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(54) **TOP COVER OF AIR TREATMENT SYSTEM**

(57) A top cover (1) of an air handling system, wherein an air outlet (2) is provided on a top surface of the top cover (1), at least one air inlet (3) is provided on a bottom surface of the top cover (1), a grille (4) is provided at the air outlet (2), and a fan (5) is provided on the lower side of the air outlet (2) in the top cover (1); and wherein the top cover further comprises a guide device (6) for changing the direction of air flow from the air outlet (2), the guide device (6) is provided on the upper side of the grille (4), the area of the bottom surface of the guide device (6) in contact with the grille (4) is less than the area of the air outlet (2), and the area of the top surface of the guide device (6) is greater than the area of the bottom surface thereof.

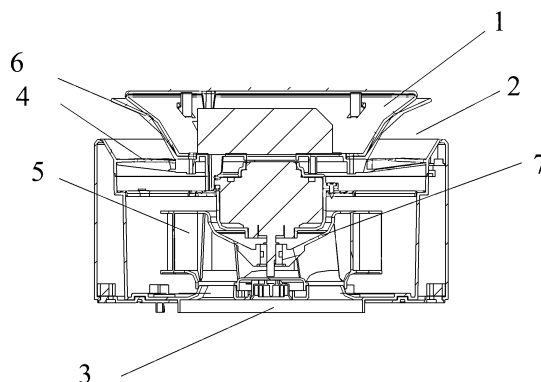


Fig. 2

Description

Technical Field

[0001] The present invention belongs to the field of cleaning equipment and, in particular, to a top cover of an air handling system.

Background of the Invention

[0002] At present, living standards are improved, air conditioners have become essential household appliances. In the summer, the air conditioners can reduce the indoor ambient temperature, and provide people with a comfortable environment, but most people experienced that the cold wind from the air outlet of the air conditioner directly blows to the body. This not only makes people feel cold, but also easily makes people suffer from influenza, bad trachea, partial cervical numbness and other air conditioning syndromes. Therefore, there is a need for a device capable of adjusting the direction of air flow to change the wind direction of the air outlet.

Summary of the Invention

[0003] Therefore, the present invention provides a top cover of an air handling system, which is capable of changing the air outletting direction of the air outlet and increasing the air outletting angle.

[0004] Disclosed is a top cover of an air handling system, wherein an air outlet is provided on a top surface of the top cover, an air inlet is provided on a bottom surface of the top cover, a grille is provided at the air outlet, and a fan is provided on the lower side of the air outlet in the top cover; and wherein the top cover further comprises a guide device for changing the direction of air flow from the air outlet, the guide device is provided on the upper side of the grille, the area of the bottom surface of the guide device in contact with the grille is less than the area of the air outlet, and the area of the top surface of the guide device is greater than the area of the bottom surface thereof.

[0005] A grille is provided at each of the air outlet and the air inlet.

[0006] The grille provided at the air outlet is a guide vane.

[0007] The fan is internally formed with a reverse tapered flow guide body, which forms a radially annular flow-guide air outlet with an inner wall of the top cover.

[0008] Preferably, the guide device is of an inverted isosceles trapezoidal radial cross-section.

[0009] Preferably, the radial cross-section of the guide device is a tapered cylinder.

[0010] Preferably, an outer wall of the guide device is in the shape of a concave arc.

[0011] Preferably, the guide device is concentric with the centre of the top cover.

[0012] Preferably, the area of the the top surface of the

guide device is less than or equal to the area of the cross-section of the machine body.

[0013] Preferably, the radius of circular arc of a side surface of the guide device is 60 mm to 100 mm.

[0014] Preferably, the radius of circular arc of the side surface of the guide device is 80 mm.

[0015] Preferably, the guide device is provided with an extension device which is capable of extending along the side surface of the guide device, the extension device being capable of adjusting the extension length until it is sealed with the machine body.

[0016] The top cover of an air handling system provided in the invention is provided with an additional guide device at the air outlet so as to change the air outletting direction of the air outlet, to increase the air outletting angle, and to improve the comfort of air supply, and is simple in operation and convenient to use.

Brief Description of the Drawings

[0017] The accompany drawings constituting part of the present invention are used to provide a further understanding of the present invention; and exemplary embodiments and illustrations thereof of the present invention are used to explain the present invention, and do not unduly limit the present invention. In the drawings:

Fig. 1 is a structural schematic view of a top cover of an air handling system provided in the present invention;

Fig. 2 is a sectional view of the top cover of an air handling system provided in the present invention; and

Fig. 3 is a structural schematic view of an additional extension plate of the top cover of an air handling system provided in the present invention.

Detailed Description of the Invention

[0018] The following description and the accompany drawings fully illustrate specific embodiments of the present invention so as to enable those skilled in the art to practice the same. Other embodiments may include structural, logical, electrical, procedural, and other changes. The embodiments represent only possible variations. Individual components and functions are optional, and the order of operations may vary, unless explicitly required. Portions and features of some embodiments may be included in or replace portions and features of other embodiments. The scope of the embodiments of the present invention encompasses the full scope of the claims, and all available equivalents of the claims. In this context, these embodiments of the present invention may be individually or collectively referred to by the term "invention" for convenience only, and if in fact more than one invention is disclosed, it is not intended to automatically limit that the application is within the scope of any single inventive or inventive concept.

[0019] In a top cover of an air handling system as shown in Figs. 1-3, an air outlet 2 is provided on a top surface of the top cover 1, an air inlet 3 is provided on a bottom surface of the top cover 1, a grille 4 is provided at the air outlet 2, and a fan 5 is provided on the lower side of the air outlet 2 in the top cover 1; and wherein the top cover further comprises a guide device 6 for changing the direction of air flow from the air outlet 2, the guide device 6 is provided on the upper side of the grille 4, the area of the bottom surface of the guide device 6 in contact with the grille 4 is less than the area of the air outlet 2, and the area of the top surface of the guide device 6 is greater than the area of the bottom surface thereof.

[0020] A grille is provided at each of the air outlet 2 and the air inlet 3.

[0021] The grille 4 provided at the air outlet 2 is a guide vane.

[0022] The fan 5 is internally formed with a reverse tapered flow guide body 7, which reverse tapered flow guide body 7 forms a radially annular flow-guide air outlet with an inner wall of the top cover 1.

[0023] Preferably, the guide device 6 is of an inverted isosceles trapezoidal radial cross-section.

[0024] Preferably, the radial cross-section of the guide device 6 is a tapered cylinder.

[0025] Preferably, an outer wall of the guide device 6 is in the shape of a concave arc.

[0026] Preferably, the guide device 6 is concentric with the centre of the top cover 1.

[0027] When in use, the top cover 1 of the air handling system is adjusted and opened according to the demand, so that an airflow is generated at the air outlet 2, which passes through the guide device 6 and the direction of which is changed by the guide device 6, making the outletting air soft and comfortable.

[0028] Preferably, the area of the the top surface of the guide device 6 is less than or equal to the area of the cross-section of the top cover 1.

[0029] Preferably, the radius of circular arc of a side surface of the guide device 6 is 60 mm to 100 mm.

[0030] Preferably, the radius of circular arc of the side surface of the guide device 6 is 80 mm.

[0031] Preferably, an outer wall of the top cover 1 is provided with an upwardly extending extension plate 8, which extension plate 8 is capable of matching with the guide device 6 in a sealing manner, the extension plate 8 being extendable beyond an outer wall of the top cover 1 by any length.

[0032] Preferably, when the air handling system is closed, the extension plate 8 is adjusted such that the extension plate is sealed with the guide device 6, so as to prevent dust from entering the machine body 1 through the grill 4; and during use of the air handling system, the extension plate 8 is adjusted such that the extension plate 8 is away from the guide device 6.

[0033] In some illustrative embodiments, the air handling system further comprises a top cover 1, which is disposed on the one or more air handling devices. The

top cover comprises an air inlet 3, an air outlet 2, and a power-supply input structure for receiving the power supplied from the adjacent air handling device. The power-supply input structure is provided on the bottom surface of top cover 1. The power-supply input structure is specified as a top cover 1 power source mating interface. The air handling system may further comprise a top cover 1 communication mating interface provided on the bottom surface of the top cover 1 for communication connection. Of course, the top cover 1 power source mating interface and the top cover 1 communication mating interface may be integrated into one interface. The top cover 1 power source mating interface and the top cover 1 communication mating interface employ the structure of the first terminal block or the second terminal block of the connector as described above. The top cover 1 is further provided with a top cover 1 magnet and a guide post on the bottom surface thereof. The top cover 1 magnet is the aforementioned magnetic component, and the guide post is of the aforementioned guide post structure.

[0034] In some illustrative embodiments, a side wall of the top cover 1 comprises an inner wall and an outer wall, and a spacing is provided between the inner wall and the outer wall. The top cover 1 is further provided with a detection unit. The detection unit comprises a detection air inlet 3, a detection air outlet 2, a detection fan and sensors. The detection air inlet 3 and the detection air outlet 2 are respectively provided on the surface of the outer wall of the top cover 1. The detection fan and the sensors are provided in the spacing between the detection air inlet 3 and the detection air outlet 2. In this embodiment, the sensors comprise a VOC (volatile organic compounds) sensor, a PM detection device, temperature and humidity sensors, and the like. It should be understood that the present invention is not limited to this, and the sensors may be other types of sensors for detecting air indicators. In some illustrative embodiments, the quality of the air can be detected by using the detection unit.

[0035] In some illustrative embodiments, a motor is further provided in the top cover 1. The motor is used to power the air handling system.

[0036] In some illustrative embodiments, a protrusion is provided on the top surface of the top cover 1, and a display screen is provided on the surface of the protrusion. The display screen serves as a human-computer interaction interface for displaying the current operating state, the operation being performed by the user, and the like. The outer periphery of the display screen is provided with a circular indicator lamp strip, which may serve as an indication of machine operation, stop, or malfunction. The indicator lamp strip can also be used to indicate air quality, for example, different colours of the indicator lamp strip represent different air quality levels.

[0037] In addition to the basic controls, the top cover can also be equipped with an infrared transceiver for controlling other household appliances in some illustrative embodiments.

[0038] While the foregoing is only preferred embodi-

ments of the present invention, it should be noted that modifications and adaptations may be made by those skilled in the art without departing from the principles of the present invention, and should be considered to be within the scope of protection of the present invention.

Claims

1. A top cover of an air handling system, the top of the top cover having a top surface and an air outlet surrounding the top surface, a bottom surface of the top cover being provided with an air inlet, and a fan being provided between the top surface and the bottom surface, **characterized by** further comprising a guide device for changing the direction of air flow from the air outlet, the guide device being provided on the top surface, and a top surface of the guide device extending outwardly to shield all or part of the air outlet. 10 15 20
2. The top cover according to claim 1, **characterized in that** a grille is provided at each of the air outlet and the air inlet. 25
3. The top cover according to claim 1, **characterized in that** the grille provided at the air outlet is a guide vane. 30
4. The top cover according to claim 1, **characterized in that** the fan is internally formed with a reverse tapered flow guide body, which forms a radially annular flow-guide air outlet with an inner wall of the top cover. 35
5. The top cover according to claim 1, **characterized in that** the guide device is of an inverted isosceles trapezoidal radial cross-section. 40
6. The top cover according to claim 5, **characterized in that** an outer wall of the guide device is axially in the shape of a concave arc. 45
7. The top cover according to claim 6, **characterized in that** the guide device is concentric with the centre of the top cover. 50
8. The top cover according to claim 6 or 7, **characterized in that** the area of the top surface of the guide device is less than or equal to the area of the cross-section of the top cover. 55
9. The top cover according to claim 6, **characterized in that** the radius of circular arc of a side surface of the guide device is 60 mm to 100 mm. 55
10. The top cover according to claim 9, **characterized in that** the radius of circular arc of the side surface

of the guide device is 80 mm.

11. The top cover according to claim 1, **characterized in that** an outer wall of the top cover is provided with an upwardly extending extension plate which is capable of matching with the guide device in a sealing manner, the extension plate being extendable beyond an outer wall of the machine body by any length.

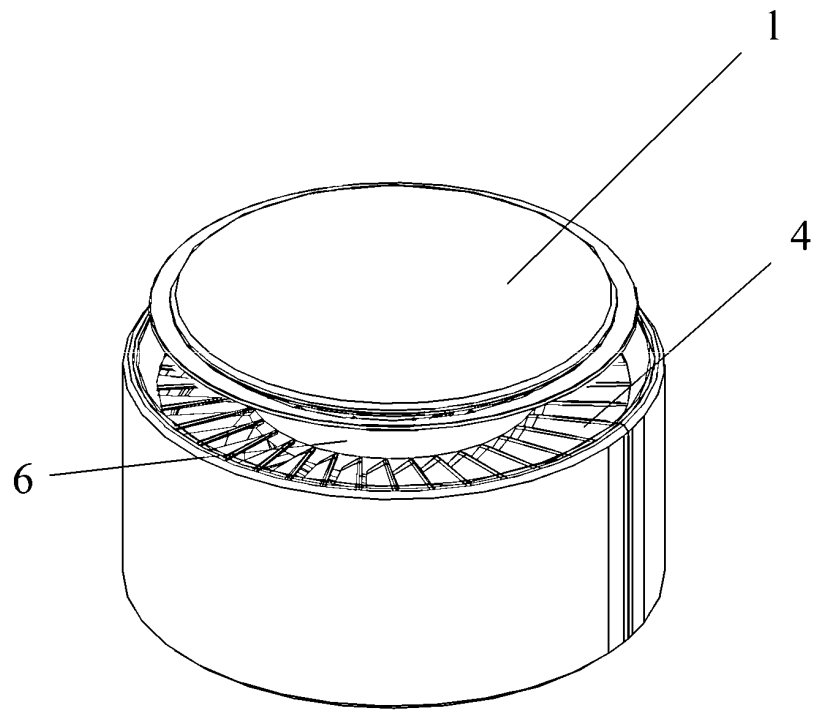


Fig. 1

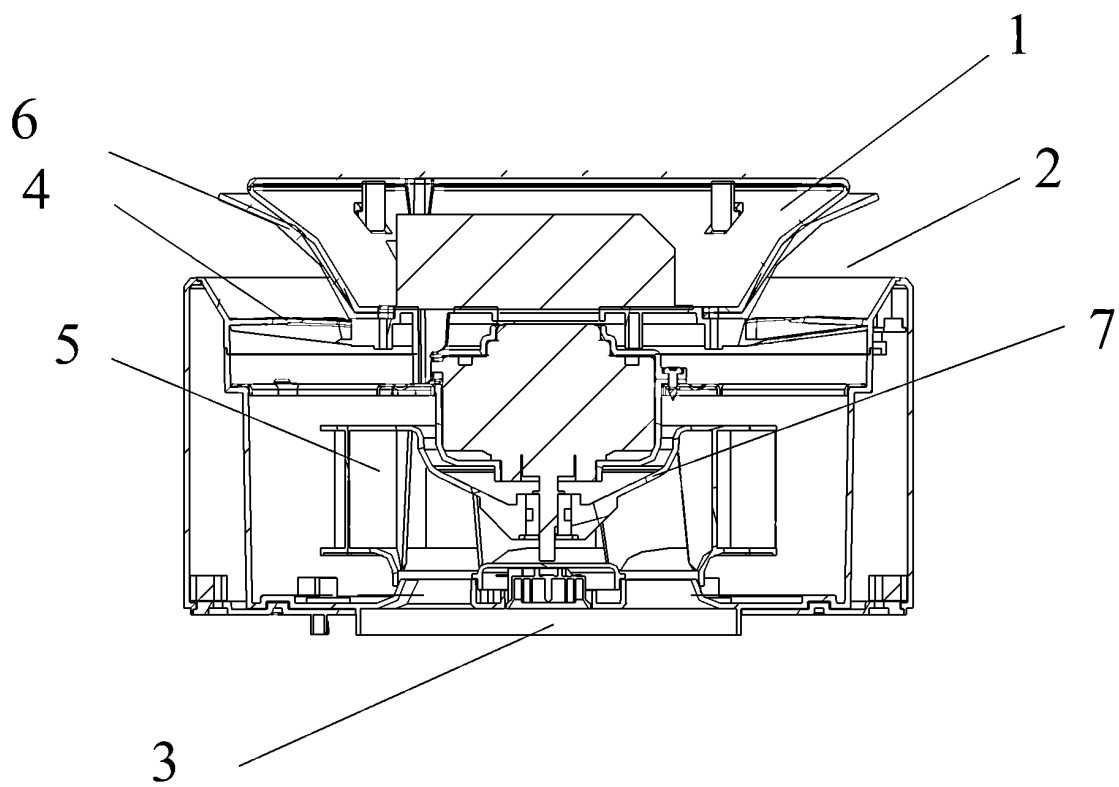


Fig. 2

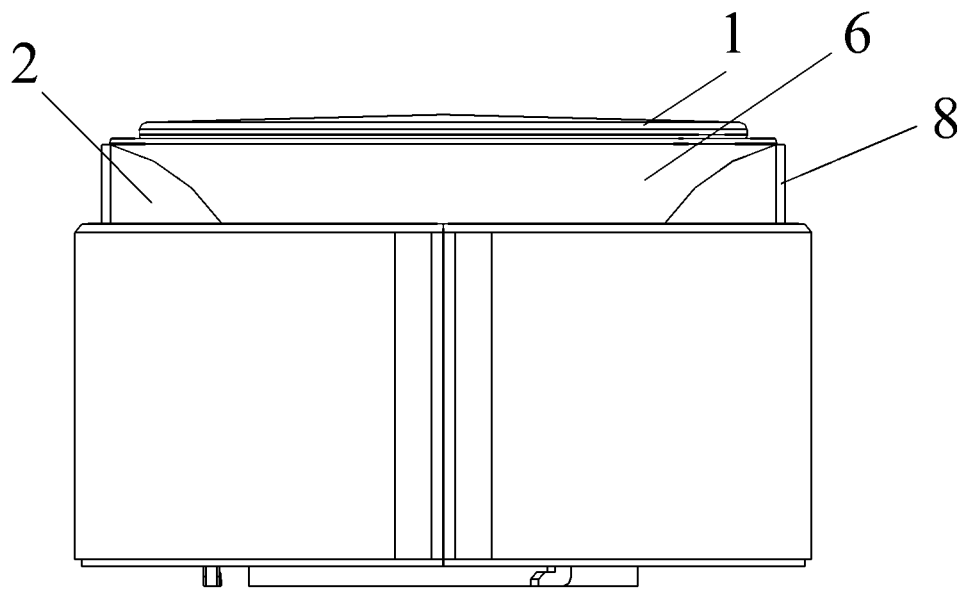


Fig. 3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2014/093248

A. CLASSIFICATION OF SUBJECT MATTER

F24F 13/20 (2006.01) i; F24F 13/08 (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, F04D

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: top cover, top surface, roof, air supply outlet, wind guide, air conditioner, top, cover, circle, surround, outlet, guid+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 202746228 U (TOOUT DESIGN CO., LTD.), 20 February 2013 (20.02.2013), description, paragraphs [0019]-[0026], and figures 1 and 2	1-11
A	WO 2013176214 A1 (SHARP KK), 28 November 2013 (28.11.2013), the whole document	1-11
A	CN 202419866 U (GREE ELECTRIC APPLIANCES, INC. OF ZHUHAI), 05 September 2012 (05.09.2012), the whole document	1-11
A	CN 103939984 A (MIDEA GROUP WUHAN REFRIGERATION EQUIPMENT CO., LTD.), 23 July 2014 (23.07.2014), the whole document	1-11
A	CN 203823885 U (HAIER ELECTRONICS GROUP CO., LTD. et al.), 10 September 2014 (10.09.2014), the whole document	1-11
A	JP H11201541 A (NGK SPARK PLUG CO.), 30 July 1999 (30.07.1999), the whole document	1-11
A	JP 2001153388 A (MATSUSHITA REFRIGERATION), 08 June 2001 (08.06.2001), the whole document	1-11

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

* Special categories of cited documents:	"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
"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	"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
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"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	"&" document member of the same patent family

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03 June 2015 (03.06.2015)

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2014/093248

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
E	CN 104329786 A (QINGDAO HAIER AIR CONDITIONER CO., LTD.), 04 February 2015 (04.02.2015), the whole document	1-11
E	CN 204301267 U (QINGDAO HAIER AIR CONDITIONER CO., LTD.), 29 April 2015 (29.04.2015), the whole document	1-11

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2014/093248

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN 202746228 U	20 February 2013	None	
WO 2013176214 A1	28 November 2013	US 2015108364 A1	23 April 2015
		CN 203655663 U	18 June 2014
		JP 2013245580 A	09 December 2013
		JP 2013245853 A	09 December 2013
		JP 2013245854 A	09 December 2013
CN 202419866 U	05 September 2012	None	
CN 103939984 A	23 July 2014	None	
CN 203823885 U	10 September 2014	None	
JP H11201541 A	30 July 1999	None	
JP 2001153388 A	08 June 2001	None	
CN 104329786 A	04 February 2015	None	
CN 204301267 U	29 April 2015	None	

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