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(54) AXIAL FLOW BLOWER FAN BLADE

(57) An axial-flow air blower's fan blades may include a blade portion, and a guide blade portion provided behind the blade portion. The guide blade portion has five guide blades, and the blade portion has a hub and a plurality of blades provided on the hub. The blades and the hub are integrated. There are twelve blades, and an outer circumference defined by the outer edges of the twelve blades has a diameter of 84 mm. The structure is simple and reasonable. The integration of the blades and hub improves concentricity and strength of the blades, increases air volume, and reduces noise. A reasonable number of blades and fan diameter together with a reasonable number of guide blades can improve efficiency and wind speed.

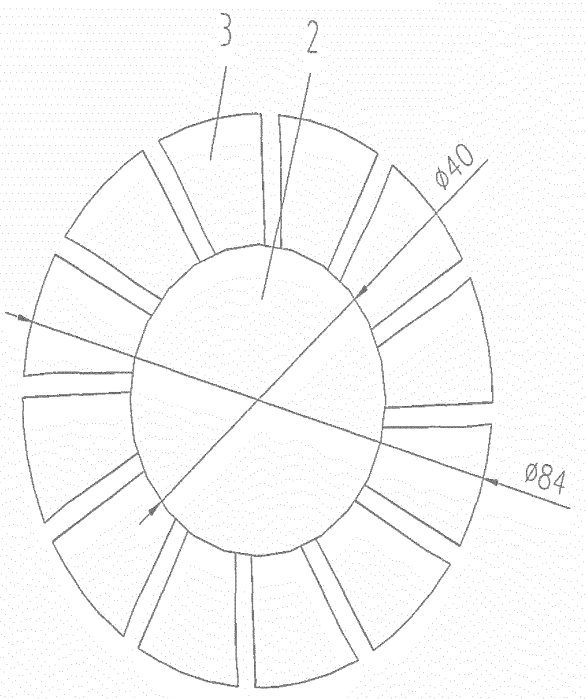

Figure 1

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Description

FIELD OF THE TECHNOLOGY

[0001] The present application relates to the field of air blower technology, and in particular relates to an axial-flow air blower's fan blades.

BACKGROUND

[0002] In existing market, blades and blade hub of an axial-flow air blower are of separate type, and need to be assembled by workers. The disadvantages are poor concentricity, low wind speed, low strength, and loud noise. In the market, the diameter of the fan, the number of blades, and the number of guide blades do not reach a reasonable ratio. The shortcomings are that wind speed is low, machine's current is high, fan vibration is vigorous, and the gap between the fan blades and the fan housing is large. This does not facilitate input air volume, and results in small output air volume and loud noise.

SUMMARY

[0003] The technical problem to be solved is to provide an axial-flow air blower with fan blades having simple and reasonable structure. The blades and the hub are integrated. This advantageously improves the concentricity and strength of the blades, increases air volume, and reduces noise. A reasonable number of blades and fan diameter together with a reasonable number of guide blades can improve efficiency and wind speed.

[0004] To solve the above-mentioned technical problem, the technical solution is to provide an axial-flow air blower's fan blades which may include a blade portion, and a guide blade portion provided behind the blade portion, the guide blade portion having five guide blades, the blade portion having a hub and a plurality of blades provided on the hub, the blades and the hub being integrated, wherein there are twelve blades, and an outer circumference defined by outer edges of the twelve blades has a diameter of 84 mm.

[0005] In a preferred embodiment, the hub has a diameter of 40 mm.

[0006] In a preferred embodiment, the guide blade portion may further include a central cylinder, one end of each guide blade being fixed to the center cylinder and another end being fixed to an inner wall of an outer cylinder of the axial-flow air blower.

[0007] The beneficial effect of the axial-flow air blower fan blades of the present application is that it has a simple and reasonable structure. The blades and the hub are integrated so as to facilitate improvement of concentricity and strength of the blades, increase air volume, and reduce noise. A reasonable number of blades and fan diameter together with a reasonable number of guide blades can improve efficiency and wind speed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] In order to more clearly illustrate the technical solution provided by the embodiments of the axial-flow air blower's fan blades of the present application, the drawings to be used in the description of the embodiments will be briefly described below. It will be apparent that the drawings mentioned in the following description are merely some implementations of the axial-flow air blower's fan blades. Without making any creative effort, a person skilled in the art may derive other drawings from the drawings in the present application, wherein:

Figure 1 is a schematic view of the structure of a blade portion:

Figure 2 is a schematic view of the structure of a guide blade portion;

Figure 3 is a schematic view of the structure of a blade;

Figure 4 is a cross-sectional view of the blade taken along line E-E of Figure 3; and

Figure 5 is a cross-sectional view of the blade taken along line H-H of Figure 3.

[0009] The reference numerals in the drawings and their designating parts are as follow: 1 - guide blades, 2 - hub, 3 - blades.

DETAILED DESCRIPTION

[0010] The technical solution provided by the embodiments of the axial-flow air blower fan blades of the present application will be described clearly and completely below. It is apparent that the described embodiments are only some embodiments of the axial-flow air blower's fan blades, and not all of the embodiments. All other embodiments obtained by an ordinary technical person skilled in the art, without making any creative effort, are within the scope of protection of the axial-flow air blower fan blades of the present application.

[0011] Referring to Figures 1 to 5, an embodiment of the axial-flow air blower fan blades of the present application may include a blade portion, and a guide blade portion provided behind the blade portion. The guide blade portion may include five guide blades 1. The blade portion may include a hub 2 and a plurality of blades 3 provided on the hub 2. The blades 3 and the hub 2 can be integrated. This can advantageously improve the concentricity and strength of the blades, increase air flow, and reduce noise.

[0012] The number of the blades 3 can be twelve. An outer circumference defined by the outer edges of the twelve blades 3 may have a diameter of 84 mm. With the combination of the five guide blades 1, the efficiency and wind speed of the fan blades can be improved. Otherwise, under the circumstances that the gap between the fan blades and fan housing is small and the motor is not fixed steadily, it will lead to friction between the fan blades and the fan housing. At the same time, the requirement of parallelism of the matching faces of the motor and the fan blades is higher.

[0013] The following table shows the data of performance for different blade numbers and different guide blade numbers:

Model	Rate of Flow (Kg/S)	Shaft Power (W)	Outlet Total Pressure (Pa)	Fan Efficiency
11 fan blades + 7 guide blades	0.1792	317.81	1195.661	55.04%
12 fan blades + 5 guide blades	0.2064	458.55	1586.598	58.36%

[0014] Preferably, the diameter of the hub 2 is 40 mm.

[0015] The guide blade portion may further include a central cylinder. One end of each guide blade may be fixed to the center cylinder and another end may be fixed to an inner wall of an outer cylinder of the axial-flow air blower.

[0016] The beneficial effect of the axial-flow air blower fan blade of the present application is that it has a simple and reasonable structure. The integration of the blades and the hub advantageously improves the concentricity and strength of the blades, increases air volume, and reduces noise. A reasonable number of blades and fan diameter together with a reasonable number of guide blades can improve efficiency and wind speed.

[0017] The above-mentioned embodiments are merely some embodiments of the axial-flow air blower's fan blades of the present application, and the scope of patent protection is not limited to these embodiments. Any equivalent structures or equivalent changes of process using the contents of the present patent specification, or any direct/indirect application in other related field of technology are within the scope of patent protection of the present application.

Claims

1. An axial-flow air blower's fan blades, comprising a blade portion, and a guide blade portion provided behind the blade portion, the guide blade portion comprising five guide blades, the blade portion comprising a hub and a plurality of blades provided on the hub, the blades and the hub being integrated, wherein there are twelve blades, and an outer circumference defined by outer edges of the twelve blades has a diameter of 84 mm.

2. The axial-flow air blower's fan blades according to claim 1, wherein the hub has a diameter of 40 mm.

3. The axial-flow air blower's fan blades according to claim 1, wherein the guide blade portion further comprises a central cylinder, one end of each guide blade being fixed to the center cylinder and another end being fixed to an inner wall of an outer cylinder of the axial-flow air blower.

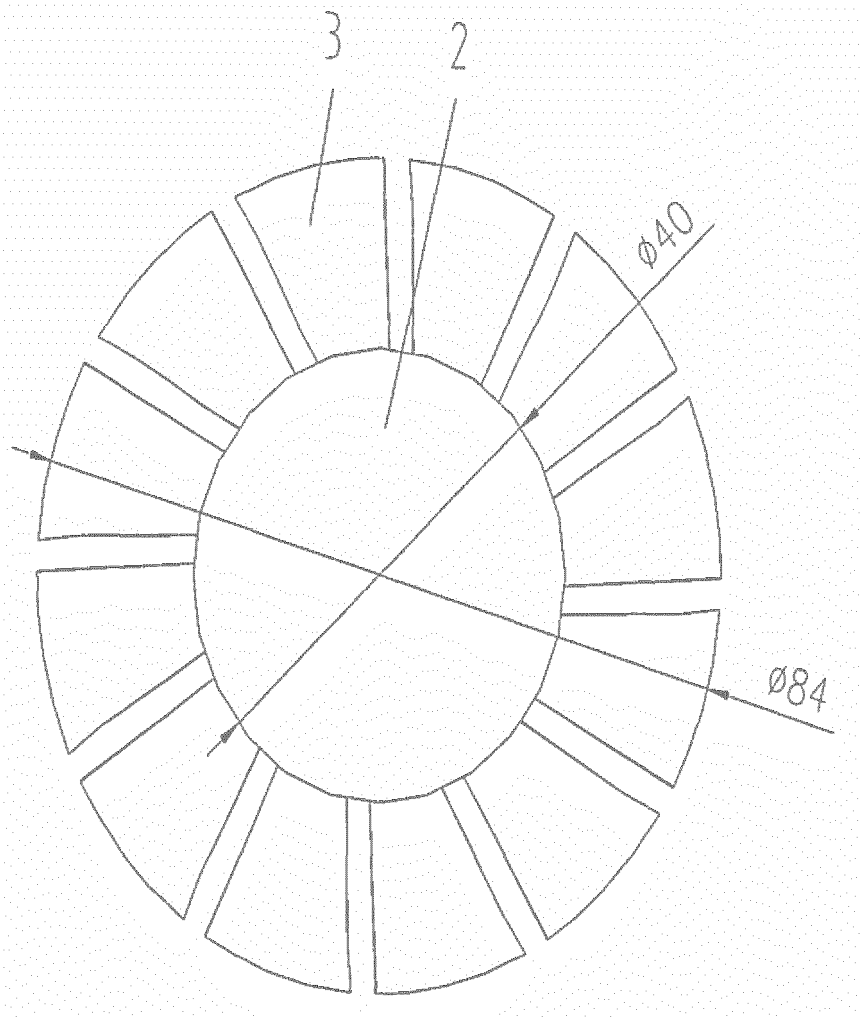

Figure 1

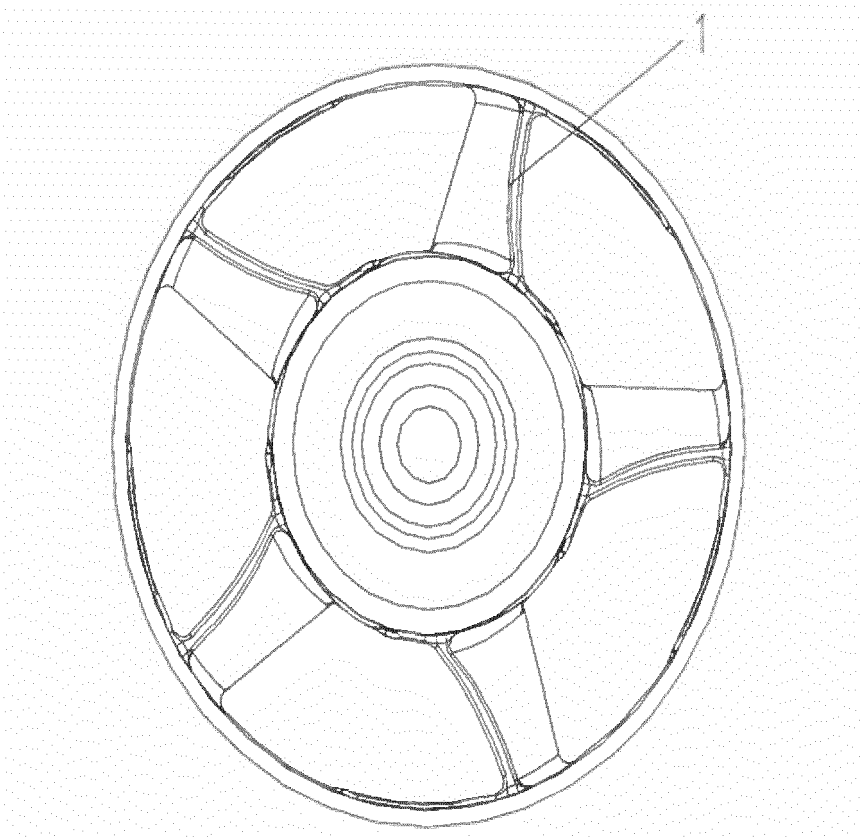

Figure 2

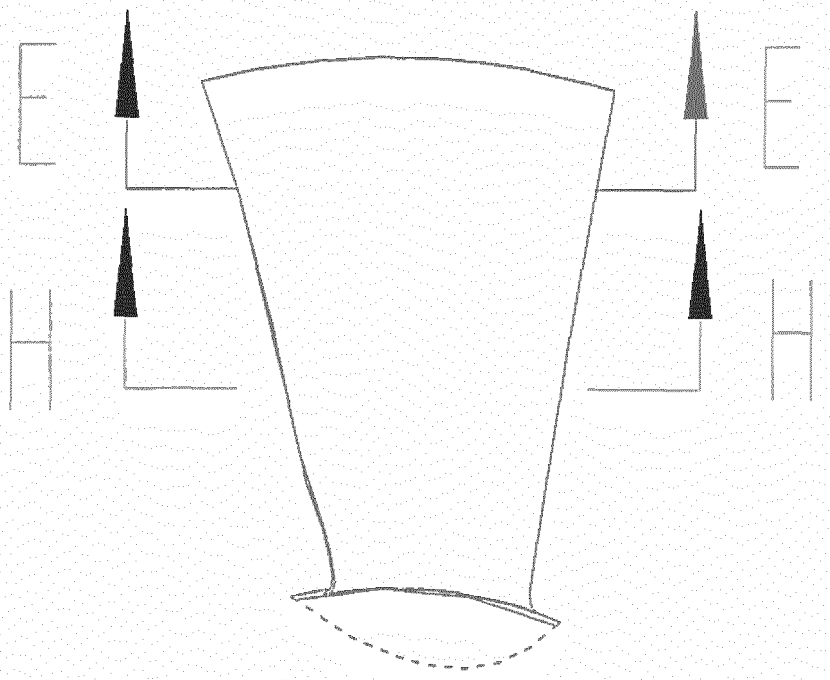

Figure 3

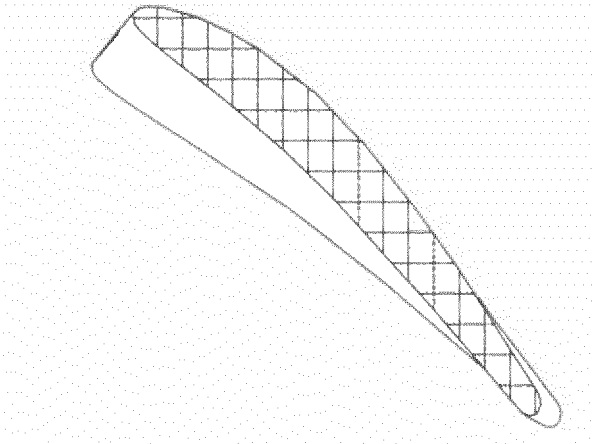

Figure 4

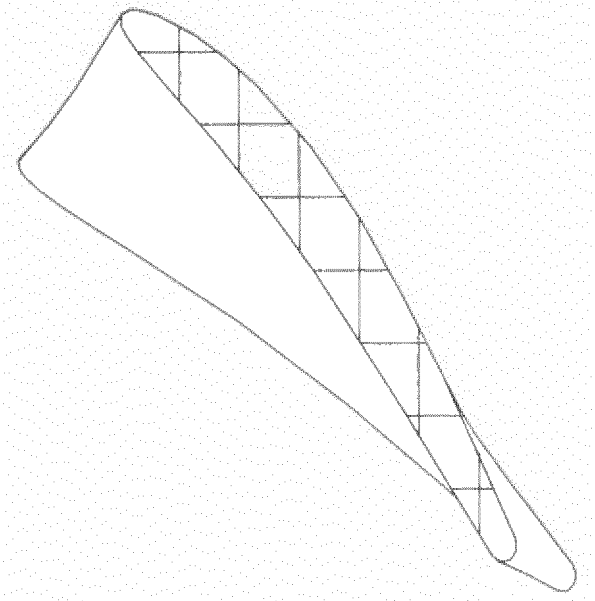

Figure 5

INTERNATIONAL SEARCH REPORT

International application No.
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A. CLASSIFICATION OF SUBJECT MATTER

F04D 29/32 (2006.01) i; F04D 29/38 (2006.01) 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)

F04D 29

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)

CNPAT, CNKI, WPI, EPODOC: guide, blade?, hub, fan, blower, integral, CHANGZHOU GLOBE, luo li, shangguan yunjie

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 204213047 U (CHANGZHOU GLOBE CO., LTD.) 18 March 2015 (18.03.2015) claims 1-3	1-3
Y	CN 203161662 U (ZHUZHOU LINCE GROUP CO., LTD.) 28 August 2013 (28.08.2013) description, paragraphs [0019]-[0026], and figure 1	1-3
Y	CN 2921392 Y (BAORUI SCIENCE&TECHNOLOGY CO., LTD.) 11 July 2011 (11.07.2011) description, page 3, the last paragraph but one, and figures 1-3	1-3
Y	CN 203335439 U (ZHUZHOU LINCE GROUP CO., LTD.) 11 December 2013 (11.12.2013) description, paragraphs [0011]-[0015], and figure 1	1-3
A	US 2014147282 A1 (COOLER MASTER CO., LTD.) 29 May 2014 (29.05.2014) the whole document	1-3
A	EP 2336569 A1 (YEN SUN TECHNOLOGY CORP.) 22 June 2011 (22.06.2011) the whole document	1-3

☐ 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

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"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

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"&"document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
12 September 2015	30 September 2015
Name and mailing address of the ISA State Intellectual Property Office of the P. R. China No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088, China Facsimile No. (86-10) 62019451	Authorized officer TIAN, Yuan Telephone No. (86-10) 62414080

Form PCT/ISA /210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2015/084526

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN 204213047 U	18 March 2015	None	
CN 203161662 U	28 August 2013	None	
CN 2921392 Y	11 July 2007	None	
CN 203335439 U	11 December 2013	None	
US 2014147282 A1	29 May 2014	None	
EP 2336569 A1	22 June 2011	EP 2336569 B1	05 December 2012
		TW 1398579 B	11 June 2013
		TW 201122231 A	01 July 2011
		US 2011150639 A1	23 June 2011

Form PCT/ISA /210 (patent family annex) (July 2009)