



WALL MOUNTED TYPE AIR CONDITIONER

HAVING ION GENERATING DEVICE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a wall mounted type air conditioner having an air blow-out direction changing plate in an air blow-out port of the main body of the air conditioner, and particularly to a wall mounted type air conditioner having an ion generating device in the air blow-out port.

2. Description of the Related Art

There is known a wall mounted type air conditioner having an air blow-out direction changing plate at an air blow-out port surrounded by a scroll portion and a tongue portion of the main body of the air conditioner. Such a wall mounted type air conditioner is designed so that the direction of air stream blown out from an air blow-out port can be controlled by changing the aspect of an air blow-out direction changing plate.

It may be considered for such a type of air conditioner that an ion generating device is equipped in an air blow-out port to contaminate minus ions into air stream from the air blow-out port, and the air contaminated with the minus ions is supplied to the room under air-conditioning. In this case, it is a problem which place the ion generating device is disposed at because the air blow-out direction changing plate is disposed in the air blow-out port. Further, even when the ion generating device is actually equipped in the air blow-out port, it is difficult for users to specify the flow direction and amount (level) of ions blown out from the air blow-out port.



SUMMARY OF THE INVENTION

Therefore, the present invention has been implemented in view of the above situation, and has an object to provide a wall mounted type air conditioner which can surely supply minus ions to a room under air conditioning while contaminating the minus ions into air stream from an air blow-out port without disturbing the location and operation of an air blow-out direction changing plate even when the air blow-out direction changing plate is controlled to any direction, and also enable users to easily specify the flow direction and amount (level) of ions blown out from the air blow-out port to the room.

In order to attain the above object, according to the present invention, there is provided a wall mounted type air conditioner having an air blow-out port surrounded by a scroll portion and a tongue portion of the main body of the air conditioner, heat-exchanged air being supplied through the air blow-out port into a room, characterized by comprising: an air blow-out direction changing plate located in the air blow-out port; and an ion generating device for emitting ions, wherein the ion generating device is disposed at a narrowed upstream side of the air blow-out port so as to project into the air blow-out port.

In the above wall mounted type air conditioner, the air blow-out port has a tapered shape in cross-sectional view, and the narrowed upstream side of the air blow-out port corresponds to the tip portion of the tapered shape.

In the above wall mounted type air conditioner, the ion generating device is further disposed on a wall surface constituting one end portion in the longitudinal direction of the air blow-out port so as to project into the air

blow-out port.

In the above wall mounted type air conditioner, the ion generating device comprises an ion generator having an ion generating needle connected to a lead wire, a holder for holding the ion generator and a fixing member for fixing the ion generating device at the narrowed upstream side of the air blow-out port, the ion generating needle emitting the ions by applying a predetermined voltage to the ion generating needle through the lead wire.

The above wall mounted type air conditioner further comprises a display device for displaying the flow direction and flow amount of the ions that are blown out from the air blow-out port while contaminated in air stream.

In the above wall mounted type air conditioner, the display device comprises plural LED arrays.

In the above wall mounted type air conditioner, the display device is disposed on the front face of the main body of the air conditioner.

In the above wall mounted type air conditioner, the air blow-out direction changing plate comprises a lower horizontal plate extending in the longitudinal direction of the lower side of the air blow-out port, an upper horizontal plate extending in the longitudinal direction of the upper side of the air blow-out port, and plural vertical plates extending in the short-side direction of the air blow-out port.

According to the present invention, there is provided a wall mounted type air conditioner having an air blow-out port surrounded by a scroll portion and a tongue portion of the main body of the air conditioner, heat-exchanged air being supplied through the air blow-out port into a room, characterized by

comprising: an air blow-out direction changing plate located in the air blow-out port; and an ion generating device for emitting ions, wherein the ion generating device is disposed on a wall surface constituting one end portion in the longitudinal direction of the air blow-out port so as to project into the air blow-out port.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a cross-sectional view showing an embodiment of a wall mounted type air conditioner according to the present invention;

Fig. 2 is a perspective view showing a state that an ion generating device is secured;

Fig. 3 is an exploded perspective view showing the ion generating device;

Fig. 4 is a diagram showing a fabricated state of the ion generating device; and

Fig. 5 is a diagram showing a display device.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

A preferred embodiment according to the present invention will be described hereunder with reference to the accompanying drawings.

Fig. 1 is a cross-sectional view showing a wall mounted type air conditioner according to an embodiment of the present invention.

Reference numeral 1 represents the main body of the air conditioner, and the main body 1 is fixed onto the wall 3. An indoor heat exchanger 5 and a cross-flow fan 7 are disposed in the main body 1. An upper air suction port 9 is formed in the form of a grille at the upper portion 1A of the main body 1, and an air suction grille 11 is secured to the front edge portion 1B of the upper

portion 1A so that the lower end 11B of the air suction grille 11 is freely released from the front face of the main body 1 under the state that the upper end 11A of the air suction grille 11 is linked to the main body 1 through a hinge so as to be rotatable around a fulcrum (not shown).

An air suction filter 13 having a filter element (not shown) is secured inside the air suction grille 11 so as to be movable upwardly and downwardly.

An air blow-out port 21 surrounded by a scroll portion 17 and a tongue portion 19 is formed at the lower portion of the main body 1 of the air conditioner, and an air blow-out direction changing plate 23 is disposed in the air blow-out port 21. The air blow-out direction changing plate 23 comprises a small-width lower horizontal plate 23A extending in the longitudinal direction of the lower side of the air blow-out port 21, an upper horizontal plate 23B extending in the longitudinal direction of the upper side of the air blow-out port 21, and plural vertical plates 23C extending in the short-side direction of the air blow-out port 21. The upper and lower horizontal plates 23B and 23A serve to control the upward and downward directions of air stream blown out from the air blow-out port 21, and the vertical plates 23C serve to control the rightward and leftward directions of the air stream.

According to this embodiment, an ion generating device 25 for generating ions (i.e., minus ions) is disposed at a narrowed upstream side of the air blow-out port 21 surrounded by the scroll portion 17 and the tongue portion 19 so as to project into the air blow-out port 21 as shown in Fig. 2 and particularly it is located on a wall surface 21A constituting one end portion in the longitudinal direction of the air blow-out port 21 as shown in Fig. 2.

In this embodiment, the air blow-out port 21 is designed so as to be

substantially elongated in a direction (for example, a rectangular shape) in front view as shown in Fig. 2 and substantially tapered toward the inside of the main body 1 (toward the cross-flow fan) in cross-sectional view as shown in Fig. 1. That is, the width of the air blow-out port 21 is gradually reduced as it approaches to the cross-flow fan 7. Accordingly, in the following description, the narrowed upstream side of the air blow-out port 21 corresponds to the tip portion of the tapered air blow-out port 21 in cross-sectional view (Fig. 1), and one end portion in the longitudinal direction of the air blow-out port 21 means at least one of both the ends of the elongated (rectangular) air blow-out port 21 in the longitudinal direction thereof (Fig. 2).

Fig. 3 is an exploded perspective view showing the ion generating device 25 and Fig. 4 is a diagram showing a fabricated state of the ion generating device 25.

As shown in Fig. 3, the ion generating device 25 comprises the main body 26 of the ion generating device (hereinafter merely referred to as "ion generating main body"), a holder 27 having a tip portion 27A inserted in an upper opening 26A of the ion generating main body 26, an ion generator 28 having an upward-faced ion generating needle 28A which is fixed to the lower surface of the holder 27, and a fixing plate 29 for fixing the ion generator 28. When the ion generating device 25 is fabricated, the holder 27, the ion generator 28 and the fixing plate 29 are unified into one body, the tip portion 27A of the holder 27 is inserted into the upper opening 26A and then the unified body is fixed to the ion generating main body 26 by a cover 30.

As shown in Fig. 2, the ion generating device 25 is fixed by fixing the ion generating main body 26 to the wall surface 21A constituting the end

portion in the longitudinal direction of the air blow-out port 21 so that the tip portion 27A of the holder 27 projects into the air blow-out port 21. The ion generating device 25 has a lead wire 31, and by applying a predetermined voltage to the ion generating needle 28A through the lead wire 31, minus ions are omitted from the tip portion of the ion generating needle 28A as shown in Figs. 3 and 4.

According to this embodiment, the ion generating device 25 is fixedly located at a specific secret position in the air blow-out port 21 as described above. That is, the ion generating device 25 is disposed at an upstream position of a narrower space of the air blow-out port 21 surrounded by the scroll portion 17 and the tongue portion 19 on the wall surface 21A constituting one end portion in the longitudinal direction of the air blow-out port 21 as shown in Fig. 2. Here, the secret position in the air blow-out port 21 may be any narrowed upstream place in the air blow-out port 21 surrounded by the scroll portion 17 and the tongue portion 19, and it is not limited to the wall surface 21A constituting one end portion in the longitudinal direction of the air blow-out port 21.

In this embodiment, the ion generating device 25 does not disturb the control of the orientation of the air blow-out direction changing plate 23, and even when the air blow-out direction changing plates 23A to 23C are controlled to face in any directions, the minus ions emitted from the tip of the ion generating needle 28A can be surely contaminated into air stream from the air blow-out port 21. Therefore, the minus ions thus emitted can be uniformly supplied to the room under air-conditioning even when the air blow-out direction changing plates 23A to 23C are oriented to any directions.

Fig. 5 shows a display device for displaying the flow direction and flow amount of ions contained in air stream from the air blow-out port 21.

The display device 31 is secured at the substantially center portion in the longitudinal direction of the front face of the main body 1 of the air conditioner (air suction grille 11) (see Fig. 1). The display device 31 comprises a display portion (blow direction monitor) comprising plural LED arrays 31A to 31C for displaying the direction of the air stream blown out from the air blow-out port 21, and a display portion (ion monitor) 31D comprising an LED or the like for displaying occurrence of ions. The display portion 31D also serves as a filter sign. If dirt of filters is detected, the display portion 31D displays the face of the dirty, and then it does not display occurrence of ions unless the dirt of the filters is removed.

The plural LED arrays 31A to 31C indicate the direction of the air stream from the air blow-out port 21, and the ions flow while riding on air stream. Accordingly, each of the LED arrays 31A to 31C indicates the flow direction of the ions.

For example when the LED array 31A on the left-side column is turned on, the air stream containing ions is blow out leftwardly from the air blow-out port 21. When the LED array 31B on the center column is turned on, the air stream containing ions is blow out from the air blow-out port 21 to the center side. When the LED array 31C on the right-side column is turned on, the air stream containing ions is blow out rightwardly from the air blow-out port 21.

Accordingly, by merely viewing the turn-on state of the LED arrays 31A to 31C, a user can specify the flow direction of ions.

When the flow velocity of the air stream from the air blow-out port 21 is varied, the display mode of each of the LED arrays 31A to 31C is varied. If the generation amount of ions from the ion generating device 25 is substantially constant, the blow-out amount of ions is increased if the velocity of the air stream is increased.

For example, when a mode in which the LEDs constituting each of the LED arrays 31A to 31C are sequentially turned on/out with time lag in the direction from the uppermost LED to the lowermost LED is used as a display mode to indicate the flow direction of the air stream, the time lag is set to a smaller value as the velocity of the air stream increases.

According to the above embodiment, by merely viewing the display mode of each of the LED arrays 31A to 31C, the user can easily specify the amount (level) of flowing ions.

The present invention is not limited to the above embodiment, and various modifications may be made without departing from the subject matter of the present invention. For example, in the above embodiment, the air blow-out port 21 is designed so as to be substantially elongated in a direction (for example, a rectangular shape or the like) in front view as shown in Fig. 2 and substantially tapered toward the inside of the main body (i.e., toward the cross-flow fan 7) in cross-sectional view as shown in Fig. 1.

However, the air blow-out port of the present invention is not limited to the above structure, and any shape may be adopted for the air blow-out port insofar as the ion generating device can be disposed at such a position that the location and movement of the air blow-out direction changing plate are not disturbed. That is, the narrowed upstream side of the air blow-out port 21 is

not limited to the innermost portion of the air blow-out port 21. For example when the air blow-out port 21 is designed to be necked at some portion between the innermost portion and the outlet thereof, the narrowed upstream side corresponds to the portion concerned.

As described above, according to the present invention, the ion generating device never disturbs the air blow-out direction changing plate, and also even when the air blow-out direction changing plate is controlled to be oriented in any direction, the minus ions can be surely supplied to the room under air-conditioning while riding on the air stream from the air blow-out port.

Further, according to the present invention, the user can easily specify the flow direction and amount (level) of ions blown out from the air blow-out port while riding on the air stream.

WHAT IS CLAIMED IS

1. A wall mounted type air conditioner having an air blow-out port surrounded by a scroll portion and a tongue portion of the main body of the air conditioner, heat-exchanged air being supplied through said air blow-out port into a room, characterized by comprising:

an air blow-out direction changing plate located in said air blow-out port; and

an ion generating device for emitting ions, wherein said ion generating device is disposed at a narrowed (necked) upstream side of said air blow-out port so as to project into said air blow-out port.

2. The wall mounted type air conditioner as claimed in claim 1, wherein said air blow-out port has a tapered shape in cross-sectional view, and said narrowed upstream side of said air blow-out port corresponds to the tip portion of the tapered shape.

3. The wall mounted type air conditioner as claimed in claim 1, wherein said ion generating device is further disposed on a wall surface constituting one end portion in the longitudinal direction of said air blow-out port so as to project into said air blow-out port.

4. The wall mounted type air conditioner as claimed in claim 1, wherein said ion generating device comprises an ion generator having an ion generating needle connected to a lead wire, a holder for holding said ion generator and a fixing member for fixing said ion generating device at the narrowed upstream side of said air blow-out port, said ion generating needle emitting the ions by applying a predetermined voltage to said ion generating needle through said lead wire.

5. The wall mounted type air conditioner as claimed in claim 1, further comprising a display device for displaying the flow direction and flow amount of the ions that are blown out from said air blow-out port while contaminated in air stream.

6. The wall mounted type air conditioner as claimed in claim 5, wherein said display device comprises plural LED arrays.

7. The wall mounted type air conditioner as claimed in claim 5, wherein said display device is disposed on the front face of the main body of said air conditioner.

8. The wall mounted type air conditioner as claimed in claim 1, wherein said air blow-out direction changing plate comprises a lower horizontal plate extending in the longitudinal direction of the lower side of said air blow-out port, an upper horizontal plate extending in the longitudinal direction of the upper side of said air blow-out port, and plural vertical plates extending in the short-side direction of the air blow-out port.

9. A wall mounted type air conditioner having an air blow-out port surrounded by a scroll portion and a tongue portion of the main body of the air conditioner, heat-exchanged air being supplied through said air blow-out port into a room, characterized by comprising:

an air blow-out direction changing plate located in said air blow-out port; and

an ion generating device for emitting ions, wherein said ion generating device is disposed on a wall surface constituting one end portion in the longitudinal direction of said air blow-out port so as to project into said air blow-out port.