

AIR SUPPLY DEVICE

TECHNICAL FIELD

[1] The present disclosure relates to the field of air supply apparatus technologies, and in particular, to an air supply device.

BACKGROUND

[2] FIG. 1 is a perspective view of an air supply device in the prior art. As shown in FIG. 1, CN104204543 discloses an air supply device with a base and a housing, and the housing 1' is provided with: a suction port 2', a high pressure air generating portion, a blowout port 3', an induction air suction port 4', an induction air mixing portion 5', and an induction air blowout port 6'. In the induction air mixing portion 5', air sucked through a plurality of induction air suction ports is mixed, and induction air is blown out of the induction air mixing portion 5' through the induction air blowout port 6'. The induction air mixing portion 5' is also provided with a discharge electrode unit 7' (i.e., an ion generator) as an electric discharge portion. As a result, various kinds of ions and ozone which are generated due to an electric discharge and are effective in deodorization and sterilization may be carried on the induction air and are conveyed a long distance, hence a large space may be deodorized and sterilized efficiently. Additionally, the housing 1' has a spherical shape, hence the air supply device may be used at any angle provided that the blowout port 3' is not closed. That is, an air supply object may efficiently contact an air flow wherever the air supply object is placed. However, when an angle of the housing 1' is adjusted, so that the blowout port 3' is placed at an obliquely upward angle or a directly upward angle, a user may accidentally splash a liquid such as a beverage onto the discharge electrode unit 7' through the induction air mixing portion 5'. The liquid entering the discharge electrode unit 7' may damage the function of the discharge electrode unit 7', thus the ions and ozone may not be stably supplied.

SUMMARY

[3] In order to solve the above problems, the present disclosure provides an air

supply device that provides a cooling sensation or promotes an air circulation within a space by supplying air, thereby suppressing a risk that a liquid contacts a discharge electrode unit.

[4] The air supply device provided by the present disclosure includes: a housing includes: a suction port configured to draw air outside the housing; a high pressure air generating portion including an impeller configured to turn the air into high pressure air and a motor configured to drive the impeller; a blowout port configured to be a ring opening for blowing out the high pressure air; and a first air passage configured to guide the high pressure air from the impeller to the blowout port. The housing further includes: a discharge electrode unit configured to generating ions; and a discharge electrode unit box body arranged inside the first air passage, the discharge electrode unit box body includes an external ion discharge port configured to allow the ions to flow out toward an outside of the discharge electrode unit box body, a first space enclosing the discharge electrode unit, and a second space configured to allow the ions to flow toward a direction of the external ion discharge port, and the first space is in communication with the second space.

[5] According to the air supply device, by arranging the discharge electrode unit box body inside the first air passage, the housing may block the liquid from contacting the discharge electrode unit box body to a certain extent. In addition, the discharge electrode unit is enclosed by the first space inside the first space, the first space is only in communication with the second space, thereby forming a substantially sealed space. Therefore, the risk that the liquid contacts the discharge electrode unit may be further suppressed to a certain extent with the discharge electrode unit box body itself as a barrier.

[6] Further, the external ion discharge port is arranged at an end portion of the second space close to the blowout port, and the external ion discharge port is staggered with the blowout port.

[7] Further, a plane where the external ion discharge port is located is perpendicular to a plane where the blowout port is located.

[8] Further, the housing is in a spherical shape; and the discharge electrode unit box body is configured to conform to the spherical shape of the housing and form an arc shape curving toward an inner peripheral side of the housing from an upstream side of the first air passage to a downstream side of the first air passage.

[9] Further, a first baffle is arranged at an end of the external ion discharge port

close to the blowout port, and the first baffle covers at least a part of the external ion discharge port.

[10] Further, a notch is arranged at a peripheral edge of the external ion discharge port opposite to the first baffle.

[11] Further, an internal ion discharge port is arranged at a junction of the first space and the second space.

[12] Further, a liquid discharge port is arranged at a downstream side of the internal ion discharge port, and a liquid inside the second space is discharged toward the outside of the discharge electrode unit box body through the liquid discharge port.

[13] Further, a second baffle is arranged at an end of the liquid discharge port close to the internal ion discharge port, and the second baffle extends away from a direction of the internal ion discharge port and tilts toward an inner side of the second space.

[14] Further, the first space includes a silencing portion, and a silencing cotton is arranged at an inner peripheral wall of the silencing portion.

[15] Further, the housing further comprises: a plurality of induction air suction ports, air is drawn by an induction of the high pressure air blown out from the blowout port; an induction air mixing portion configured to mix the air drawn into the plurality of induction air suction ports; an induction air blowout port configured to blow out induction air of the induction air mixing portion; and a second air passage connecting the induction air suction ports, the induction air mixing portion and the induction air blowout port.

[16] Further, the housing includes an outer wall and an inner wall, a penetration wall is formed from an induction air suction port of the induction air suction ports to the induction air mixing portion, and the penetration wall is a peripheral wall of a penetration hole; and the first air passage is formed by the outer wall, the inner wall and the penetration wall, the second air passage is formed by the inner wall and the penetration wall, and the second air passage and the first air passage intersect at the penetration hole.

BRIEF DESCRIPTION OF THE DRAWINGS

[17] FIG. 1 is a perspective view of an air supply device in the prior art.

[18] FIG. 2 is a schematic diagram of an air supply device according to the

embodiments of the present disclosure.

[19] FIG. 3 is a schematic diagram of a separated state of a housing and a base of an air supply device according to the embodiments of the present disclosure.

[20] FIG. 4 is a schematic diagram of an internal structure of a housing according to the embodiments of the present disclosure.

[21] FIG. 5 is a schematic structural diagram of a discharge electrode unit box body according to the embodiments of the present disclosure.

[22] FIG. 6 is a schematic cross-sectional view of an engagement between a discharge electrode unit box body and a housing according to the embodiments of the present disclosure.

[23] FIG. 7A is a schematic diagram of a first placement state of a housing according to the embodiments of the present disclosure.

[24] FIG. 7B is a schematic diagram of a second placement state of a housing according to the embodiments of the present disclosure.

[Reference signs]

Air supply device 100,

Housing 10, Suction port 101, Blowout port 102, First air passage 103, Induction air suction port 104, Induction air blowout port 105, Second air passage 106,

Outer wall 11, Inner wall 12, Penetration wall 13,

Discharge electrode unit 20,

Discharge electrode unit box body 30, External ion discharge port 301, First space 302, Second space 303, Notch 304, Internal ion discharge port 305, Liquid discharge port 306,

High pressure air generating portion 40,

First baffle 50,

Second baffle 60,

Silencing portion 70, Silencing cotton 71,

Induction air mixing portion 80,

Base 90, Chassis 91, Turntable 92.

DETAILED DESCRIPTION OF EMBODIMENTS

[25] In order to make the objectives, technical solutions, and advantages of the embodiments of the present disclosure clearer, the technical solutions of the embodiments of the present disclosure will be clearly and completely described below with reference to the accompanying drawings. Obviously, the described embodiments are only part of the embodiments of the present disclosure, rather than all the embodiments. Based on the embodiments of the present disclosure, all other embodiments obtained by those skilled in the art without any creative effort are within the scope of protection of the present disclosure.

[26] In the descriptions of the present disclosure, it should be noted that the terms “vertical”, “horizontal”, “left”, “right”, “upper”, “lower”, “front”, and “rear” as well as similar expressions are for illustrative purposes only and do not represent the sole implementation.

[27] The terms “upstream” and “downstream” are relative to an airflow formed inside a housing of an air supply device when a heat exchange device operates normally. “An upstream direction” refers to an opposite direction of an airflow direction, while “a downstream direction” refers to the airflow direction. “An upstream side” refers to a side located in the upstream direction, while “a downstream side” refers to a side located in the downstream direction.

[28] In addition, unless otherwise explicitly specified and limited, the terms “connected” and “coupled” should be interpreted broadly. For example, it may be a fixed connection, a detachable connection, or an integral connection; it may be a mechanical connection or an electrical connection; and it may be a direct connection or an indirect connection through an intermediate medium. Those skilled in the art may understand the specific meanings of the above terms in the present disclosure in the context of the specific circumstances.

[29] In order to make the objectives, technical solutions, and advantages of the

embodiments of the present disclosure clearer, the technical solutions of the embodiments of the present disclosure will be clearly and completely described below with reference to the accompanying drawings. Obviously, the described embodiments are only part of the embodiments of the present disclosure rather than all the embodiments. Based on the embodiments of the present disclosure, all other embodiments obtained by those skilled in the art without any creative effort are within the scope of protection of the present disclosure.

[30] Hereinafter, the embodiments of the present disclosure will be described with reference to the accompanying drawings.

[31] The air supply device in the embodiments of the present disclosure has functions of air purification and ion release. In addition, the air supply device may perform either of the air purification and ion release functions, or perform the air purification and ion release functions simultaneously.

[32] The air supply device 100 includes a base 90 and a housing 10 arranged on the base 90.

[33] The base 90 includes a chassis 91 and a turntable 92 rotatable relative to the chassis 91. The turntable 92 is arranged on the chassis 91. Each of the chassis 91 and the turntable 92 is a disc structure. A lower edge of the turntable 92 is engaged with an outer side of an upper edge of the chassis 91, which is stable and reliable. An arc-shaped groove is provided on the turntable 92, and the housing 10 is placed in the arc-shaped groove, so that the housing 10 may be placed stably on the base 90 and rotate as the turntable 92 rotates. The housing 10 is provided therein with a main control board for controlling a high pressure air generating portion 40, which will be described later, and a Type-C interface connected to the main control board. The base 90 is provided therein with a base circuit board for controlling a rotation of the chassis 91. By inserting a data cable led out from the base circuit board into the Type-C interface, the main control board and the base circuit board may be in a communication connection. For example, only upon receiving information that the high pressure air generating portion 40 is running from the main control board which will be described later, the base circuit board activates a rotation function of the base 90, so that the air supply device 100 may rotate and oscillate under a drive of the base 90 in an air supply state.

[34] The housing 10 includes: a suction port 101, a high pressure air generating portion 40, a blowout port 102, a first air passage 103, an induction air suction port 104, an

induction air mixing portion 80, an induction air blowout port 105, and a second air passage 106.

[35] Here, the housing 10 is in a spherical shape, and more specifically, the housing 10 in the present embodiment is in an approximately spherical shape. The expression “approximately spherical shape” refers to a shape that represents a spherical shape at a first glance. Such expression takes into account that an imaginary sphere that forms a contour of the housing 10 is not a perfect sphere due to recesses and protrusions generated on a surface of the housing 10 by the blowout port 102 and the like. That is, in a case that the imaginary sphere is not a perfect sphere, the housing 10 is expressed as representing an approximately spherical shape. However, it should be noted that the housing 10 is not particularly limited to the approximately spherical shape. In other embodiments, the housing 10 may also be in a polyhedral shape (e.g., a regular polyhedron or a truncated polyhedron), a cylinder, or a polygonal column.

[36] The housing 10 includes an outer shell and a filter screen cover, and the filter cover is mounted on the outer shell through a resilient snap fastener. The filter screen cover is provided thereon a plurality of elongated openings through which air passes, and the elongated openings form the suction port 101 used to draw air outside the housing 10. A downstream side of the filter screen cover is provided with a filter screen for filtering air. The filter screen may be one or more of a primary efficiency filter screen for filtering large particles or a high efficiency filter screen for filtering fine particles such as PM2.5.

[37] The high pressure air generating portion 40 includes an impeller used to turn the air into high pressure air and a motor used to drive the impeller.

[38] The blowout port 102 is a ring opening used to blow out the high pressure air. It should be noted that the ring shape is not limited to a circular ring, but may also be a ring shape formed by enclosing other shapes. For example, it may also be a polygonal ring or a ring shape constituted by curves.

[39] The first air passage 103 is an air passage that guides the high pressure air from the impeller toward the blowout port 102. The first air passage 103 is defined by an outer wall 11, an inner wall 12 and a penetration wall 13.

[40] A plurality of induction air suction ports 104 are spaced apart in a ring shape on the outer shell. In the embodiment, referring to FIG. 2, a total of 6 induction air suction

ports 104 are provided. The air is induced by the high pressure air blown out from the blowout port 102, and drawn in from the induction air suction port 104. Then, in the induction air mixing portion 80, the air drawn in from the plurality of induction air suction ports 104 is mixed into induction air.

[41] The induction air in the induction air mixing portion 80 is blown out through the induction air blowout port 105. The induction air blowout port 105 is enclosed by the inner wall 12 that constitutes an inner ring of the blowout port 102.

[42] The second air passage 106 is an air passage that connects the induction air suction port 104, the induction air mixing portion 80, and the induction air blowout port 105. The second air passage 106 is formed by the inner wall 12 and the penetration wall 13. The penetration wall 13 is formed from the induction air suction port 104 to the induction air mixing portion 80. The penetration wall 13 forms a peripheral wall of a penetration hole, and the second air passage 106 and the first air passage 103 intersect at the penetration hole.

[43] A center of the suction port 101 is a suction position that is farthest from a blowout center position of the blowout port 102. Therefore, the suction port 101 is far from the blowout port 102, preventing the high pressure air blown out from the blowout port 102 from being drawn back into the suction port 101, thus effectively transporting the high pressure air to a remote position.

[44] According to such structure, the impeller is provided inside the housing 10 such that it is not accessible from an outside of the air supply device 100. Therefore, a user does not need to worry about getting injured from a contact with the impeller and may use with confidence.

[45] The air induced from the plurality of induction air suction ports 104 is mixed in the induction air mixing portion 80. Then, the mixed induction air is converged and blown out of the induction air blowout port 105 along a direction of the induction air blowout port 105.

[46] A discharge electrode unit box body 30 is provided in the first air passage 103. The discharge electrode unit box body 30 includes a first space 302 that encloses a discharge electrode unit 20, and a second space 303 for ions to flow toward a direction of an external ion discharge port 301, and the first space 302 is in communication with the second space 303. The discharge electrode unit 20 generates various ions and ozone that are effective for

deodorization and sterilization through electrical discharge in the first space 302. The ions and ozone are transported from the first space 302 to the second space 303, and then blown out of the external ion discharge port 301 in the second space 303. After being blown out, the ions and ozone are transported over a long distance through the blowout port 102 along a flow direction of the high pressure air. Therefore, deodorization and sterilization may be performed in a large space. In the embodiment, the first space 302 further includes a silencing portion 70. A silencing cotton 71 is provided at an inner peripheral wall of the silencing portion 70, which may absorb noises generated by high voltage discharge, thereby reducing a noise of the air supply device 100 during operation. When the high pressure air is blown from the suction port 101 to the blowout port 102, a negative pressure is formed outside the external ion discharge blowout port 301, so that the ions and ozone discharged by the external ion discharge port 301 are induced to the first air passage 103, mixed with the high pressure air, and then blown out of the blowout port 102. That is, the ions and ozone are blown out toward an outside of the blowout port 102 together with the high pressure air. Since the external ion discharge port 301 is located at an end portion of the second space 303 close to the blowout port 102, i.e., a distance between the external ion discharge port 301 and the blowout port 102 is relatively short, the ions and ozone may be more easily blown out toward the outside of the blowout port 102. Since the discharge electrode unit box body 30 is arranged within the first air passage 103, and the first air passage 103 is arranged inside the housing 10, a risk that a liquid contacts the discharge electrode unit 20 may be suppressed to a certain extent with the housing 10 as a barrier. In addition, the discharge electrode unit 20 is enclosed by the first space 302, and the first space 302 is only in communication with the second space 303, thereby forming a substantially sealed space. Therefore, the risk that a liquid contacts the discharge electrode unit 20 may be further suppressed to a certain extent with the discharge electrode unit box body 30 itself as a barrier.

[47] Furthermore, the external ion discharge port 301 is staggered with the blowout port 102, and the external ion discharge port 301 is closer to a side wall of the housing 10 than the blowout port 102. In this way, when a liquid entering the housing 10 from the blowout port 102, it is difficult for the liquid to enter the discharge electrode unit box body 30 through the external ion discharge port 301.

[48] According to an embodiment of the present disclosure, as shown in FIG. 6, a plane where the external ion discharge port 301 is located is perpendicular to a plane where the blowout port 102 is located. Specifically, an extension line L1 along the plane where the

external ion discharge port 301 is located toward a direction of the blowout port 102 is perpendicular to an extension line L2 along the plane where the blowout port 102 is located toward a direction of the external ion discharge port 301. Since the plane where the external ion discharge port 301 is located is perpendicular to the plane where the blowout port 102 is located, when a liquid enters the housing 10 through the blowout port 102, it is more difficult for the liquid to enter the discharge electrode unit box body 30 through the external ion discharge port 301 perpendicular to the blowout port.

[49] Since the housing 10 is in an approximately spherical shape, when the discharge electrode unit box body 30 is arranged inside the first air passage 103, the second space 303 is constructed to conform to the spherical shape of the housing 10 and form an arc shape curving toward an inner peripheral side of the housing 10 from an upstream side of the first air passage 103 to a downstream side of the first air passage 103. As shown in FIG. 7A, when the housing 10 is placed in a state that the external ion discharge port 301 faces downward, it is difficult for a liquid to enter the external ion discharge port 301. Even if a small amount of liquid enters the second space 303 of the discharge electrode unit box body 30 through the external ion discharge port 301, the liquid will flow out to the outside of the discharge electrode unit box body 30 along the arch-shaped second space 303, and will not flow upward into the first space 302, so that the discharge electrode unit 20 will not be damaged. As shown in FIG. 7B, a liquid discharge port 306 is provided on a downstream side of an internal ion discharge port 305. When the housing 10 is placed in a state that the external ion discharge port 301 faces upward, even if a small amount of liquid enters the second space 303 of the discharge electrode unit box body 30 through the external ion discharge port 301, the liquid may be discharged to the outside of the discharge electrode unit box body 30 through the liquid discharge port 306 before entering the first space 302.

[50] A first baffle 50 is provided at an end of the external ion discharge port 301 close to the blowout port 102. The first baffle 50 covers at least a part of the external ion discharge port 301, so as to prevent a liquid from entering the second space 303 through the external ion discharge port 301. Specifically, the external ion discharge port 301 may be circular, and the first baffle 50 may be semi-circular, thereby covering a part of the external ion discharge port 301 close to the blowout port 102, and further making it difficult for a liquid to enter the discharge electrode unit box body 30 through the external ion discharge port 301. In addition, a notch 304 is provided at a peripheral edge of the external ion discharge port 301 opposite to the first baffle 50. The notch 304 and the external ion

discharge port 301 are in communication, both allow the ions and ozone to pass through and flow into the first air passage 103. The notch 304 may allow more ions to flow out, thereby ensuring an ion outflow.

[51] A second baffle 60 is provided at an end of the liquid discharge port 306 close to the internal ion discharge port 305. The second baffle 60 extends in a direction away from the internal ion discharge port 305 and tilts toward an inner side of the second space 303. On the premise of ensuring that the ions may be still blown out through the internal ion discharge port 305, the second baffle 60 being located on an outer side of the internal ion discharge port 305 may block a liquid entering the second space 303 from entering the first space 302, and guide the liquid to directly flow out from the liquid discharge port 306, thereby preventing damage to the discharge electrode unit 20 in the first space 302.

[52] In addition, an ion generating electrode unit or an ozone generating electrode unit that applies a high voltage may be used as the discharge electrode unit 20.

[53] The specific embodiments described above further describe the purposes, technical solutions and beneficial effects of the present disclosure. It should be understood that the above descriptions are only specific implementations of the present disclosure and are not intended to limit the present disclosure. Any modification, equivalent substitution, improvement, and the like made within the spirit and principle of the present disclosure should be included within the protection scope of the present disclosure.

[54] Furthermore, ordinal numbers themselves, such as “first”, “second”, and “third” used in the specification and claims to modify corresponding elements, neither imply or represent any ordinal numbers of the elements, nor do they represent an order of an element relative to another element, or an order of a manufacturing method. The use of these ordinal numbers is only to enable an element with a certain designation to be clearly distinguished from another element with the same designation.

What is claimed is:

1. An air supply device, comprising a housing, wherein the housing comprises:
 - a suction port configured to draw air outside the housing;
 - a high pressure air generating portion comprising an impeller configured to turn the air into high pressure air and a motor configured to drive the impeller;
 - a blowout port configured to be a ring opening for blowing out the high pressure air; and
 - a first air passage configured to guide the high pressure air from the impeller to the blowout port,wherein the housing further comprises:
 - a discharge electrode unit configured to generating ions; and
 - a discharge electrode unit box body arranged inside the first air passage, wherein the discharge electrode unit box body comprises an external ion discharge port configured to allow the ions to flow out toward an outside of the discharge electrode unit box body, a first space enclosing the discharge electrode unit, and a second space configured to allow the ions to flow toward a direction of the external ion discharge port, and the first space is in communication with the second space.
2. The air supply device of claim 1, wherein the external ion discharge port is arranged at an end portion of the second space close to the blowout port, and the external ion discharge port is staggered with the blowout port.
3. The air supply device of claim 2, wherein a plane where the external ion discharge port is located is perpendicular to a plane where the blowout port is located.
4. The air supply device of claim 1, wherein,
 - the housing is in a spherical shape; and
 - the discharge electrode unit box body is configured to conform to the spherical shape of the housing and form an arc shape curving toward an inner peripheral side of the housing from an upstream side of the first air

passage to a downstream side of the first air passage.

5. The air supply device of claim 1, wherein a first baffle is arranged at an end of the external ion discharge port close to the blowout port, and the first baffle covers at least a part of the external ion discharge port.
6. The air supply device of claim 5, wherein a notch is arranged at a peripheral edge of the external ion discharge port opposite to the first baffle.
7. The air supply device of claim 1, wherein an internal ion discharge port is arranged at a junction of the first space and the second space.
8. The air supply device of claim 1, wherein a liquid discharge port is arranged at a downstream side of the internal ion discharge port, and a liquid inside the second space is discharged toward the outside of the discharge electrode unit box body through the liquid discharge port.
9. The air supply device of claim 8, wherein a second baffle is arranged at an end of the liquid discharge port close to the internal ion discharge port, and the second baffle extends away from a direction of the internal ion discharge port and tilts toward an inner side of the second space.
10. The air supply device of claim 1, wherein the first space comprises a silencing portion, and a silencing cotton is arranged at an inner peripheral wall of the silencing portion.
11. The air supply device of claim 1, wherein the housing further comprises:
 - a plurality of induction air suction ports, wherein air is drawn by an induction of the high pressure air blown out from the blowout port;
 - an induction air mixing portion configured to mix the air drawn into the plurality of induction air suction ports;
 - an induction air blowout port configured to blow out induction air of the induction air mixing portion; and
 - a second air passage connecting the induction air suction ports, the induction

air mixing portion and the induction air blowout port.

12. The air supply device of claim 11, wherein,
the housing comprises an outer wall and an inner wall, a penetration wall is formed from an induction air suction port of the induction air suction ports to the induction air mixing portion, and the penetration wall is a peripheral wall of a penetration hole; and
the first air passage is formed by the outer wall, the inner wall and the penetration wall, the second air passage is formed by the inner wall and the penetration wall, and the second air passage and the first air passage intersect at the penetration hole.