

Description

Title of Invention

DISCHARGE DEVICE AND AIR CONDITIONING SYSTEM

Technical Field

[0001]

The present invention relates to a discharge device and an air conditioning system.

Background Art

[0002]

A negative ion generating device described in PTL 1 is disposed in a blowout port of a device in which an air blowing unit that blows out wind is built. The negative ion generating device includes a wind tunnel part, a discharge electrode, and a power supply circuit. The wind tunnel part introduces wind and leads the wind to the outside. The discharge electrode is disposed in the wind tunnel part and generates negative ions. The power supply circuit supplies electric power to the discharge electrode.

Citation List

Patent Literature

[0003]

PTL 1: JP 2003-59621 A

Summary of Invention

Technical Problem

[0004]

However, in the negative ion generating device described in PTL 1, it is difficult to guide wind to a discharging unit having an electrode like the discharge electrode.

[0005]

The present invention is in view of the problem described above, and an object thereof is to provide a discharge device and an air conditioning system capable of guiding wind to a discharging unit.

Solution to Problem

[0006]

According to one aspect of the present invention, a discharge device includes an attachment portion, a first inclination portion, and a discharging unit. The attachment portion faces a wall and is attachable to the wall. The first inclination portion is inclined with respect to the attachment portion. The discharging unit has an electrode and is made

to discharge through application of a voltage to the electrode. The discharging unit is disposed in the first inclination portion.

[0007]

According to another aspect of the present invention, an air conditioning system includes the discharge device described above and an air conditioning device. The air conditioning device blows out air toward the discharge device.

Advantageous Effects of Invention

[0008]

According to a discharge device and an air conditioning system of the present invention, wind can be guided to a discharging unit.

Brief Description of Drawings

[0009]

FIG. 1 is a diagram illustrating an air conditioning system according to a first embodiment of the present invention.

FIG. 2 is a perspective view illustrating a discharge device according to the first embodiment.

FIG. 3 is a diagram illustrating a cross section of the discharge device according to the first embodiment along line III – III.

FIG. 4 is a diagram illustrating a main body part of the discharge device according to the first embodiment.

FIG. 5 is a diagram of a first discharge device seen from a first-direction side.

FIG. 6 is a diagram of the first discharge device seen from a sixth-direction side.

FIG. 7 is a diagram illustrating a first inclination portion of a first discharge device according to a first modified example of the first embodiment.

FIG. 8 is a diagram illustrating a cross section of a main body part of a first discharge device according to a second modified example of the first embodiment.

FIG. 9 is a diagram illustrating a first discharge device according to a second embodiment of the present invention.

FIG. 10 is a diagram illustrating a main body part of the first discharge device according to the second embodiment.

FIG. 11 is a diagram illustrating a first discharge device according to a first modified example of the second embodiment.

FIG. 12 is a diagram illustrating a first discharge device according to a second modified example of the second embodiment.

Description of Embodiments

[0010]

Embodiments of the present invention will be described hereinafter with reference to the drawings. Note that, in the drawings, the same or equivalent components are denoted by the same reference signs and description thereof will not be repeated. In the drawings, an X axis, a Y axis, and a Z axis orthogonal to each other are illustrated. The Z axis is parallel to a vertical direction, and the X and Y axes are parallel to a horizontal direction.

[0011]

First Embodiment

An air conditioning system 1 according to a first embodiment will be described with reference to FIG. 1. FIG. 1 is a diagram illustrating the air conditioning system 1 according to the first embodiment. The air conditioning system 1 includes an air conditioning device 300 and a plurality of discharge devices 100. The air conditioning device 300 blows out air. More specifically, the air conditioning device 300 blows out air of which a temperature or a humidity has been adjusted. The air conditioning device 300 is fixed to a wall W. For example, the wall W is a ceiling. In addition, the air conditioning device 300, for example, may also have a function of introducing outside air into the inside for ventilation. In other words, the air conditioning device 300 may include a ventilation device. Furthermore, the air conditioning device 300, for example, may also have a function of cleaning indoor air. In other words, the air conditioning device 300 may include an air cleaning device.

[0012]

The air conditioning device 300 has a plurality of blowout ports 301 that blow out air of which a temperature or a humidity has been adjusted. The plurality of blowout ports 301 include a first blowout port 301A, a second blowout port 301B, a third blowout port 301C, and a fourth blowout port 301D.

[0013]

The first blowout port 301A blows out air in the first direction D1. The first direction D1 indicates a direction from the third blowout port 301C toward the first blowout port 301A. The air blown out in the first direction D1 is wind F1.

[0014]

The second blowout port 301B transmits air in a second direction D2. The second direction D2 indicates a direction orthogonal to the first direction D1. More specifically, the second direction D2 indicates a direction from the fourth blowout port 301D toward the second blowout port 301B. The air blown out in the second direction D2 is wind F2.

[0015]

The third blowout port 301C blows out air in a third direction D3. The third direction D3 indicates a direction opposite to the first direction D1. More specifically, the third direction D3 indicates a direction from the first blowout port 301A toward the third blowout port 301C. The air blown out in the third direction D3 is wind F3.

[0016]

The fourth blowout port 301D blows out air in a fourth direction D4. The fourth direction D4 indicates a direction opposite to the second direction D2. More specifically, the fourth direction D4 indicates a direction from the second blowout port 301B toward the fourth blowout port 301D. The air blown out in the fourth direction D4 is wind F4.

[0017]

Each of the plurality of discharge devices 100 performs discharging to generate active species. The active species contain ions. The plurality of discharge devices 100 are electrically connected via a wire R wired along the wall W. One of the plurality of discharge devices 100 is a master unit. The discharge devices 100 other than the discharge device 100 that is the master unit are slave units. The discharge device 100 that is the master unit is connected to the plurality of discharge devices 100 that are slave devices via a wire R. In other words, by operating the discharge device 100 that is the master unit, the plurality of discharge devices 100 that are the slave units are collectively operated.

[0018]

The plurality of discharge devices 100 include a first discharge device 100A, a second discharge device 100B, a third discharge device 100C, and a fourth discharge device 100D. The first discharge device 100A corresponds to the first blowout port 301A and is disposed on a downstream side of the first blowout port 301A in the first direction D1. In other words, the first discharge device 100A can include ions in the wind F1.

[0019]

The second discharge device 100B corresponds to the second blowout port 301B and is disposed on a downstream side of the second blowout port 301B in the second direction D2. In other words, the second discharge device 100B can include ions in the wind F2.

[0020]

The third discharge device 100C corresponds to the third blowout port 301C and is disposed on a downstream side of the third blowout port 301C in the third direction D3. In other words, the third discharge device 100C can include ions in the wind F3.

[0021]

The fourth discharge device 100D corresponds to the fourth blowout port 301D and is disposed on a downstream side of the fourth blowout port 301D in the fourth direction D4. In other words, the fourth discharge device 100D can include ions in the wind F4.

[0022]

Next, referring to FIGS. 1 to 3, the discharge device 100 will be described in detail. FIG. 2 is a perspective view illustrating the discharge device 100. FIG. 3 is a diagram illustrating a cross section of the discharge device 100 illustrated in FIG. 2 along

line III – III. Since the first discharge device 100A to the fourth discharge device 100D have the same configuration, the first discharge device 100A will be described as an example. The first discharge device 100A may also be described as a discharge device 100.

[0023]

As illustrated in FIG. 2, the discharge device 100 has a “D” shape. In other words, the discharge device 100 has a side having a linear shape and a side having an arc shape. The wind F1 flows into the discharge device 100 from the side having the linear shape. Furthermore, the wind F1 flows out of the discharge device 100 from the side having the arc shape. In other words, the side having the linear shape is an upstream side in a direction in which the wind F1 flows, and the side having the arc shape is a downstream side in the direction in which the wind F1 flows. The side having the arc shape protrudes in the direction in which the wind F1 flows.

[0024]

As illustrated in FIG. 3, the discharge device 100 includes a main body part 101, a discharging unit 108, a substrate 122, an operation unit 130, and a cover part 201. The main body part 101 houses a part of the discharging unit 108, the substrate 122, and a part (not illustrated) of the wire R in an internal space A1.

[0025]

As illustrated in FIG. 3, the main body part 101 has a substantially triangular shape in a cross-sectional view. The main body part 101 includes an attachment portion 112, a first inclination portion 111, and a first extending portion 151.

[0026]

The attachment portion 112 faces the wall W. The attachment portion 112 is attachable to the wall W. In other words, by attaching the attachment portion 112 to the wall W, the main body part 101 is attached to the wall W.

[0027]

The attachment portion 11 has a first support portion 121 and a second support portion (not illustrated). The first support portion 121 supports the discharging unit 108. More specifically, the first support portion 121 supports the discharging unit 108 such that the discharging unit 108 is adjusted to an inclination angle of the first inclination portion 111. The second support portion (not illustrated) supports the substrate 122.

[0028]

The first inclination portion 111 faces the attachment portion 112. The first inclination portion 111 is inclined with respect to the attachment portion 112. More specifically, the first inclination portion 111 is inclined with respect to the attachment portion 112 by “ θA ”. For example, “ θA ” is 30 degrees. The first inclination portion 111 has a flat plate shape. The first inclination portion 111 extends to the side of the attachment portion 112.

[0029]

The first inclination portion 111 has a first opening portion 116 and a second opening portion 117. The operation unit 130 is disposed in the first opening portion 116. The first opening portion 116 is an opening having a rectangular shape. The discharging unit 108 is disposed in the second opening portion 117. The second opening portion 117 is an opening having a rectangular shape.

[0030]

The first extending portion 151 extends from the first inclination portion 111 to the side of the attachment portion 112. The first extending portion 151 faces the attachment portion 112. The first extending portion 151 is inclined with respect to the attachment portion 112. More specifically, the first extending portion 151 is inclined with respect to the attachment portion 112 by “ θ C”. For example, “ θ C” is 60 degrees.

[0031]

The discharging unit 108 has electrodes 181. The discharging unit 108 causes the electrodes 181 to discharge through application of a voltage to the electrodes 181. In accordance with the discharging, active species are generated. The active species include ions.

[0032]

As illustrated in FIG. 3, the discharging unit 108 is disposed in the first inclination portion 111. The first inclination portion 111 that is inclined with respect to the attachment portion 112 is also inclined with respect to the wall W. Thus, the wind F1 blown out toward the first inclination portion 111 passes through the discharging unit 108 along the first inclination portion 111. In other words, the first inclination portion 111 can guide the wind F1 to the discharging unit 108. As a result, the wind F1 guided to the first inclination portion 111 can pass through the discharging unit 108, and the wind F1 including ions can be discharged to the outside of the first discharge device 100A.

[0033]

More specifically, as illustrated in FIG. 3, the wind F1 blown out from the first blowout port 301A of the air conditioning device 300 reaches the first discharge device 100A disposed downstream in the first direction D1. Next, the wind F1 flows toward the discharging unit 108 along the first inclination portion 111. The discharging unit 108 to which a voltage is applied performs discharging and generates active species including ions. Next, the wind F1 passes through the discharging unit 108. In other words, the wind F1 contains active species including ions and is further directed downstream. The wind F1 including the ions is discharged to the outside of the first discharge device 100A.

[0034]

Also, the electrodes 181 of the discharging unit 108 protrude from the first inclination portion 111. Therefore, the wind F1 directly hits the electrodes 181. As a result, ions generated by the electrodes 181 can be efficiently included in the wind F1.

[0035]

The substrate 122 supplies electric power from the power supply unit 109 illustrated in FIG. 1 to the discharging unit 108. The substrate 122 includes a plurality of electronic components. For example, the plurality of electronic components are a capacitor and a transformer.

[0036]

The operation unit 130 operates the discharging unit 108. The operation unit 130 includes a plurality of buttons and a plurality of notification units. For example, one of the plurality of buttons performs switching to an on state in which the discharging unit 108 generates active species or to an off state in which the discharging unit 108 does not generate active species. In addition, one of the plurality of notification units reports that the discharging unit 108 is in the on state. For example, the notification unit is a light emitting diode (LED). The second discharge device 100B to the fourth discharge device 100D can be operated through the operation unit 130 of the first discharge device 100A.

[0037]

The cover part 201 is attached to the main body part 101 and covers the main body part 101. The cover part 201 covers the main body part 101 such that a user's body is not in contact with the electrodes 181 of the discharging unit 108.

[0038]

Next, referring now to FIGS. 3 and 4, the main body part 101 of the discharge device 100 will be described in detail. FIG. 4 is a diagram illustrating the main body part 101 of the discharge device 100.

[0039]

As illustrated in FIG. 3, the first inclination portion 111 has a first base end portion 113 and a first distal end portion 114. The first base end portion 113 extends toward the attachment portion 112. The first base end portion 113 has a flat plate shape. The first base end portion 113 is disposed the fifth direction D5 side relative to the first distal end portion 114. The fifth direction D5 is a direction from the cover part 201 toward the attachment portion 112. In addition, the fifth direction D5 is a direction in which the first discharge device 100A is seen from a surface facing the wall W. For example, the surface facing the wall W is a floor surface. In other words, the first base end portion 113 is closer to the attachment portion 112 than the first distal end portion 114. The distance from the attachment portion 112 to the first base end portion 113 is "distance H2". The first base end portion 113 is disposed on an upstream side of the first distal end portion 114 in the flowing direction of the wind F1.

[0040]

As illustrated in FIG. 4, the first base end portion 113 has an end portion 113A. The end portion 113A is a side having a linear shape. The end portion 113A is a side that

is disposed on an upstream side of the first distal end portion 114 in the flowing direction of the wind F1.

[0041]

The first distal end portion 114 extends in a direction away from the attachment portion 112. The first distal end portion 114 has a flat plate shape. The first distal end portion 114 is disposed on the sixth direction D6 side relative to the first base end portion 113. The sixth direction D6 is a direction from the attachment portion 112 toward the cover part 201. As illustrated in FIG. 3, the distance from the attachment portion 112 to the first distal end portion 114 is “distance H1”. The distance H1 is longer than the distance H2. In other words, the first distal end portion 114 is further away from the attachment portion 112 than the first base end portion 113. The first distal end portion 114 is disposed on a downstream side of the first base end portion 113 in the flowing direction of the wind F1.

[0042]

As illustrated in FIG. 4, the first distal end portion 114 has an end portion 114A. The end portion 114A is a side having a curved shaped. More specifically, the end portion 114A is a side having an arc shape protruding with respect to the end portion 113A. The end portion 114A is a side that is disposed on a downstream side of the end portion 113A in the flowing direction of the wind F1.

[0043]

Further, the shape of the end portion 113A and the shape of the end portion 114A are different from each other. Thus, it can be determined whether or not the main body part 101 has been attached to the wall W in an incorrect orientation on the basis of a difference between the shape of the end portion 113A and the shape of the end portion 114A. As a result, when the discharge device 100 is attached, the discharge device 100 can be inhibited from being attached in an incorrect orientation.

[0044]

The first opening portion 116 and the second opening portion 117 are disposed between the first base end portion 113 and the first distal end portion 114. In addition, the first opening portion 116 is disposed between the first base end portion 113 and the second opening portion 117. In other words, the operation unit 130 is disposed between the first base end portion 113 and the second opening portion 117. The operation unit 130 is disposed in the first opening portion 116 such that it does not protrude from the first inclination portion 111. Thus, even in a case in which the operation unit 130 is disposed in the first inclination portion 111, the operation unit 130 does not block the flow of the wind F1. As a result, it becomes easy for the wind F1 to reach the discharging unit 108.

[0045]

In addition, the second opening portion 117 is disposed between the first opening portion 116 and the first distal end portion 114. In other words, the discharging unit 108

is disposed between the first opening portion 116 and the first distal end portion 114. In other words, the discharging unit 108 is disposed further toward the first distal end portion 114 than the first base end portion 113. The wind F1 along the first inclination portion 111 flows from the side of the first base end portion 113 to the side of the first distal end portion 114. Thus, ions generated on the side of the first distal end portion 114 are included in the wind F1 that is guided from the side of the first base end portion 113 to the side of the first distal end portion 114 and are discharged to the outside of the discharge device 100. As a result, the ions generated by the discharging unit 108 can be inhibited from being lost on the side of the first base end portion 113 before the ions are discharged to the outside of the discharge device 100.

[0046]

Also, as illustrated in FIGS. 3 and 4, the discharging unit 108 includes induction electrodes 182 respectively surrounding the electrodes 181. The electrodes 181 are, for example, a needle-shaped or brush-shaped electrodes. The induction electrodes 182 are ring-shaped electrodes. The electrodes 181 and the induction electrodes 182 are, for example, formed using a metal having conductivity.

[0047]

In this embodiment, the discharging unit 108 has one pair of electrodes 181 and one pair of induction electrodes 182. A high voltage is applied to the one pair of electrodes 181 and the one pair of induction electrodes 182. For example, a corona occurs between the electrodes 181 and the induction electrodes 182 to which a high voltage is applied. Then, one electrode 181 out of the one pair of electrodes 181 and one induction electrode 182 out of the one pair of induction electrodes 182 discharge positive ions through discharging. The positive ions are cluster ions ($H^+(H_2O)_m$ (here, m is an arbitrary integer equal to or greater than zero)) with a plurality of water molecules clustered around a hydrogen ion (H^+). In addition, the other electrode 181 of the one pair of electrodes 181 and the other induction electrode 182 of the one pair of induction electrodes 182 discharge negative ions through discharging. The negative ions are cluster ions ($O_2^-(H_2O)_n$, (here, n is an arbitrary integer equal to or greater than zero)) with a plurality of water molecules clustered around an oxygen ion (O_2^-).

[0048]

For example, each of the positive ions and the negative ions that have been discharged surrounds a mold fungus floating in the air and causes a chemical reaction on the surface of the mold fungus. The chemical reaction produces hydroxyl radicals ($\cdot OH$) of an active species. Then, The action of hydroxyl radicals ($\cdot OH$) then removes the mold fungi.

[0049]

Next, the cover part 201 will be described in more detail with reference to FIGS. 3 and 4. As illustrated in FIG. 3, the cover part 201 has a substantially triangular shape in a

cross-sectional view. The cover part 201 includes a second inclination portion 211 and a second extending portion 251.

[0050]

The second inclination portion 211 restrains contact of the electrode 181 with the body of a user. The second inclination portion 211 faces the attachment portion 112. The second inclination portion 211 is inclined with respect to the attachment portion 112. More specifically, the second inclination portion 211 is inclined with respect to the attachment portion 112 by “ θB ”. For example, “ θB ” is 45 degrees. The second inclination portion 211 has a flat plate shape.

[0051]

The second inclination portion 211 faces the first inclination portion 111. The second inclination portion 211 is inclined with respect to the attachment portion 112. Accordingly, a gap is formed between the second inclination portion 211 and the first inclination portion 111. As a result, the discharging unit 108 can be disposed in the gap between the second inclination portion 211 and the first inclination portion 111.

[0052]

The second inclination portion 211 has a second base end portion 213 and a second distal end portion 214. The second base end portion 213 extends toward the attachment portion 112. The second base end portion 213 has a flat plate shape. The second base end portion 213 is disposed on the fifth direction D5 side relative to the second distal end portion 214. The distance from the attachment portion 112 to the second base end portion 213 is “distance H4”. The distance H4 is shorter than the distance H1 and is longer than the distance H2. In other words, the second base end portion 213 is closer to the attachment portion 112 than the second distal end portion 214. The second base end portion 213 is further away from the attachment portion 112 than the first base end portion 113. In addition, the second base end portion 213 is closer to the attachment portion 112 than the first distal end portion 114.

[0053]

The second distal end portion 214 extends in a direction away from the attachment portion 112. The second distal end portion 214 has a flat plate shape. The second distal end portion 214 is disposed on the sixth direction D6 side relative to the second base end portion 213. The distance from the attachment portion 112 to the second distal end portion 214 is “distance H3”. The distance H3 is longer than the distance H1, the distance H2, and the distance H4. In other words, the second distal end portion 214 is further away from the attachment portion 112 than the second base end portion 213. In addition, the second distal end portion 214 is further away from the attachment portion 112 than the first base end portion 113.

[0054]

Furthermore, the second distal end portion 214 is further away from the attachment portion 112 than the first distal end portion 114. Thus, a space in which ions are generated can be secured. In other words, the amount of ions generated can be inhibited from being decreased due to a narrow ion generation space. As a result, ions can be easily included in the wind F1 passing through the discharging unit 108.

[0055]

The second extending portion 251 restrains contact of the electrodes 181 with the body of a user. The second extending portion 251 faces the attachment portion 112. The second extending portion 251 is inclined with respect to the attachment portion 112. In addition, the second extending portion 251 is inclined with respect to the attachment portion 112 at an angle different from that of the second inclination portion 211. More specifically, the second extending portion 251 is inclined with respect to the attachment portion 112 by “ θD ”. For example, “ θD ” is 60 degrees. In other words, the second extending portion 251 is inclined at the same angle as that of the first extending portion 151. The second extending portion 251 extends along the first extending portion 151. The second extending portion 251 covers the first extending portion 151.

[0056]

The second extending portion 251 extends from the second inclination portion 211. More specifically, the second extending portion 251 extends from the second distal end portion 214 to the side of the attachment portion 112. The second extending portion 251 corresponds to one example of an “extending portion”. The second extending portion 251 includes a construction part 260.

[0057]

D261 is applied to the construction part 260. A label 261 is, for example, composed of letters, symbols, graphics, and combinations of two or more thereof. The label 261 may indicate a method for operating the discharge device 100. The label 261, for example, is attached to the construction part 260 using an adhesive. In addition, the label 261, for example, may be formed as the label 261 by directly machining the construction part 260. The second extending portion 251 is inclined with respect to the attachment portion 112. As a result, when the first discharge device 100A is attached to the wall W such as the ceiling, a user can visually recognize the label 261 provided in the construction part 260.

[0058]

Next, the discharge device 100 will be described in greater detail with reference to FIGS. 4 and 5. FIG. 5 is a diagram of the first discharge device 100A seen from a first-direction D1 side. As illustrated in FIG. 4, the main body part 101 further has one pair of housing parts 190. The one pair of housing parts 190 houses the wire R. One of the one pair of housing parts 190 is disposed on a second direction D2 side of the first inclination portion 111. The other of the one pair of housing parts 190 is disposed on a fourth

direction D4 side of the first inclination portion 111. A bottom of the housing part 190 is configured using the attachment portion 112.

[0059]

Each of the bottoms of the one pair of housing parts 190 includes a first through hole 191A and a second through hole 191B. The wire R is inserted into the first through hole 191A. More specifically, the wire R extending from the power supply unit 109 (see FIG. 1) is inserted into the first through hole 191A of one of the housing parts 190. Then, the wire R inserted into the first through hole 191A is connected to the substrate 122. In addition, the wire R extending from the substrate 122 to the second discharge device 100B is inserted into the first through hole 191A of the other one of the housing parts 190. A screw is inserted into the second through hole 191B. In other words, the main body part 101 is attached to the wall W using a screw.

[0060]

As illustrated in FIG. 5, the cover part 201 further includes one pair of flat plate portions 290. Each of the one pair of flat plate portions 290 covers the housing part 190. Thus, the wire R and the screw disposed in the housing part 190 can be hidden from a user. As a result, the appearance of the discharge device 100 is improved.

[0061]

Next, the cover part 201 will be described in more detail with reference to FIGS. 2, 3, 5, and 6. FIG. 6 is a diagram of the first discharge device 100A seen from a sixth-direction D6 side. In FIG. 6, the cover part 201 is illustrated as being cut along the first inclination portion 111.

[0062]

As illustrated in FIG. 6, the cover part 201 further includes one pair of first wall portions 220 and one pair of second wall portions 230.

[0063]

The one pair of first wall portions 220 extend from the second inclination portion 211 toward the first inclination portion 111. In other words, the first wall portions 220 are disposed between the second inclination portion 211 and the first inclination portion 111. One of the one pair of the first wall portions 220 is disposed on the second direction D2 side of the first inclination portion 111. The other of the one pair of first wall portions 220 is disposed on the fourth direction D4 side of the first inclination portion 111. In addition, the one pair of the first wall portions 220 extend in a direction from the first base end portion 113 toward the first distal end portion 114. The first wall portion 220 extends in a direction from the second base end portion 213 to the second distal end portion 214. In other words, by attaching the cover part 201 to the main body part 101, the first wall portions 220 are disposed on the second direction D2 side and the fourth direction D4 side of the first inclination portion 111.

[0064]

In addition, as illustrated in FIG. 6, at least a part of the discharging unit 108 is disposed between the one pair of the first wall portions 220. Thus, the wind F1 flowing along the first inclination portion 111 can be rectified by the one pair of the first wall portions 220. Further, the wind F1 can be aggregated by the one pair of the first wall portions 220 and guided to the discharging unit 108. As a result, the aggregated wind F1 can be guided to the discharging unit 108, and ions can be blown out to the outside of the first discharge device 100A.

[0065]

More specifically, the discharging unit 108 is disposed at a position located between the one pair of the first wall portions 220 but not in contact with the pair of the first wall portions 220. Further, at least a part of the discharging unit 108 may be the electrodes 181. In other words, the electrodes 181 may be disposed between the one pair of the first wall portions 220.

[0066]

A length LB of the first wall portion 220 is shorter than a length LA of the first inclination portion 111. In other words, the first wall portion 220 is interrupted in the middle of the first inclination portion 111. More specifically, since the end portion 114A of the first inclination portion 111 has an arc shape protruding in the first direction D1, the length LA of the first inclination portion 111 is longer than the length LB of the first wall portion 220.

[0067]

A wind velocity of a wind F1A flowing near the one pair of the first wall portions 220 in the first inclination portion 111 is lower than a wind velocity of a wind F1B flowing through a center portion of the first inclination portion 111. More specifically, the wind F1B flowing through the center portion of the first inclination portion 111 is a wind flowing toward the discharging unit 108. In detail, the wind F1A collides with first wall portion 220 and the wind velocity thereof decreases. On the other hand, although the wind velocity of the wind F1B decreases in accordance with a decrease in the wind velocity of the wind F1A, the degree of decrease is lower than that of the wind F1A. In other words, the wind velocity of the wind F1B is higher than the wind velocity of the wind F1A. Thus, the wind F1B having a high wind velocity passes through the discharging unit 108 while the wind F1 flowing in from the side of the end 113A of the first base end portion 113 is guided to the discharging unit 108. As a result, the likelihood of being able to stably blow out the ions generated by the discharging unit 108 to the outside of the discharge device 100 is improved. In the first inclination portion 111, it is preferable to dispose the discharging unit 108 in a portion through which the wind F1B passes. Thus, the wind F1B having a high wind velocity can be applied to the electrodes 181.

[0068]

In addition, in this embodiment, the length LA of the first inclination portion 111 is longer than the length LB of the first wall portion 220. In other words, the wind velocity of the wind F1A increases from a place in which the first wall portion 220 is absent. In accordance with an increase in the wind velocity of the wind F1A, the wind velocity of the wind F1B also increases. Thus, a wind having a high wind velocity passes through the discharging unit 108. As a result, while guiding the wind F1 flowing out from the side of the end portion 113A of the first base end portion 113 to the discharging unit 108, the likelihood of being able to stably blow out the ions generated by the discharging unit 108 to the outside of the discharge device 100 is improved.

[0069]

In addition, in accordance with an increase in the wind velocity of the wind F1B, the wind F1B flowing near the first wall portion 220 can be guided to the side of the discharging unit 108 through which the wind F1B flows. In other words, the likelihood of the flow rate of the wind F1B passing through the discharging unit 108 being increased is improved. As a result, the likelihood of stably blowing out the ions generated by the discharging unit 108 to the outside of the discharge device 100 is improved.

[0070]

The one pair of second wall portions 230 extend from the flat plate portion 290 toward the attachment portion 112. The one pair of second wall portions 230 are disposed between the flat plate portion 290 and the attachment portion 112. One of the one pair of second wall portions 230 is disposed on the second direction D2 side of the first inclination portion 111. The other of the one pair of second wall portions 230 is disposed on the fourth direction D4 side of the first inclination portion 111. The one pair of first wall portions 220 are disposed between the one pair of second wall portions 230.

[0071]

As illustrated in FIG. 5, the second inclination portion 211 includes a plurality of first restraining members 271 and a plurality of first support members 271A. Each of the plurality of first restraining members 271 restrains the body of a user from being in contact with the electrodes 181. Each of the plurality of first restraining members 271 extends from the second base end portion 213 to the second distal end portion 214. The plurality of first restraining members 271 are disposed spaced apart at intervals. The intervals may be of equal spacing or may be of unequal spacing. In other words, the plurality of first restraining members 271 are disposed spaced apart at intervals such that the body of a user is not in contact with the electrodes 181.

[0072]

The first support members 271A support the first restraining members 271. The plurality of first support members 271A are disposed between the one pair of first wall portions 220. The plurality of first support members 271A are spaced apart at intervals. The intervals may be of equal spacing or may be of unequal spacing.

[0073]

In addition, a first long hole 270 is formed between the first restraining member 271 and the first restraining member 271 that are adjacent to each other. In other words, the second inclination portion 211 has a plurality of first long holes 270. Each of the plurality of first long holes 270 extends from the second base end portion 213 to the second distal end portion 214. The wind F1 flows into the plurality of first long holes 270. In other words, the plurality of first long holes 270 function as an inflow port of the wind F1.

[0074]

As illustrated in FIGS. 5 and 6, the plurality of first restraining members 271 and the plurality of first long holes 270 are disposed between the one pair of first wall portions 220 and are not disposed between one of the one pair of first wall portions 220 and one of the one pair of second wall portions 230 and between the other of the one pair of first wall portions 220 and the other of the one pair of second wall portions 230. Thus, the wind F1 is guided between the one pair of first wall portions 220. Furthermore, the one pair of first wall portions 220 inhibits penetration of the wind F1 to the side of the housing parts 190. On the other hand, the first restraining member 271 and the first long hole 270 are not disposed in the flat plate portion 290 that is between the first wall portion 220 and the second wall portion 230. Thus, a portion guiding the wind F1 and a portion not guiding the wind F1 can be separated. As a result, electronic components and the wire R can be disposed in portions that do not guide the wind F1.

[0075]

As illustrated in FIG. 5, the electrode 181 is positioned between the first restraining member 271 and the first restraining member 271 that are adjacent to each other. In other words, the electrode 181 is disposed at the position of the first long hole 270. Thus, when ions generated by the electrode 181 are blown out by the wind F1, a decrease in the number of ions due to collision with the first restraining member 271 can be inhibited.

[0076]

As illustrated in FIGS. 2, 3, and 5, the second extending portion 251 has a plurality of second restraining members 272. Each of the plurality of second restraining members 272 restrains the body of a user from being in contact with the electrodes 181. Each of the plurality of second restraining members 272 extends from the second distal end portion 214 toward the attachment portion 112. The plurality of second restraining members 272 are disposed spaced apart at intervals. The intervals may be of equal spacing or may be of unequal spacing. In other words, the plurality of second restraining members 272 are disposed spaced apart at intervals such that the body of a user is not in contact with the electrodes 181. The second restraining members 272 are continuous with the first restraining members 271.

[0077]

In addition, a second long hole 273 is formed between the second restraining member 272 and the second restraining member 272 that are adjacent to each other. In other words, the second extending portion 251 has a plurality of second long holes 273. Each of the plurality of second long holes 273 extends from the second distal end portion 214 to a predetermined position P (see FIG. 3) of the second extending portion 251. The predetermined position P substantially coincides with the position of the first distal end portion 114. The plurality of second long holes 273 discharge the wind F1. In other words, the plurality of second long holes 273 function as an outlet port of the wind F1. In other words, ions included in the wind F1 can be discharged from the second long holes 273 while applying the wind F1 flowing in from the first long holes 270 to the electrodes 181.

[0078]

First Modified Example

Next, a first modified example of the first embodiment will be described with reference to FIG. 7. A main body part 101 according to the first modified example is mainly different from the first embodiment in that the shape of a first inclination portion 111 is different from that of the first inclination portion 111 according to the first embodiment. In addition, a cover part 201 according to the first modified example is mainly different from the first embodiment in that an interval between the one pair of first wall portions 220 is different from an interval between the one pair of first wall portions 220 according to the first embodiment. Hereinafter, differences of the first modified example from the first embodiment will be described.

[0079]

FIG. 7 is a diagram illustrating a first inclination portion 111 according to the first modified example of the first embodiment. As illustrated in FIG. 7, the first inclination portion 111 includes a first base end portion 113 and a first distal end portion 114.

[0080]

As illustrated in FIG. 7, the width of the first base end portion 113 and the width of the first distal end portion 114 are different from each other. More specifically, the width of the first base end portion 113 is a width LC. The width of the first distal end portion 114 is a width LD. The width LD is smaller than the width LC. In other words, the width of the first inclination portion 111 becomes narrower toward the first distal end portion 114 from the first base end portion 113.

[0081]

The interval between the one pair of first wall portions 220 of the cover part 201 differs between the side of the first base end portion 113 and the side of the first distal end portion 114. More specifically, the interval between the one pair of first wall portions 220 on the side of the first base end portion 113 is larger than the interval between the

one pair of first wall portions 220 on the side of the first distal end portion 114. In other words, the interval LF between the one pair of first wall portions 220 on the side of the first distal end portion 114 is narrower than the interval LE between the one pair of first wall portions 220 of the first base end portion 113. As a result, when the wind F1 flowing in from the side of the first base end portion 113 is guided toward the discharging unit 108 on the side of the first distal end portion 114, the wind F1 can be intensively applied to the electrodes 181.

[0082]

Second Modified Example

Next, a second modified example of the first embodiment will be described with reference to FIG. 8. A main body part 101 according to the second modified example is mainly different from the first embodiment in that the shape of a first inclination portion 111 is different from the first inclination portion 111 of the first embodiment. More specifically, in the second modified example, the angle of the first base end portion 113 and the angle of the first distal end portion 114 are different from each other. Hereinafter, differences of the first modified example from the first embodiment will be described.

[0083]

FIG. 8 is a diagram illustrating a cross section of a main body part 101 according to the second modified example of the first embodiment. As illustrated in FIG. 8, the first inclination portion 111 has a first base end portion 113 and a first distal end portion 114.

[0084]

The first base end portion 113 has a flat plate shape. The first base end portion 113 is inclined with respect to the attachment portion 112. More specifically, the first base end portion 113 is inclined with respect to the attachment portion 112 by " θE ". For example, " θE " is 30 degrees.

[0085]

The first distal end portion 114 has a flat plate shape. The first distal end portion 114 is inclined with respect to the attachment portion 112. More specifically, the first distal end portion 114 is inclined with respect to the attachment portion 112 by " θF ". For example, " θF " is 15 degrees. In other words, an angle of the first distal end portion 114 with respect to the attachment portion 112 is smaller than an angle of the first base end portion 113 with respect to the attachment portion 112. Thus, when the cover part 201 is attached to the main body part 101, the distance between the second inclination portion 211 and the first distal end portion 114 increases. In other words, a space in which ions are generated by the discharging unit 108 increases. As a result, a space in which ions are generated by the discharging unit 108 can be sufficiently secured.

[0086]

Second Embodiment

Next, a discharge device 100 according to a second embodiment will be described with reference to FIGS. 9 and 10. The discharge device 100 according to the second embodiment is different from the discharge device 100 according to the first embodiment in that a shape of a cover part 201 and a shape of a main body part 101 are different. Hereinafter, matters of the second embodiment that are different from the first embodiment will be described, and description of parts that are duplicates of the first embodiment will be omitted.

[0087]

FIG. 9 is a diagram illustrating the discharge device 100 according to the second embodiment. FIG. 10 is a diagram illustrating the main body part 101 of the discharge device 100 according to the second embodiment. As illustrated in FIGS. 9 and 10, the discharge device 100 includes a main body part 101, a discharging unit 108, a substrate (not illustrated), an operation unit 130, and a cover part 201.

[0088]

As illustrated in FIG. 9, the cover part 201 has a substantially rectangular shape. The cover part 201 covers the main body part 101 such that a user's body is not in contact with the electrodes 181 of the discharging unit 108. The cover part 201 includes a second inclination portion 211, a second extending portion 251, one pair of first wall portions 220, one pair of second wall portions 230, and one pair of flat plate portions 290.

[0089]

The second inclination portion 211 is inclined with respect to an attachment portion 112 and faces a first inclination portion 111. The second inclination portion 211 has a second base end portion 213 and a second distal end portion 214. The second base end portion 213 is a side having a linear shape. The second distal end portion 214 is a side having a linear shape.

[0090]

The one pair of first wall portions 220 extend from the second inclination portion 211 toward the first inclination portion 111.

[0091]

As illustrated in FIG. 10, the main body part 101 has a substantially rectangular shape. The main body part 101 includes an attachment portion 112, a first inclination portion 111, a first extending portion 151, and one pair of housing parts 190. The first inclination portion 111 is inclined with respect to the attachment portion 112. The first inclination portion 111 has a flat plate shape.

[0092]

The first inclination portion 111 has a first base end portion 113 and a first distal end portion 114. The first base end portion 113 extends toward the attachment portion 112. The first base end portion 113 is closer to the attachment portion 112 than the first distal end portion 114. The first base end portion 113 has a flat plate shape. The first base

end portion 113 has an end portion 113A. The end portion 113A is a side having a linear shape.

[0093]

The first distal end portion 114 extends in a direction away from the attachment portion 112. The first distal end portion 114 has a flat plate shape. The first distal end portion 114 is further away from the attachment portion 112 than the first base end portion 113. The first distal end portion 114 has an end portion 114A. The end portion 114A is a side having a linear shape.

[0094]

The discharging unit 108 is disposed between the one pair of first wall portions 220. Thus, a loss of generated ions inside the first discharge device 100A until the ions are blown out to the outside of the first discharge device 100A can be reduced. As a result, the quantity of ions blown out to the outside of the first discharge device 100A can be inhibited from being reduced.

[0095]

First Modified Example

Next, a first modified example of the second embodiment is described with reference to FIG. 11. The shape of a cover part 201 according to the first modified example is different from the shape of the cover part 201 according to the second embodiment, which is a main difference from the second embodiment. Hereinafter, differences of the first modified example from the second embodiment will be described. FIG. 11 is a diagram illustrating a first discharge device 100A according to the first modified example of the second embodiment.

[0096]

The second inclination portion 211 is inclined with respect to the attachment portion 112 and faces the first inclination portion 111. The second inclination portion 211 has a second base end portion 213 and a second distal end portion 214. The second base end portion 213 is parallel to the first base end portion 113 of the first inclination portion 111. The second base end portion 213 has a third opening portion 213A. The position of the third opening portion 213A substantially coincides with the position of the first opening portion 116. In other words, the third opening portion 213A corresponds to the position of the operation unit 130. Thus, a user can operate the operation unit 130 through the third opening portion 213A.

[0097]

The second distal end portion 214 is inclined with respect to the second base end portion 213. The second distal end portion 214 has a third inclination portion 214A and a fourth inclination portion 214B. The third inclination portion 214A is inclined with respect to the second base end portion 213. The angle of the third inclination portion 214A is larger than the angle of the second base end portion 213.

[0098]

The fourth inclination portion 214B is inclined with respect to the third inclination portion 214A. The angle of the fourth inclination portion 214B is smaller than the angle of the third inclination portion 214A.

[0099]

The second distal end portion 214 has a plurality of first restraining members 271. Each of the plurality of first restraining members 271 extends from the third inclination portion 214A to the fourth inclination portion 214B. The plurality of first restraining members 271 are disposed spaced apart at intervals.

[0100]

Further, a first long hole 270 is formed between the first restraining member 271 and the first restraining member 271. In other words, the second distal end portion 214 has a plurality of first long holes 270. Each of the plurality of first long holes 270 extends from the third inclination portion 214A to the fourth inclination portion 214B. The wind F1 flows into the second distal end portion 214 from the plurality of first long holes 270.

[0101]

Second Modified Example

Next, a second modified example of the second embodiment will be described with reference to FIG. 12. The shape of a cover part 201 according to the second modified example is different from the shape of the cover part 201 according to the second embodiment and the shape of the cover part 201 according to the first modified example, which is a main difference from the second embodiment and the first modified example. Hereinafter, points of the second modified example different from the second embodiment and the first modified example will be described. FIG. 12 is a diagram illustrating a first discharge device 100A according to a second modified example of the second embodiment.

[0102]

One pair of flat plate portions 290 according to the second modified example protrude in the sixth direction D6 from the second base end portion 213. Thus, a housing space of the housing part 190 increases. As a result, extra wires R can be housed in the housing space.

[0103]

In addition, the one pair of first wall portions 220 according to the second modified example include one pair of first wall portions 220A and one pair of first wall portions 220B. The one pair of first wall portions 220A are disposed on both sides of the second base end portion 213. More specifically, one of the one pair of first wall portions 220A is disposed in the second direction D2 side of the second base end portion 213. The other of the one pair of first wall portions 220A is disposed on the fourth direction D4 side of the second base end portion 213. Thus, the one pair of first wall portions 220A

can guide a wind F1 flowing into the side of the first distal end portion 114 from the second base end portion 213. As a result, the wind F1 can be guided to the discharging unit 108 disposed in the first distal end portion 114.

[0104]

One pair of first wall portions 220B are disposed on both sides of the first distal end portion 114. More specifically, one of the one pair of first wall portions 220B is disposed on the second direction D2 side of the first distal end portion 114. The other of the one pair of first wall portions 220B is disposed on the fourth direction D4 side of the first distal end portion 114. Thus, the one pair of first wall portions 220B can guide the wind F1 flowing into the second extending portion 251 to the discharging unit 108. As a result, the wind F1 can be guided to the discharging unit 108 disposed in the second extending portion 251.

[0105]

The embodiments of the present invention have been described above with reference to the drawings. However, the present invention is not limited to the embodiments described above, and the present invention can be implemented in various modes without departing from the gist thereof. Further, various inventions can be formed by appropriately combining a plurality of components disclosed in the embodiments described above. For example, some components may be removed from all of the components described in the embodiments. Furthermore, the components across different embodiments may be appropriately combined. For ease of understanding, the drawings schematically illustrate each component as a main constituent, and the thickness, length, number, spacing, and the like of each component illustrated are different from the actual thickness, length, number, spacing, and the like for convenience of drawing preparation. Further, the speed, material, shape, dimensions, and the like of each component illustrated in the embodiments described above are one example and are not particularly limited, and various modifications can be made within a range that does not substantially deviate from the configuration of the present invention.

[0106]

(1) Although the angle of the first inclination portion 111 according to the first embodiment and the second embodiment is illustrated as “30 degrees”, the angle is not limited thereto. For example, the angle of the first inclination portion 111 may be determined in accordance with the rotation angle of the blowout port 301 of the air conditioning device 300. More specifically, the angle of the first inclination portion 111 may be determined in accordance with a maximum angle by which the blowout port 301 can rotate. As a result, even when the blowout port 301 changes angle, the wind F1 can be guided to the first inclination portion 111.

[0107]

(2) In the first modified example of the first embodiment, although a case in which the interval between the one pair of first wall portions 220 decreases as the one pair or first wall portions 220 approach from the first base end portion 113 toward the first distal end portion 114 has been described, the configuration is not limited thereto. For example, the interval between the one pair of first wall portions 220 may decrease as the one pair or first wall portions 220 approach from the second inclination portion 211 toward the first inclination portion 111.

[0108]

(3) In the second modified example of the first embodiment, although the first distal end portion 114 is inclined with respect to the attachment portion 112, the configuration is not limited thereto. For example, the first distal end portion 114 may be inclined with respect to the first base end portion 113. In other words, the first distal end portion 114 may be inclined with respect to the first base end portion 113, and the first distal end portion 114 may be parallel with the attachment portion 112. As a result, a space in which ions are generated by the discharging unit 108 can be sufficiently secured.

[0109]

(4) In the first embodiment and the second embodiment, although the discharging unit 108 is disposed between the one pair of first wall portions 220, the configuration is not limited thereto. For example, the discharging unit 108 may be disposed at the end portion 114A of the first distal end portion 114. In other words, the discharging unit 108 is not disposed between the one pair of first wall portions 220. Even in the case of such a configuration, a wind F1 aggregated by the one pair of first wall portions 220 is guided to the discharging unit 108.

[0110]

(5) In the first embodiment and the second embodiment, although the one pair of electrodes 181 are disposed in a direction in which the one pair of first wall portions 220 are aligned, the configuration is not limited thereto. For example, the direction in which the one pair of first wall portions 220 are aligned is the second direction D2. In such a case, the one pair of electrodes 181 generate ions having the same polarity. For example, the one pair of electrodes 181 may be disposed in a direction in which the first base end portion 113 and the first distal end portion 114 are aligned. For example, the direction in which the first base end portion 113 and the first distal end portion 114 are aligned is the first direction D1. In other words, one of the one pair of electrodes 181 is disposed on an upstream side in a direction in which the wind F1 flows, and the other of the one pair of electrodes 181 is disposed on a downstream side.

[0111]

(6) In the first embodiment and the second embodiment, although the angle of the first inclination portion 111 with respect to the attachment portion 112 and the angle of the second inclination portion 211 with respect to the attachment portion 112 are different

from each other, the configuration is not limited thereto. For example, the angle of the first inclination portion 111 and the angle of the second inclination portion 211 may be the same. When the angle of the first inclination portion 111 and the angle of the second inclination portion 211 are the same, the distance H4 from the attachment portion 112 to the second base end portion 213 is longer than the distance H2 from the attachment portion 112 to the first base end portion 113. Thus, the wind F1 is guided between the one pair of first wall portions 220.

[0112]

(7) The first restraining member 271 has a predetermined thickness H5 in the fifth direction D5. Thus, when the wind F1 flows into the first inclination portion 111 from the first long hole 270, the wind is rectified by the first restraining member 271. As a result, there is a likelihood that it becomes easy for the one pair of first wall portions 220 to rectify the wind F1.

Industrial Applicability

[0113]

The present invention provides a discharge device and an air conditioning system, which have industrial applicability.

Reference Signs List

[0114]

1 Air conditioning system
11 Attachment portion
100 Discharge device
108 Discharging unit
111 First inclination portion
112 Attachment portion
113 First base end portion
113A End portion
114 First distal end portion
114A End portion
181 Electrode
211 Second inclination portion
213 Second base end portion
214 Second distal end portion
220 First wall portion
220A First wall portion
220B First wall portion
260 Construction part

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261 Label

270 First long hole

273 Second long hole

300 Air conditioning device

W Wall

Claims

[Claim 1]

A discharge device comprising:
an attachment portion that faces a wall and is attachable to the wall;
a first inclination portion that is inclined with respect to the attachment portion;
and
a discharging unit that has an electrode and is made to discharge through application of a voltage to the electrode,
wherein the discharging unit is disposed in the first inclination portion.

[Claim 2]

The discharge device according to claim 1,
wherein the electrode protrudes from the first inclination portion.

[Claim 3]

The discharge device according to claim 1 or 2,
wherein the first inclination portion has a first base end portion extending toward the attachment portion and a first distal end portion extending in a direction away from the attachment portion,
the first distal end portion is disposed at a position farther from the attachment portion than the first base end portion, and
the discharging unit is disposed on a side of the first distal end portion.

[Claim 4]

The discharge device according to claim 3, further comprising:
one pair of first wall portions extending in a direction from the first base end portion toward the first distal end portion,
wherein at least a part of the discharging unit is disposed between the one pair of first wall portions.

[Claim 5]

The discharge device according to claim 4,
wherein an interval between the one pair of first wall portions on a side of the first base end portion is larger than an interval between the one pair of first wall portions on a side of the first distal end portion.

[Claim 6]

The discharge device according to any one of claims 3 to 5, further comprising:

a second inclination portion that faces the attachment portion and covers the first inclination portion,

wherein the second inclination portion has a second base end portion extending toward the attachment portion and a second distal end portion extending in a direction away from the attachment portion, and

the second distal end portion is further away from the attachment portion than the first distal end portion.

[Claim 7]

The discharge device according to claim 6, further comprising:

an extending portion extending from the second distal end portion to a side of the attachment portion,

wherein the extending portion has a construction part which is inclined with respect to the attachment portion at an angle different from the second inclination portion and for which labeling is performed.

[Claim 8]

The discharge device according to claim 7,

wherein the second inclination portion has a plurality of first long holes extending from the second base end portion to the second distal end portion,

the extending portion has a plurality of second long holes extending from the second distal end portion to a predetermined position of the extending portion, and

the predetermined position substantially coincides with a position of the first distal end portion.

[Claim 9]

The discharge device according to claim 8,

wherein the second inclination portion further has one pair of second walls,

the one pair of first walls are disposed between the one pair of second walls, and

the plurality of first long holes are disposed between the one pair of first walls.

[Claim 10]

The discharge device according to any one of claims 3 to 9,

wherein the first base end portion has a flat plate shape,

the first distal end portion has a flat plate shape, and

an angle of the first distal end portion with respect to the attachment portion is smaller than an angle of the first base end portion with respect to the attachment portion.

[Claim 11]

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An air conditioning system comprising:
the discharge device according to any one of claims 1 to 10; and
an air conditioning device that blows out air toward the discharge device.