(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 173 700 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
31.05.2017 Bulletin 2017/22

(21) Application number: **15796579.9**

(22) Date of filing: **22.05.2015**

(51) Int Cl.:
F24B 7/00 *(2006.01)* ***F24F 7/06*** *(2006.01)*
F24F 7/08 *(2006.01)*

(86) International application number:
PCT/KR2015/005203

(87) International publication number:
WO 2015/178735 (26.11.2015 Gazette 2015/47)

(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
Designated Extension States:
BA ME
Designated Validation States:
MA

(30) Priority: **22.05.2014 KR 20140061690**

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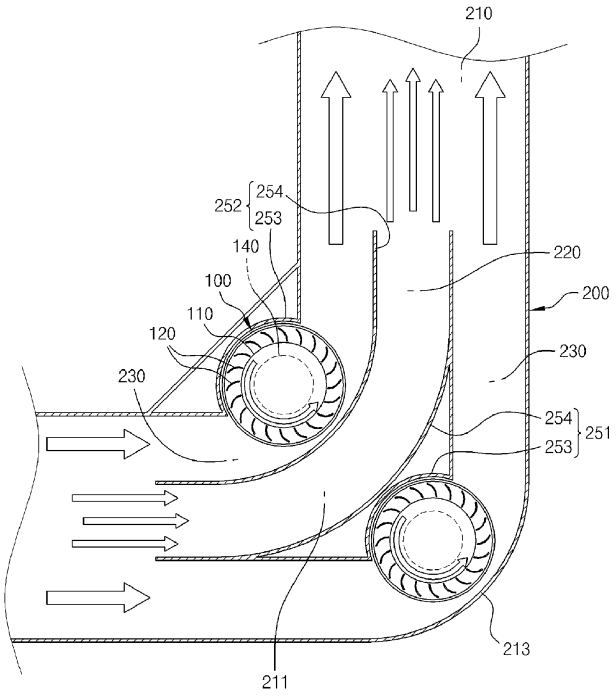
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(54) DUCT VENTILATION APPARATUS

(57) A duct ventilation apparatus according to the present invention, which is installed in the interior of a duct, is equipped with a rotating means comprising a shaft having a plurality of blades attached on the outer circumferential surface thereof, the shaft having a length and rotating by being connected to a motor, wherein the rotating means is disposed in the inflected part of the flow space in the interior of the duct.

[Fig. 1]



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Description

[Technical Field]

[0001] The present invention relates to a duct ventilation apparatus, and more particularly, to a duct ventilation apparatus in which a rotating means is installed in a bent portion of a duct in order to increase a flow velocity and a flow rate of an air flow in a flow space in the duct.

[Background Art]

[0002] Recently, as buildings become higher and bigger and an external appearance of the building is considered as an important factor, a window structure is changed to a sealed window structure in consideration of environmental pollution or safety, and thus changed to a structure in which it is difficult to perform ventilation through the window in the outer wall of the building, but instead, a ventilation apparatus is installed in a ceiling or the like in the building so that air in the building is discharged to the outside and fresh outside air is supplied into the building by the ventilation apparatus.

[0003] The ventilation apparatus is configured such that a blower fan is installed in a ventilation duct installed in a ceiling of a building and the blower fan operates to supply and discharge air, the ventilation apparatus may also be configured such that an air cleaning filter or the like in a duct so as to purify the supplied air, or the ventilation apparatus may also be configured such that a hot air blower or a cold air blower is provided to control an indoor temperature.

[0004] However, in the case of the ventilation apparatus in the related art, there are problems in that even though the air needs to be introduced into or discharged from the interior as much as the amount of supplied or discharge air, the air cannot naturally flow because of the sealed interior space, and thus the air cannot be smoothly supplied or discharged due to the nature of the ventilation apparatus in the related art.

[0005] In particular, the duct is inevitably bent when the duct is installed, and as a result, there is a problem in that a flow velocity and a flow rate of air are decreased due to the bent portion in the duct.

[Disclosure]

[Technical Problem]

[0006] The present invention has been made in an effort to solve the aforementioned problems, and an object of the present invention is to provide a duct ventilation apparatus in which a rotating means is installed in a bent portion in a duct in order to increase a flow rate and a flow velocity in a flow space of the duct.

[0007] Another object of the present invention is to provide a duct ventilation apparatus in which partition walls are formed at edge portions in a bent flow space in a duct, respectively, such that the flow space is divided into a main flow hole and a sub flow hole, and the rotating means are installed in the duct, thereby increasing a flow rate and a flow velocity of a flow of air introduced into the bent edges of the duct.

[Technical Solution]

[0008] To achieve the aforementioned objects, a duct ventilation apparatus of the present invention includes a rotating means which has a plurality of blades mounted at an outer circumference of a shaft which has a length and is rotated by being connected with a motor, in which the rotating means is installed in a bent space in a flow space in the duct.

[0009] According to the present invention, the rotating means is installed at an edge of the bent space in the flow space of the duct.

[0010] According to the present invention, the rotating means is installed in a space at a convex edge between the edges of the bent space in the flow space of the duct.

[0011] According to the present invention, the rotating means is installed in a space at a concave edge between the edges of the bent space in the flow space of the duct.

[0012] According to the present invention, partition walls are formed at both of the edges of the bent portion in the flow space of the duct at an interval so as to divide the flow space into a main flow hole and a pair of sub flow holes, and the rotating means is installed in the sub flow hole.

[0013] According to the present invention, a partition wall is formed at a concave edge between the edges of the bent portion in the flow space of the duct at an interval with the concave edge so as to divide the flow space into a main flow hole and a sub flow hole, and the rotating means is installed in the sub flow hole formed at the concave edge.

[0014] According to the present invention, a partition wall is formed at a convex edge between the edges of the bent portion in the flow space of the duct at an interval with the convex edge so as to divide the flow space into a main flow hole and a sub flow hole, and the rotating means is installed in the sub flow hole formed at the convex edge.

[0015] According to the present invention, air pressure in the sub flow hole is increased by an operation of the rotating means, and an air pressure difference occurs between the sub flow hole and the main flow hole, such that a flow velocity is increased.

[Advantageous Effects]

[0016] According to the duct ventilation apparatus of the present invention, the rotating means, which has the plurality of blades mounted at the outer circumference of the shaft which has a length and is rotated by being connected with the motor, is provided, and the rotating means is installed in the flow space in the duct, such that

the rotating means having a length is installed in the duct or the bent portion in the duct, thereby increasing a flow rate and a flow velocity in the flow space of the duct.

[0017] In addition, according to the duct ventilation apparatus of the present invention, the partition walls are formed at the edge portions in the bent flow space in the duct, respectively, such that the flow space is divided into the main flow hole and the sub flow hole, and the rotating means are installed in the duct, thereby increasing a flow rate and a flow velocity of a flow of air introduced into the bent edges of the duct.

[Description of Drawings]

[0018]

FIG. 1 is a cross-sectional view illustrating a first exemplary embodiment of a duct ventilation apparatus of the present invention.

FIG. 2 is a cross-sectional view illustrating a second exemplary embodiment of a duct ventilation apparatus of the present invention.

FIG. 3 is a cross-sectional view illustrating a third exemplary embodiment of a duct ventilation apparatus of the present invention.

FIG. 4 is a perspective view illustrating a rotating means to be installed in the duct ventilation apparatus of the present invention.

[Description of Main Reference Numerals of Drawings]

[0019]

10: duct ventilation apparatus
100: rotating means
110: shaft
120: blade
140: motor
200: duct
210: flow space
211: bent portion
212: convex edge
213: concave edge
220: main flow hole
230: sub flow hole
250: partition wall
251: inner partition wall
252: outer partition wall
253: first partition wall
254: second partition wall

[Best Mode]

[0020] Hereinafter, the present invention will be described in detail with reference to the accompanying drawings. First, it should be noted that in the drawings, like constituent elements or components are referred by like reference numerals if possible. In the description of the present invention, the specific descriptions of publicly known related function or configurations will be omitted in order to prevent the specific descriptions from obscuring the subject matter of the present invention.

[0021] Words of degree, such as "about", "substantially", and the like are used in the present specification in the sense of "at, or nearly at, when given the manufacturing, design, and material tolerances inherent in the stated circumstances" and are used to prevent the unscrupulous infringer from unfairly taking advantage of the invention disclosure where exact or absolute figures and operational or structural relationships are stated as an aid to understanding the invention.

[0022] FIG. 1 is a cross-sectional view illustrating a first exemplary embodiment of a duct ventilation apparatus of the present invention, FIG. 2 is a cross-sectional view illustrating a second exemplary embodiment of a duct ventilation apparatus of the present invention, FIG. 3 is a cross-sectional view illustrating a third exemplary embodiment of a duct ventilation apparatus of the present invention, and FIG. 4 is a perspective view illustrating a rotating means to be installed in the duct ventilation apparatus of the present invention.

[0023] First, as illustrated in FIGS. 1 to 4, a duct ventilation apparatus 10 of the present invention has a rotating means 100 which is installed in a duct 200 and has a length.

[0024] As illustrated in FIG. 4, the rotating means 100 has a plurality of blades 120 installed in a longitudinal direction at an outer circumference of a shaft 110 having a length.

[0025] The blade 120 has a shape having a curvature, and the blade 120 is installed to be inclined in a rotation direction of the shaft 110.

[0026] The shaft 110 is connected with the motor 140, and the shaft 110 is rotated by an operation of the motor 140, such that a flow velocity and a flow rate of air are generated through the blades 120.

[0027] The rotating means 100, which is configured as described above, is installed in a bent portion 211 in the duct 200.

[0028] That is, in the case of the existing duct 200, the air, which is generated by ventilating devices installed in indoor and outdoor heat exchangers and has a flow rate and a flow velocity, flows into the duct 200, but the flow velocity and the flow rate are decreased due to a length of the duct 200 or a bent state of the duct 200.

[0029] To solve the aforementioned problems, in the present invention, the rotating means 100 is installed in the bent portion 211 in the duct 200, such that the flow velocity and the flow rate of the air flow are increased without being decreased, and as a result, the air flow is improved and thus ventilation efficiency is improved.

[0030] The exemplary embodiments of the duct venti-

lation apparatus of the present invention are classified into first to third exemplary embodiments.

[0031] That is, the first to third exemplary embodiments may be applied as various exemplary embodiments by installing the rotating means 100 based on positions of edges 212 and 213 of the bent portion 211 in the flow space 210 of the duct.

[0032] As illustrated in FIG. 1, in the first exemplary embodiment, the rotating means 100 are installed at both of the edges 212 and 213 of the bent portion 211 in the flow space 210 of the duct.

[0033] As illustrated in FIG. 2, in the second exemplary embodiment, the rotating means 100 is installed in a space at the convex edge 212 between the edges of the bent portion 211 in the flow space 210 of the duct.

[0034] As illustrated in FIG. 3, in the third exemplary embodiment, the rotating means 100 is installed in a space at the concave edge 213 between the edges of the bent portion 211 in the flow space 210 of the duct.

[0035] In the first and third exemplary embodiments configured as described above, a partition wall 250 may be selectively formed at the edges 212 and 213 of the bent portion 211.

[0036] In other words, in the first exemplary embodiment, an inner partition wall 251 and an outer partition wall 252 are formed at both of the edges 212 and 213 of the bent portion 211 in the flow space 210 of the duct so as to divide the flow space 210 into a main flow hole 220 and a pair of sub flow holes 230, and the rotating means 100 are installed in the sub flow holes 230.

[0037] In the second exemplary embodiment, the outer partition wall 252 is formed at the concave edge 212 between the edges of the bent portion 211 in the flow space 210 of the duct so as to divide the flow space 210 into the main flow hole 220 and the sub flow hole 230, and the rotating means 100 is installed in the sub flow hole 230 formed at the concave edge 213.

[0038] In the third exemplary embodiment, the inner partition wall 251 is formed at the convex edge 212 between the edges of the bent portion 211 in the flow space 210 of the duct so as to divide the flow space 210 into the main flow hole 220 and the sub flow hole 230, and the rotating means 100 is installed in the sub flow hole 230 formed at the convex edge 212.

[0039] Here, the partition walls include the outer partition wall 252 and the inner partition wall 251 based on a state in which the partition walls are disposed in the bent portion.

[0040] That is, the outer partition wall 252 is installed at the convex edge 212 of the bent portion, and the inner partition wall 251 is installed at the concave edge 213 of the bent portion.

[0041] Further, the outer partition wall 252 includes a first partition wall 253 which is formed at the convex edge 212, has an arc shape, and accommodates a part of the rotating means, and a second partition wall 254 which is spaced apart from the convex edge 212 at an interval and has the same curvature as the bent portion.

[0042] Since the outer partition wall 252 has the same curvature as the convex edge 212 of the bent portion, the air may flow smoothly.

[0043] In addition, the inner partition wall 251 includes the first partition wall 253 which is formed at the concave edge 213, has an arc shape, and accommodates a part of the rotating means, and a second partition wall 254 which connects a horizontal surface and a vertical surface of the first partition wall 253 and has the same curvature as the bent portion, and as a result, since the second partition wall 254 has the same curvature as the concave edge 213, the air may flow smoothly.

[0044] In the duct ventilation apparatus having the aforementioned various exemplary embodiments, air pressure in the sub flow hole 230 is increased by the operation of the rotating means 100, and an air pressure difference occurs between the sub flow hole 230 and the main flow hole 220, and as a result, a flow velocity is increased.

[0045] Specifically, the flow space 210 is divided into the main flow hole 220 and the sub flow hole 230, and the sub flow hole 230 is installed only in the bent portion 211 in the flow space 210, and as a result, an inlet and an outlet at both sides of the sub flow hole 230 communicate with the flow space 210.

[0046] Further, the rotating means 100 is selectively installed in both of the pair of sub flow holes 230 or one of the pair of sub flow holes 230, and the rotating means 100 is operated, and as a result, air pressure in the sub flow hole 230 is increased.

[0047] Therefore, an air pressure difference occurs between the main flow hole 220 and the sub flow hole 230, and as a result, a flow velocity is increased.

[0048] That is, as the air pressure in the sub flow hole 230 is increased by the operation of the rotating means 100, the air is discharged to the outlet of the sub flow hole 230 at the increased flow velocity and the increased flow rate.

[0049] In this case, because force of the air is applied from high air pressure to low air pressure, the air in the main flow hole 220 is drawn as the air pressure in the main flow hole 220 is relatively decreased, and as a result, the flow rate and the flow velocity are increased.

[0050] The present invention, which has been described above, is not limited by the aforementioned exemplary embodiment and the accompanying drawings, and it is obvious to those skilled in the art to which the present invention pertains that various substitutions, modifications and alterations may be made without departing from the technical spirit of the present invention.

Claims

1. A duct ventilation apparatus which is installed in a duct, the duct ventilation apparatus comprising:

   a rotating means which has a plurality of blades

mounted at an outer circumference of a shaft which has a length and is rotated by being connected with a motor,
wherein the rotating means is installed in a bent portion in a flow space in the duct.

2. The duct ventilation apparatus of claim 1, wherein the rotating means is installed at an edge of the bent portion in the flow space of the duct.

3. The duct ventilation apparatus of claim 2, wherein the rotating means is installed in a space at a convex edge between the edges of the bent portion in the flow space of the duct.

4. The duct ventilation apparatus of claim 2, wherein the rotating means is installed in a space at a concave edge between the edges of the bent portion in the flow space of the duct.

5. The duct ventilation apparatus of claim 2, wherein an inner partition wall and an outer partition wall are formed at both of the edges of the bent portion in the flow space of the duct, respectively, so as to divide the flow space into a main flow hole and a pair of sub flow holes, and the rotating means are formed in the sub flow holes.

6. The duct ventilation apparatus of claim 3, wherein an inner partition wall is formed at a concave edge between the edges of the bent portion in the flow space of the duct so as to divide the flow space into a main flow hole and a sub flow hole, and the rotating means is installed in the sub flow hole formed at the concave edge.

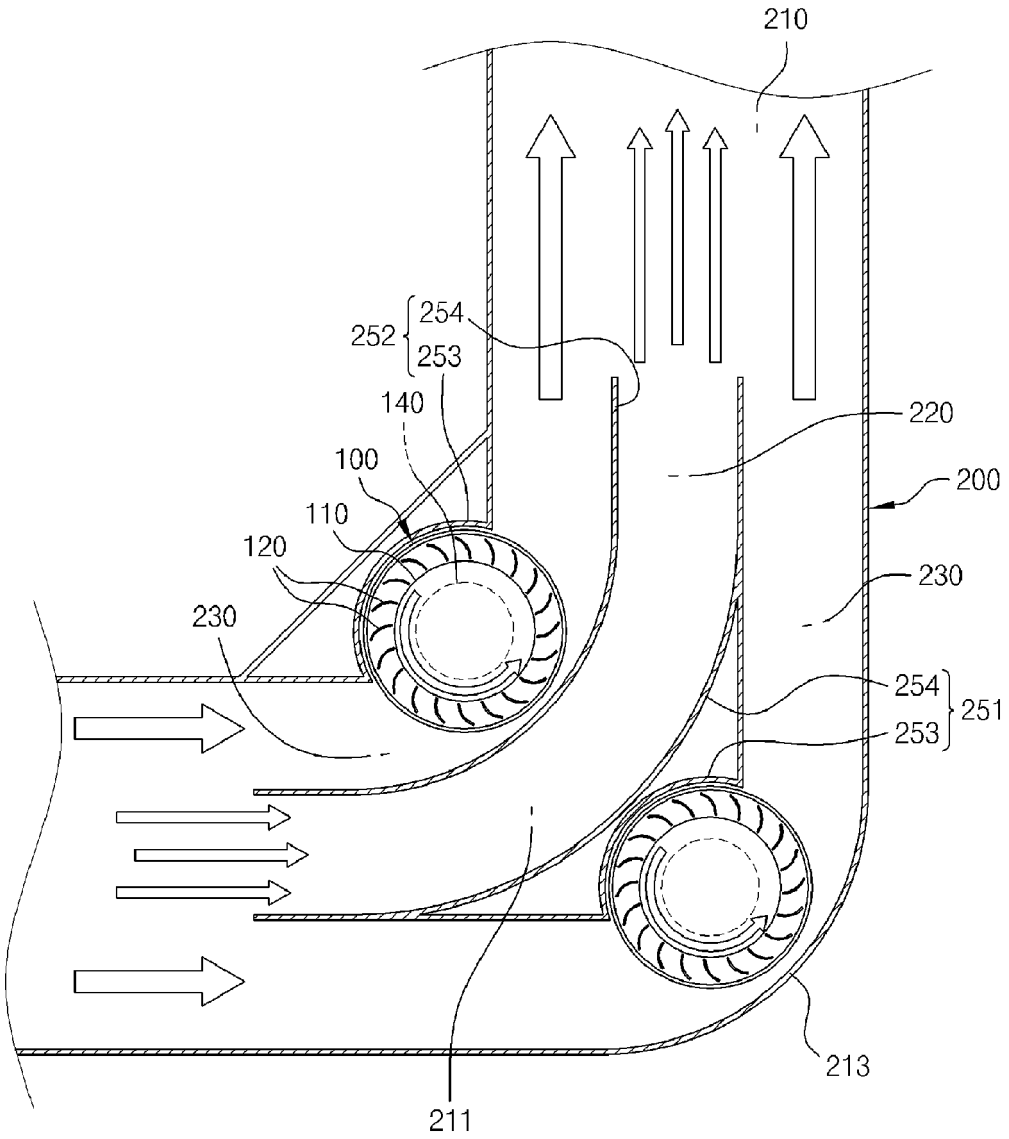
7. The duct ventilation apparatus of claim 4, wherein an outer partition wall is formed at a convex edge between the edges of the bent portion in the flow space of the duct so as to divide the flow space into a main flow hole and a sub flow hole, and the rotating means is installed in the sub flow hole formed at the convex edge.

8. The duct ventilation apparatus of claim 5 or 6, wherein the outer partition wall includes a first partition wall which is formed at the convex edge, has an arc shape, and accommodates a part of the rotating means, and a second partition wall which is spaced apart from the convex edge at an interval and has the same curvature as the bent portion.

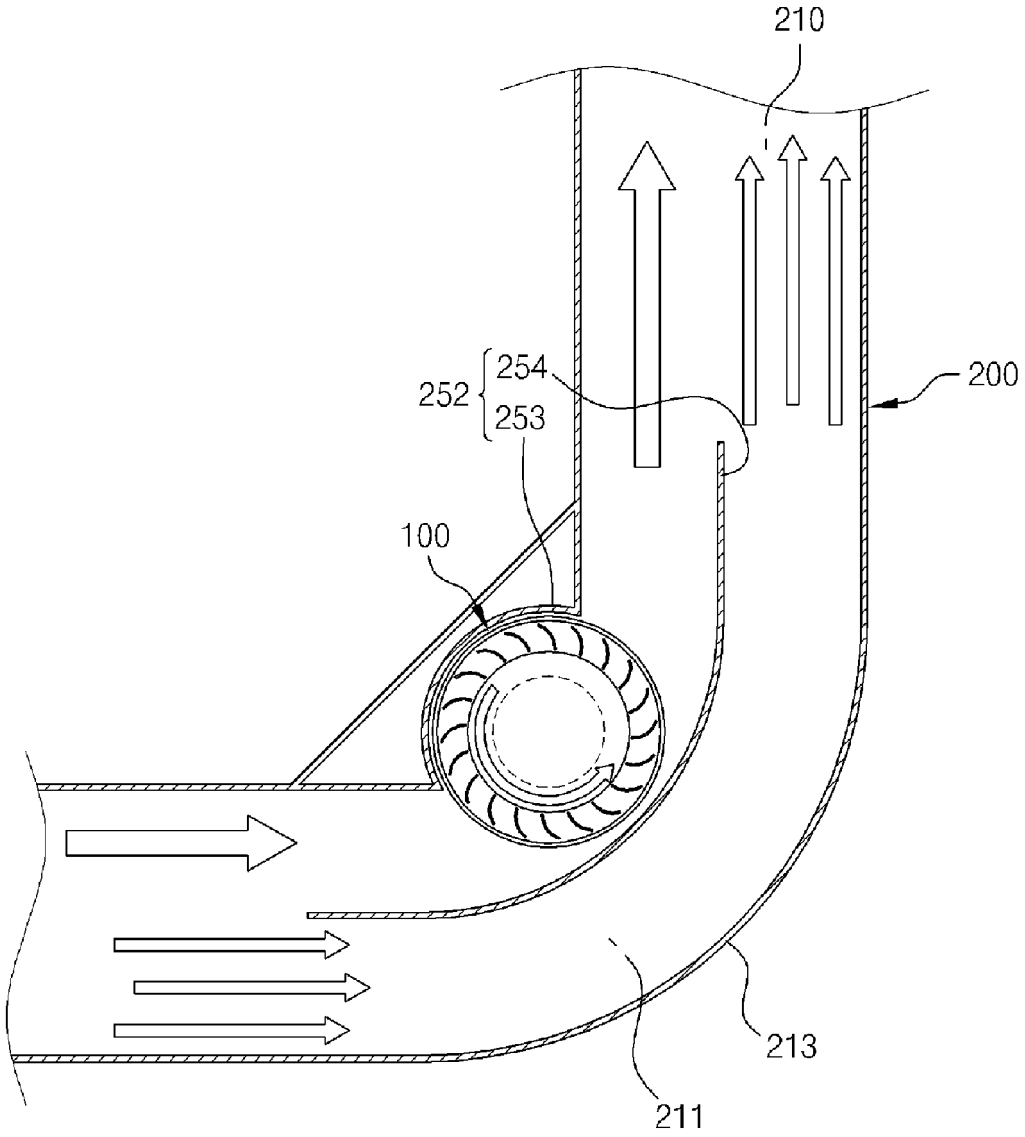
9. The duct ventilation apparatus of claim 5 or 7, wherein the inner partition wall includes a first partition wall which is formed at the concave edge, has an arc shape, and accommodates a part of the rotating means, and a second partition wall which connects a horizontal surface and a vertical surface of the first partition wall and has the same curvature as the bent portion.

10. The duct ventilation apparatus of any one of claims 5, 6, and 7, wherein air pressure in the sub flow hole is increased by an operation of the rotating means, and an air pressure difference occurs between the sub flow hole and the main flow hole, such that a flow velocity is increased.

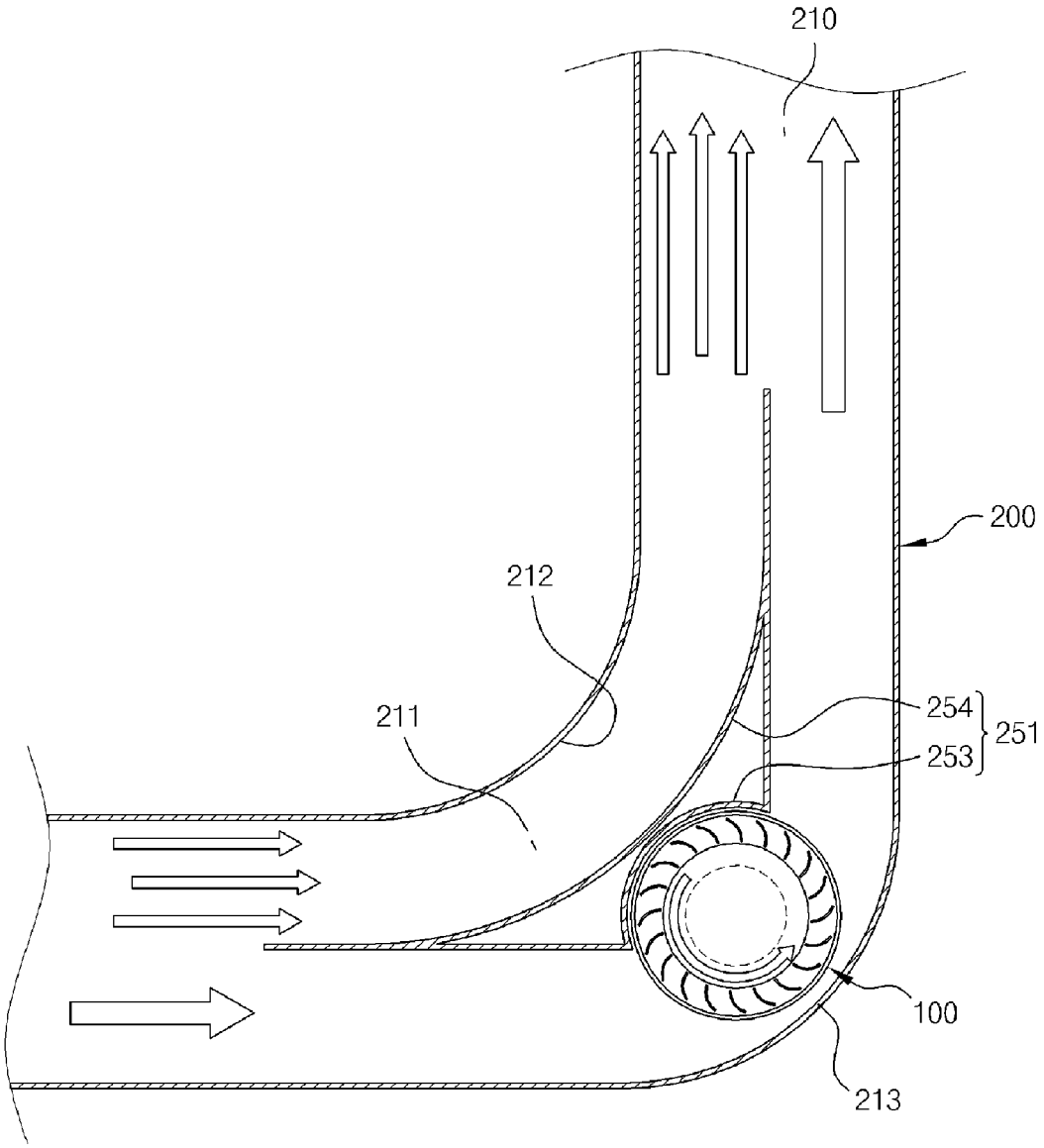
[Fig. 1]


210
252
254
253
140
100
110
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211

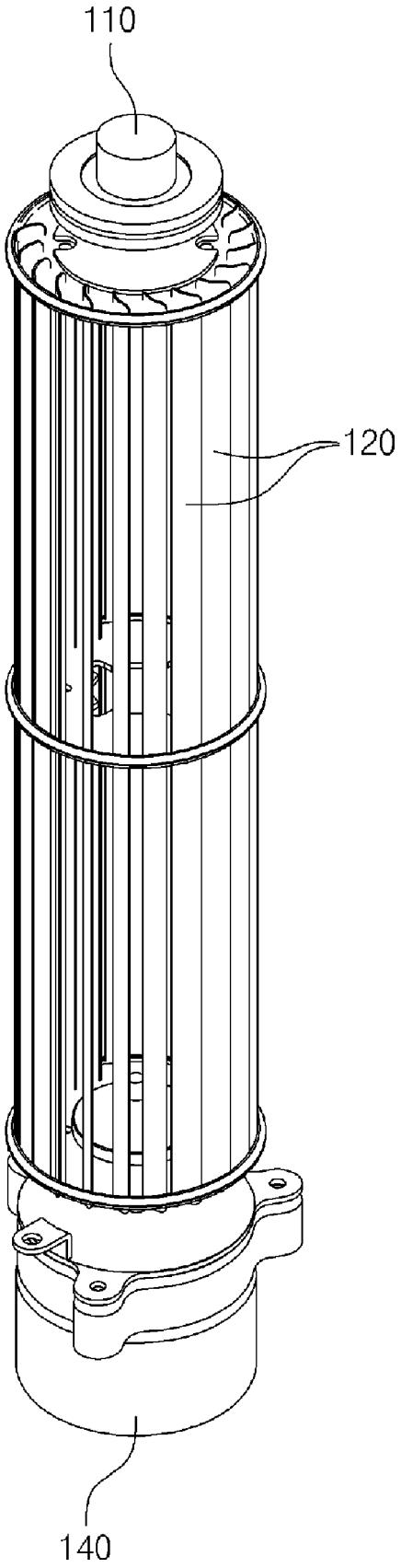
[Fig. 2]



[Fig. 3]



[Fig. 4]



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2015/005203

A. CLASSIFICATION OF SUBJECT MATTER

F24F 7/00(2006.01)i, F24F 7/06(2006.01)i, F24F 7/08(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)

F24F 7/00; F24F 7/10; H05K 7/20; F24F 7/007; F04D 27/00; F24F 7/013; F24D 15/00; D06F 58/10; F24F 7/06; F24F 7/08

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean Utility models and applications for Utility models: IPC as above
Japanese Utility models and applications for Utility models: IPC as above

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

eKOMPASS (KIPO internal) & Keywords: curved part, each part, refraction, curved, blade, blade, blower, blower, fan, blade, propeller, impeller

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	JP 2000-205625 A (SEKISUI CHEM. CO., LTD.) 28 July 2000 See paragraphs [0017]-[0031] and figures 1-5.	1-4 6-10
A	JP 2012-169514 A (CANON INC.) 06 September 2012 See paragraphs [0017]-[0062] and figures 1-13.	1-10
A	JP 2006-161665 A (MITSUBISHI ELECTRIC CORP.) 22 June 2006 See figure 1.	1-10
A	JP 10-309400A (KUSATSU DENKI KK.) 24 November 1998 See paragraphs [0008]-[0013] and figures 1-4.	1-10

☐ 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
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Date of the actual completion of the international search	Date of mailing of the international search report
31 JULY 2015 (31.07.2015)	**31 JULY 2015 (31.07.2015)**
Name and mailing address of the ISA/**KR** Korean Intellectual Property Office Government Complex-Daejeon, 189 Seonsa-ro, Daejeon 302-701, Republic of Korea Facsimile No. 82-42-472-7140	Authorized officer Telephone No.

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/KR2015/005203

Patent document cited in search report	Publication date	Patent family member	Publication date
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