axial skip of the fan blades.

[0010] To achieve the above and other objects, the fan impeller structure of the present invention includes a main body having a central annular section, a connection section and a flow guide section. The central annular section has a through hole. The connection section has multiple connection members. Two ends of the connection members are respectively connected with the central annular section and the flow guide section. The flow guide section has a carrier annular body. Multiple fan blades are disposed on at least one side of the carrier annular body.

[0011] The fan impeller structure is able to improve the shortcomings of the conventional centrifugal fan that in operation, the conventional centrifugal fan will slightly vibrate and the fan impeller of the conventional centrifugal fan will axially skip.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The structure and the technical means adopted by the present invention to achieve the above and other objects can be best understood by referring to the following detailed description of the preferred embodiments and the accompanying drawings, wherein:

[0013] FIG. 1 is a perspective view of a first embodiment of the fan impeller structure of the present invention;

[0014] FIG. 2 is a perspective view of a second embodiment of the fan impeller structure of the present invention; and

[0015] FIG. 3 is a perspective view of a third embodiment of the fan impeller structure of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0016] Please refer to FIG. 1, which is a perspective view of a first embodiment of the fan impeller structure of the present invention. According to the first embodiment, the fan impeller structure of the present invention includes a main body 1 having a central annular section 11, a connection section 12 and a flow guide section 13. The central annular section 11 has a through hole 111. The connection section 12 has multiple connection members 121. Two ends of the connection members 121 are respectively connected with the central annular section 11 and the flow guide section 13. The flow guide section 13 has a carrier annular body 131. Multiple fan blades 132 are disposed on at least one side of the carrier annular body 131. At least one air inlet 121a is defined between the connection members 121.

[0017] The fan blades 132 are arranged at equal intervals or unequal intervals. In this embodiment, the fan blades 132 are, but not limited to, arranged at equal intervals for illustration purposes.

[0018] The connection members 121 are reverse U-shaped. Two ends of the connection members 121 are connected with the central annular section 11 and the flow guide section 13. Therefore, the central annular section 11 and the flow guide section 13 are radially horizontally arranged corresponding to each other.

[0019] Please now refer to FIG. 2, which is a perspective view of a second embodiment of the fan impeller structure of the present invention. The second embodiment is partially identical to the first embodiment in structure and thus will not be redundantly described hereinafter. The second embodiment is different from the first embodiment in that the junction between the flow guide section 13 and the connection section 12 further has an annular rib 122. The annular rib 122 is disposed on the other plane face of the flow guide section 13, which plane face is free from the fan blades 132. The annular rib 122 can be normal to the flow guide section 13 or inclined from the flow guide section 13. The annular rib 122 serves to enhance the flow guide effect and further increase the flow guide efficiency.

[0020] Please now refer to FIG. 3, which is a perspective view of a third embodiment of the fan impeller structure of the present invention. The third embodiment is partially

identical to the first embodiment in structure and thus will not be redundantly described hereinafter. The third embodiment is different from the first embodiment in that the fan impeller structure further has a hub 2 connected with the central annular section 11. The material of the hub 2 can be identical to or different from the material of the central annular section 11. The hub 2 is integrally connected with the central annular section 11 by means of injection molding or enclosure injection molding.

[0021] According to the above arrangement, the fan blades 132 are disposed on at least one side of the carrier annular body 131 of the flow guide section 13. The carrier annular body 131 serves to enhance the structural strength of the fan blades 132 and minimize the cut of the fan blades 132 to the windward side. Accordingly, in working, the fan blades 132 will not vibrate to make noise.

[0022] The present invention is further advantageous in that the present invention is able to improve the shortcoming of the conventional fan impeller structure that the structure is too complicated and the fan impeller can be hardly demolded after the injection molding. Moreover, the fan impeller structure of the present invention has multiple reinforcement structures to help in enhancing the strength of the entire fan impeller structure and reduce the axial skip of the fan blades 132.

[0023] The present invention has been described with the above embodiments thereof and it is understood that many changes and modifications in such as the form or layout pattern or practicing step of the above embodiments can be carried out without departing from the scope and the spirit of the invention that is intended to be limited only by the appended claims.

What is claimed is:

1. A fan impeller structure comprising a main body having a central annular section, a connection section and a flow guide section, the central annular section having a through hole, the connection section having multiple connection members, two ends of the connection members being respectively connected with the central annular section and the flow guide section, the flow guide section having a carrier annular body, multiple fan blades being disposed on at least one side of the carrier annular body.
2. The fan impeller structure as claimed in claim 1, wherein the connection members are U-shaped.
3. The fan impeller structure as claimed in claim 1, wherein the fan blades are arranged at equal intervals or unequal intervals.
4. The fan impeller structure as claimed in claim 1, wherein a junction between the flow guide section and the connection section further has an annular rib.
5. The fan impeller structure as claimed in claim 1, wherein at least one air inlet is defined between the connection members.
6. The fan impeller structure as claimed in claim 1, further comprising a hub connected with the main body, the material of the hub being identical to or different from the material of the main body, the hub being integrally connected with the central annular section by means of injection molding.
7. The fan impeller structure as claimed in claim 1, wherein the central annular section and one side of the flow guide section are radially horizontally arranged corresponding to each other.

* * * * *