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(54) ATOMIZER AND CARRIER COMPRISING SAME

(57) An atomizer (100) and a vehicle (200) having same are provided. The atomizer (100) includes: a housing assembly (20), where at least a part of the housing assembly (20) is configured to guide a flow direction of airflow, the housing assembly (20) is provided with a first mounting cavity (52), and the housing assembly (20) is provided with a fluid inlet (5611) and a fluid outlet (71) communicating with the first mounting cavity (52); a fog-generating device (10) configured to produce and spray fog drops, where a part of the fog-generating device (10) is disposed in the first mounting cavity (52), and other part of the fog-generating device extends toward the fluid outlet (71); and an air supply device (30) disposed in the first mounting cavity (52), where the air supply device (30) is located upstream of the fog-generating device (10) along the flow direction of the airflow.

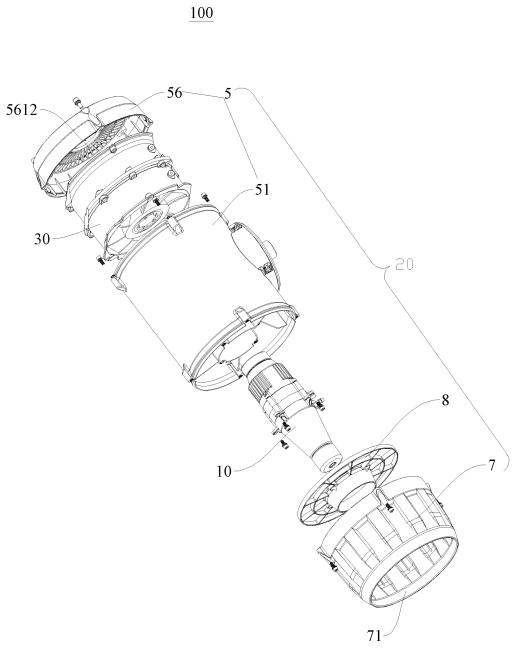

FIG. 1

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Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is filed based on and claims priority to CN Patent Application No. 201911315718.9 and CN Patent Application No. 201922301609.3, which are filed on December 19, 2019. All content of both CN patent applications are incorporated herein by reference in their entireties.

TECHNICAL FIELD

[0002] This application relates to the technical field of atomization, and in particular, to an atomizer and a vehicle having the atomizer.

BACKGROUND

[0003] In the related art, an atomizer has a complex structure and is difficult to assemble. In addition, the spray range of the atomizer is short, such that working efficiency of the atomizer is affected. Therefore, the structure of the atomizer needs to be improved.

SUMMARY

[0004] This application is intended to solve at least one of the technical problems existing in prior art. Therefore, an objective of this application is to provide an atomizer featuring simple structure with easy assembly, long spray range and high working efficiency.

[0005] This application further provides a vehicle including the foregoing atomizer.

[0006] The atomizer according to an embodiment of this application includes: a housing assembly, where at least a part of the housing assembly is configured to guide a flow direction of airflow, the housing assembly is provided with a first mounting cavity, and the housing assembly is provided with a fluid inlet and a fluid outlet communicating with the first mounting cavity; a fog-generating device configured to produce and spray fog drops, where a part of the fog-generating device is disposed in the first mounting cavity, and the other part of the fog-generating device extends toward the fluid outlet; and an air supply device, where the air supply device is disposed in the first mounting cavity, and the air supply device is located upstream of the fog-generating device along the flow direction of the airflow.

[0007] In the atomizer according to this embodiment of this application, a part of the fog-generating device is disposed in the first mounting cavity and the other part of the fog-generating device extends towards the fluid outlet. In addition, the air supply device is disposed in the first mounting cavity, and the air supply device is located upstream of the fog-generating device along the flow direction of the airflow. Therefore, the spray range of the atomizer can be increased, and the working efficiency of the atomizer can be improved. In addition, the atomizer has a simple structure and is easy to assemble.

[0008] According to some embodiments of this application, the fog-generating device includes: a housing, where the housing is provided with an air inlet and a droplet outlet, and the droplet outlet and the fluid outlet are disposed facing each other; a power assembly, where the power assembly is disposed in the housing, the power assembly includes a draught fan and an electrical control board, and the electrical control board is connected to the draught fan to control a running status of the draught fan; and an atomization assembly, where the atomization assembly is disposed in the housing, the atomization assembly includes a spray nozzle and a liquid guide tube, a liquid inlet of the spray nozzle is connected to the liquid guide tube, and a liquid outlet of the spray nozzle and the droplet outlet are disposed facing each other.

[0009] In some embodiments of this application, the fog-generating device further includes a separator, and the separator is disposed in the housing and is connected to the housing to separate the interior of the housing into a first working cavity and a second working cavity, where the first working cavity communicates with the air inlet, the second working cavity communicates with the droplet outlet, the power assembly is located in the first working cavity, the atomization assembly is located in the second working cavity, the separator is provided with air vents, and the first working cavity communicates with the second working cavity through the air vents.

[0010] In some embodiments of this application, a part of the separator is recessed in a direction away from the droplet outlet to form a water-receiving portion.

[0011] In some embodiments of this application, an inner wall of the water-receiving portion is provided with a first reinforcing rib to separate the water-receiving portion into a plurality of water-receiving troughs.

[0012] In some embodiments of this application, there are a plurality of air vents, and the plurality of air vents are spaced along a circumferential direction of the separator.

[0013] In some embodiments of this application, a second reinforcing rib is disposed between two adjacent air vents.

[0014] According to some embodiments of this application, the fog-generating device includes a centrifugal spray head, and the centrifugal spray head is disposed close to the fluid outlet.

[0015] According to some embodiments of this application, the fog-generating device includes a pressure spray head, and the pressure spray head is disposed close to the fluid outlet.

[0016] According to some embodiments of this application, the housing assembly includes a housing body and an air guide shell, where the air guide shell is configured to guide a direction of airflow, the housing body is provided with the first mounting cavity, the housing body is provided with the fluid inlet, the air guide shell is provided on the housing body, the air guide shell is pro-

vided with the fluid outlet, and the other part of the fog-generating device stretches into the air guide shell.

[0017] In some embodiments of this application, a cross-sectional area of the air guide shell decreases gradually along the flow direction of the airflow.

[0018] According to some embodiments of this application, the housing body includes: a mounting housing, where the first mounting cavity is defined in the mounting housing; and a mounting portion, where the mounting portion is disposed in the first mounting cavity, the mounting portion is located downstream of the air supply device along the flow direction of the airflow, a fitting cavity is defined in the mounting portion, an air supply channel is provided on the outer side of the fitting cavity, an air intake port and air guide ports are provided at one end of the mounting portion close to the air supply device, one end of the fog-generating device stretches into the fitting cavity, a part of the fog-generating device located in the fitting cavity is provided with the air inlet communicating with the air intake port, and a heat exchange air channel communicating with the air guide ports is provided on the outer side of the fog-generating device.

[0019] In some embodiments of this application, the housing body further includes a plurality of connecting portions, the plurality of connecting portions are spaced along a circumferential direction of the mounting housing, and one end of each connecting portion is connected to an inner peripheral wall of the mounting housing, and another end is connected to an outer peripheral wall of the mounting portion.

[0020] In some embodiments of this application, the mounting portion includes: a mounting plate, where two axial ends of the mounting plate are open to define the fitting cavity, and an outer peripheral wall of the mounting plate is connected to an inner peripheral wall of the mounting housing; and a fitting plate, where the fitting plate is located in the fitting cavity and is disposed at one end of the mounting plate close to the air supply device to block the opening of the mounting plate, and the fitting plate is provided with the air intake port and the air guide ports.

[0021] In some embodiments of this application, the mounting portion includes a plurality of position limiting plates, and the plurality of position limiting plates are spaced along a circumferential direction of the fitting cavity. One end of each of the plurality of position limiting plates is connected to an inner peripheral wall of the fitting cavity, and another end is adapted to abut against an outer peripheral wall of the fog-generating device.

[0022] In some embodiments of this application, there are a plurality of air guide ports, and each of the plurality of air guide ports faces space defined between two adjacent position limiting plates along the flow direction of the airflow.

[0023] According to some embodiments of this application, the housing assembly further includes a securing frame, the securing frame is located between the housing body and the air guide shell, the securing frame is sheathed on an outer peripheral wall of the fog-generating device, and the securing frame is fixedly connected to the housing body by means of a connecting piece to secure the fog-generating device onto the housing body.

[0024] A vehicle according to an embodiment of this application includes the atomizer according to the foregoing embodiment of this application.

[0025] According to the vehicle of this embodiment of this application, the atomizer according to the foregoing embodiment of this application is disposed, so that a spray range of the atomizer can be increased, and the working efficiency of the vehicle can be improved.

[0026] Additional aspects and advantages of this application are set forth in part in the following description, and in part will be apparent from the following description, or may be learned by practice of this application.

BRIEF DESCRIPTION OF DRAWINGS

[0027] The above and/or additional aspects and advantages of this application will become apparent and easily comprehensible from the following description of embodiments in conjunction with the accompanying drawings, in which:

FIG. 1 is an exploded view of an atomizer according to some embodiments of this application;
FIG. 2 is a sectional view of an atomizer according to some embodiments of this application;
FIG. 3 is a sectional view of a fog-generating device according to some embodiments of this application;
FIG. 4 is a schematic diagram of a second housing section according to some embodiments of this application;
FIG. 5 is a schematic diagram of a housing body according to some embodiments of this application;
FIG. 6 is a schematic diagram of a securing frame according to some embodiments of this application;
FIG. 7 is a schematic diagram of a securing cover according to some embodiments of this application;
FIG. 8 is an exploded view of a fog-generating device according to some embodiments of this application;
FIG. 9 is a schematic diagram of an air supply device according to some embodiments of this application;
FIG. 10 is a schematic diagram of a spray nozzle according to some embodiments of this application; and
FIG. 11 is a schematic diagram of a vehicle according to some embodiments of this application.

[0028] Reference numerals:

100: atomizer; 200: vehicle;
10: fog-generating device;
1: housing;
11: first housing section; 12: second housing section;
13: third housing section;
14: first end cover; 141: droplet outlet; 15: second

end cover; 151: air inlet;
16: second mounting cavity; 161: first working cavity; 162: second working cavity;
2: power assembly;
21: draught fan; 211: power motor; 212: power wind wheel; 22: electrical control board;
23: power housing; 231: ventilation opening; 24: diversion air duct;
3: atomization assembly;
31: spray nozzle; 311: spray nozzle body; 3111: liquid inlet; 3112: liquid outlet; 312: water isolation portion;
313: first annular plate; 314: second annular plate; 315: fitting protrusion; 32: liquid guide tube;
4: separator;
41: air vent;
42: water-receiving portion; 421: first reinforcing rib; 422: water-receiving trough; 423: annular rib;
43: second reinforcing rib;
20: housing assembly;
5: housing body;
51: mounting housing; 52: first mounting cavity;
53: mounting portion; 531: mounting plate; 532: fitting cavity; 533: fitting plate; 5331: air guide port; 5332: air intake port; 534: position limiting plate; 54: connecting portion; 55: abutting portion;
56: securing cover; 561: securing bottom wall; 5611: fluid inlet; 5612: air-inlet grille; 562: securing peripheral wall;
7: air guide shell;
71: fluid outlet;
8: securing frame;
30: air supply device;
301: air supply rim; 302: air supply motor; 303: air supply wind wheel;
40: air supply channel; 50: heat exchange air channel.

DETAILED DESCRIPTION

[0029] Embodiments of this application are described below in detail, and examples of the embodiments are shown in the accompanying drawings, where identical or similar reference numerals throughout the specification represent identical or similar elements or the elements having identical or similar functions. The embodiments described below with reference to the accompanying drawings are exemplary and only used to explain this application, and shall not be understood as a limitation to this application.

[0030] In the description of this application, it should be understood that, orientation or position relationships indicated by the terms "central", "longitudinal", " transverse", "length", "width", "thickness", "upper", "lower", "front", "rear", "left", "right", "vertical", "horizontal", "top", "bottom", "inner", "outer", "clockwise", "anticlockwise", "axial direction", "radial direction", "circumferential direction", and the like are orientation or position relationships based on the accompanying drawings and are merely intended to facilitate the description of this application and simplify the description, rather than indicating or implying that the device or element mentioned must have a particular orientation or be constructed and operated in a particular orientation, and therefore should not be interpreted as limiting this application. In addition, features defined with "first" and "second" may explicitly or implicitly include one or more of the features. In the description of this application, unless otherwise specified, "a plurality of' means two or more.

[0031] In the description of this application, it should be noted that, unless expressly specified and defined otherwise, the terms "mount", "join", and "connect" should be understood in a broad sense. For example, "connection" may be a fixed connection, a detachable connection, or an integral connection; or may be a mechanical connection or an electrical connection; or may be a direct connection, an indirect connection by means of an intermediate medium, or a connection between two elements. For persons of ordinary skill in the art, specific meanings of the foregoing terms in this application may be understood based on specific situations.

[0032] An atomizer 100 according to an embodiment of this application is described below with reference to FIG. 1 to FIG. 11. The atomizer 100 may be applied to a mobile vehicle 200 such as an unmanned aerial vehicle, an unmanned vehicle, an unmanned ship, and the like. It should be noted that the vehicle 200 is a collective term for transportation means. For example, automobiles, motorcycles, and the like are collectively referred to as ground vehicle 200; planes, helicopters, and the like are collectively referred to as flying vehicle 200, or referred to as aircrafts; and ships are collectively referred to as marine vehicle 200. The ground vehicles, the flying vehicles, and the marine vehicles are collectively referred to as "vehicle 200". For example, in FIG. 11, the vehicle 200 is an unmanned vehicle.

[0033] As shown in FIG. 1 and FIG. 2, the atomizer 100 according to this embodiment of this application includes a housing assembly 20, a fog-generating device 10 and an air supply device 30.

[0034] Specifically, as shown in FIG. 1, FIG. 2 and FIG. 5, at least a part of the housing assembly 20 is configured to guide a direction of airflow, the housing assembly 20 is provided with a first mounting cavity 52, and the housing assembly 20 is provided with a fluid inlet 5611 and a fluid outlet 71 communicating with the first mounting cavity 52. In other words, the fluid inlet 5611 communicates with the fluid outlet 71 through the first mounting cavity 52. The airflow can flow into the first mounting cavity 52 through the fluid inlet 5611, and then flow out of the atomizer 100 through the fluid outlet 71.

[0035] As shown in FIG. 2, the fog-generating device 10 is configured to produce and spray fog drops, where a part of the fog-generating device 10 is disposed in the first mounting cavity 52, and the other part of the fog-generating device extends toward the fluid outlet 71. The

air supply device 30 is disposed in the first mounting cavity 52, and the air supply device 30 is located upstream of the fog-generating device 10 along the flow direction of the airflow. It can be understood that in the direction of the airflow, it is more reasonable to dispose a droplet outlet 141 of the fog-generating device 10 close to the fluid outlet 71, which helps the atomizer 100 to spray fog drops, thereby ensuring working efficiency of the atomizer 100.

[0036] It can be learned that the atomizer 100 may use the fog-generating device 10 to produce fog drops, and the fog drops sprayed by the fog-generating device 10 can be sprayed from the atomizer 100 through the fluid outlet 71. The fog-generating device 10 can be protected to a certain extent by disposing the housing assembly 20, so that reliability of spraying the fog drops from the atomizer 100 can be ensured to a certain extent, and reliability of the atomizer 100 is improved. In addition, it can be learned that the atomizer 100 in this embodiment of this application has a simple structure and is easy to assemble.

[0037] Due to the structural disposition of the air supply device 30 and the fog-generating device 10, when the atomizer 100 works, the air supply device 30 can send the airflow from the fluid inlet 5611 into the first mounting cavity 52 to the fluid outlet 71, which can increase a flow velocity of the airflow in the first mounting cavity 52 to a certain extent. The housing assembly 20 may further guide the airflow in the first mounting cavity 52 to the fluid outlet 71, thereby helping to increase the flow velocity of the airflow and air pressure in the housing assembly 20. It can be learned that the fog drops sprayed by the fog-generating device 10 can be sprayed farther under the action of the high-pressure and high-velocity airflow, thereby increasing the spray range of the atomizer 100 and improving the working efficiency of the atomizer 100.

[0038] In the atomizer 100 according to embodiments of this application, a part of the fog-generating device 10 is disposed in the first mounting cavity 52 and the other part of the fog-generating device extends towards the fluid outlet 71. In addition, the air supply device 30 is disposed in the first mounting cavity 52, and the air supply device 30 is located upstream of the fog-generating device 10 along the flow direction of the airflow. Therefore, the spray range of the atomizer 100 can be increased, and the working efficiency of the atomizer 100 can be improved. In addition, the atomizer 100 has a simple structure and is easy to assemble.

[0039] As shown in FIG. 3 and FIG. 8, according to some embodiments of this application, the fog-generating device 10 includes: a housing 1, a power assembly 2, and an atomization assembly 3. The housing 1 is provided with an air inlet 151 and a droplet outlet 141, and the droplet outlet 141 and the fluid outlet 71 are disposed facing each other. The power assembly 2 is disposed in the housing 1, the power assembly 2 includes a draught fan 21 and an electrical control board 22, and the electrical control board 22 is connected to the draught fan 21 to control a running status of the draught fan 21. The atomization assembly 3 is disposed in the housing 1, the atomization assembly 3 includes a spray nozzle 31 and a liquid guide tube 32, a liquid inlet 3111 of the spray nozzle 31 is connected to the liquid guide tube 32, and a liquid outlet 3112 of the spray nozzle 31 and the droplet outlet 141 are disposed facing each other.

[0040] It can be learned that in a case where the fog-generating device 10 is running, the atomizer 100 can control rotation of the draught fan 21 by means of the electrical control board 22, so that the airflow can enter the inside of the housing 1 through the air inlet 151, and finally flow to the droplet outlet 141. The liquid guide tube 32 can guide a liquid to be atomized to the spray nozzle 31, and the liquid is sprayed from the spray nozzle 31 to the droplet outlet 141. In this case, the air pressure in the housing 1 is higher than the air pressure outside the housing 1, such that the spray from the spray nozzle 31 is refined and atomized under the action of the high-velocity airflow, and is finally sprayed out of the housing 1 through the droplet outlet 141, and a process of droplet producing and spraying by the fog-generating device 10 is further implemented. It can be understood that the draught fan 21 is disposed in the fog-generating device 10, such that the draught fan 21 can cooperate with the air supply device 30, thereby not only atomizing the liquid, but also spraying the atomized fog drops for a long distance. This is beneficial to reduce the energy consumption and extend the service life of the air supply device 30 and the draught fan 21.

[0041] As shown in FIG. 3 and FIG. 4, in some embodiments of this application, the fog-generating device 10 further includes a separator 4, and the separator 4 is disposed in the housing 1 and is connected to the housing 1 to separate the interior of the housing 1 into a first working cavity 161 and a second working cavity 162, where the first working cavity 161 communicates with the air inlet 151, the second working cavity 162 communicates with the droplet outlet 141, the power assembly 2 is located in the first working cavity 161, the atomization assembly 3 is located in the second working cavity 162, the separator 4 is provided with air vents 41, and the first working cavity 161 communicates with the second working cavity 162 through the air vents 41.

[0042] It can be learned that in the atomizer 100 of this embodiment of this application, disposition of the separator 4 can effectively prevent failures such as a short circuit caused by the spray flowing back to the housing 1 and contacting with the electrical control board 22, thereby further improving the operation reliability of the power assembly 2, improving the working reliability of the fog-generating device 10, and ensuring the working reliability of the atomizer 100 to a certain extent.

[0043] It can be understood that the spray flowing back to the housing 1 cannot flow to the first working cavity 161 through the air vents 41 and therefore cannot be in contact with the electric control board 22. This is because in a case where the draught fan 21 in the first working

cavity 161 rotating, the airflow enters the first working cavity 161 through the air inlet 151. Therefore, the air pressure in the first working cavity 161 is significantly higher than the air pressure in the second working cavity 162. Under the action of the pressure difference, the airflow flows from the first working cavity 161 to the second working cavity 162, so that the airflow can directly blow away the spray flowing to the air vents 41. This can ensure the spray isolation effect of the separator 4, and ensure the working reliability of the fog-generating device 10, thereby ensuring the working reliability of the atomizer 100.

[0044] As shown in FIG. 3 and FIG. 4, in some embodiments of this application, a portion of the separator 4 is recessed in a direction away from the droplet outlet 141 to form a water-receiving portion 42. It can be learned that the water-receiving portion 42 can, to a certain extent, collect the liquid that is liquefied from the isolated spray on the water-receiving portion 42, thereby further improving the spray isolation effect of the separator 4, further preventing a short circuit and other failures caused when the spray flows back to the housing 1 and is in contact with the electrical control board 22, improving the operation reliability of the power assembly 2, and improving the working reliability of the fog-generating device 10. In addition, this is beneficial to improving the structural strength and reliability of the separator 4. Therefore, the operation reliability of the atomizer 100 is ensured.

[0045] As shown in FIG. 4, in some embodiments of this application, an inner wall of the water-receiving portion 42 is provided with a first reinforcing rib 421 to separate the water-receiving portion 42 into a plurality of water-receiving troughs 422. It can be learned that disposition of the first reinforcing rib 421 can further improve the structural strength and reliability of the separator 4. In addition, the plurality of water-receiving troughs 422 can improve a liquid collection capacity of the water-receiving portion 42, thereby further improving the reliability of the fog-generating device 10 and the reliability of the atomizer 100.

[0046] Specifically, as shown in FIG. 4, there are a plurality of first reinforcing ribs 421 and the plurality of first reinforcing ribs 421 are spaced on the inner wall of the water-receiving portion 42. Therefore, the reliability of the separator 4 can be further improved, and more water-receiving troughs 422 are formed on the water-receiving portion 42, thereby improving the reliability of the fog-generating device 10. Optionally, each first reinforcing rib 421 is formed in a plate shape, and a central axis of the plurality of first reinforcing ribs 421 and a central axis of the water-receiving portion 42 meet at a same point. Optionally, an annular rib 423 is further provided on the inner wall of the water-receiving portion 42, a central axis of the annular rib 423 coincides with the central axis of the water-receiving portion 42, and the annular rib 423 intersects the plurality of first reinforcing ribs 421. There may be a plurality of annular ribs 423, and the plurality of annular ribs 423 are sequentially spaced along an extension direction of the first reinforcing ribs 421. This can further improve the structural strength and the reliability of the separator 4, thereby improving the reliability of the fog-generating device 10.

[0047] In some embodiments of this application, along the flow direction of the airflow, the air vents 41 and the droplet outlet 141 are arranged in a staggered manner. Therefore, the disposition effect of the separator 4 can be further improved, which is beneficial to avoiding impact of the spray flowing back to the housing 1 on the airflow, so that the air flows more smoothly near the air vents 41. This is beneficial to making the fog drops from the droplet outlet 141 finer, and is beneficial to enhancing the droplet-producing effect of the fog-generating device 10.

[0048] As shown in FIG. 4, in some embodiments of this application, the air vents 41 are located at an edge of the separator 4 and extends along a circumferential direction of the separator 4. It is known that the draught fan 21 in the power assembly 2 is an axial flow fan 21, and the pressure of the airflow is the highest near an inner peripheral wall of the housing 1, so that disposition of the air vents 41 is beneficial to increasing the flow velocity of air in the fog-generating device 10, thereby further helping to make the fog drops sprayed from the droplet outlet 141 finer, and enhancing the droplet-producing effect of the fog-generating device 10.

[0049] As shown in FIG. 4, in some embodiments of this application, there are a plurality of air vents 41, and the plurality of air vents 41 are spaced along a circumferential direction of the separator 4. Therefore, disposition of the plurality of air vents 41 is beneficial to increasing a flow area of the air when the air flows through the separator 4, which is further beneficial to increasing the flow velocity of air in the fog-generating device 10, so that the fog drops sprayed from the droplet outlet 141 are finer, and the droplet-producing effect of the fog-generating device 10 is enhanced.

[0050] As shown in FIG. 4, in some embodiments of this application, a second reinforcing rib 43 is provided between two adjacent air vents 41. This can further enhance the structural strength and the reliability of the separator 4, thereby further improving the reliability of the fog-generating device 10.

[0051] In some embodiments of this application, the separator 4 and the housing 1 are formed integrally. This can improve the production efficiency of the fog-generating device 10 and improve the structural reliability of the fog-generating device 10.

[0052] As shown in FIG. 4, in some embodiments of this application, a part of an outer peripheral wall of the separator 4 and a part of the inner peripheral wall of the housing 1 jointly define the air vents 41. It can be learned that a disposition manner of the air vents 41 is simple and reliable. In addition, the housing 1 and the separator 4 are facilitated to be manufactured and processed.

[0053] According to some embodiments of this appli-

cation, the fog-generating device 10 includes a centrifugal spray head, and the centrifugal spray head is disposed close to the fluid outlet 71. It can be learned that the fog drops produced in the fog-generating device 10 can be sprayed out of the fog-generating device 10 through the centrifugal spray head, and the sprayed fog drops are sprayed out of the fluid outlet 71 under the action of the airflow guided by the air guide shell 7.

[0054] According to some embodiments of this application, the fog-generating device 10 includes a pressure spray head, and the pressure spray head is disposed close to the fluid outlet 71. It can be learned that the fog drops produced in the fog-generating device 10 can be sprayed out of the fog-generating device 10 through the pressure spray head, and the sprayed fog drops are sprayed out of the fluid outlet 71 under the action of the airflow guided by the air guide shell 7.

[0055] It should be noted that the fog-generating device 10 may alternatively include other types of spray heads, as long as the reliability of the fog-generating device 10 in producing and spraying fog drops and the reliability of the atomizer 100 can be ensured.

[0056] As shown in FIG. 1 and FIG. 2, according to some embodiments of this application, the housing assembly 20 includes a housing body 5 and an air guide shell 7, where the air guide shell 7 is configured to guide a direction of airflow, the housing body 5 is provided with the first mounting cavity 52, the housing body 5 is provided with the fluid inlet 5611, the air guide shell 7 is provided on the housing body 5 and the air guide shell 7 is provided with the fluid outlet 71, and the other part of the fog-generating device 10 stretches into the air guide shell. It can be learned that the housing assembly 20 has a simple structure, which facilitates the mounting and disassembly of the fog-generating device 10. When the atomizer 100 works, the air supply device 30 may send the airflow flowing from the fluid inlet 5611 into the first mounting cavity 52 to the fluid outlet 71 on the air guide shell 7, and the air guide shell 7 can guide the airflow in the first mounting cavity 52 to the fluid outlet 71, thereby helping to increase the flow velocity of the airflow and the air pressure in the air guide shell 7. It can be learned that the fog drops sprayed by the fog-generating device 10 can be sprayed farther under the action of the high-pressure and high-velocity airflow, thereby increasing the spray range of the atomizer 100 and improving the working efficiency of the atomizer 100.

[0057] As shown in FIG. 1 and FIG. 2, according to some embodiments of this application, a cross-sectional area of the air guide shell 7 decreases gradually along the flow direction of the airflow. In this way, the guiding effect of the air guide shell 7 on the airflow can be enhanced, and the air pressure at the fluid outlet 71 can be higher, which is beneficial to further increase the spray range of the atomizer 100 and improve the working efficiency of the atomizer 100.

[0058] As shown in FIG. 2 and FIG. 5, according to some embodiments of this application, the housing body 5 includes a mounting housing 51 and a mounting portion 53.

[0059] The first mounting cavity 52 is defined in the mounting housing 51. The mounting portion 53 is disposed in the first mounting cavity 52, and the mounting portion 53 is located downstream of the air supply device 30 along the flow direction of the airflow. A fitting cavity 532 is defined in the mounting portion 53, an air supply channel 40 is provided on the outer side of the fitting cavity 532, and an air intake port 5332 and air guide ports 5331 are provided at one end of the mounting portion 53 close to the air supply device 30. One end of the fog-generating device 10 stretches into the fitting cavity 532, a portion of the fog-generating device 10 located in the fitting cavity 532 is provided with the air inlet 151 communicating with the air intake port 5332, and a heat exchange air channel 50 communicating with the air guide ports 5331 is provided on the outer side of the fog-generating device 10.

[0060] It can be learned that the airflow entering the first mounting cavity 52 from the fluid inlet 5611 may flow to the fluid outlet 71 on the air guide shell 7 through the air supply channel 40, or may enter the fitting cavity 532 through the air intake port 5332 and the air guide ports 5331, so that the airflow also exists in the fitting cavity 532. One part of the airflow in the fitting cavity 532 may enter the fog-generating device 10 through the air inlet 151, and the other part of the airflow may enter the heat exchange air channel 50 through the air guide ports 5331, and may flow on the outer wall of the fog-generating device 10 along the heat exchange air channel 50. The heat generated by the fog-generating device 10 during operation can be exchanged with this part of airflow, and then this part of heat can be dissipated in time, so as to improve the heat dissipation effect of the atomizer 100 and the working reliability of the atomizer 100. It can be understood that the air supply device 30 can achieve forced flow of the airflow in the first mounting cavity 52 to a certain extent, so that the airflow entering the heat exchange air channel 50 can be quickly discharged to the external space after heat exchange with the fog-generating device 10, so as to accelerate the heat dissipation for the fog-generating device 10 and further improve the heat dissipation effect of the atomizer 100.

[0061] As shown in FIG. 5, in some embodiments of this application, the housing body 5 further includes a plurality of connecting portions 54, the plurality of connecting portions 54 are spaced along a circumferential direction of the mounting housing 51, and one end of each connecting portion 54 is connected to an inner peripheral wall of the mounting housing 51, and another end is connected to an outer peripheral wall of the mounting portion 53. It can be learned that the connecting portions 54 are located in the air supply channel 40, and the mounting housing 51 and the mounting portion 53 may be connected by using the plurality of connecting portions 54, so that a connection between the mounting housing 51 and the mounting portion 53 is simple and reliable.

Optionally, the plurality of connecting portions 54 are evenly spaced. This can further improve the reliability of the connection between the mounting housing 51 and the mounting portion 53, and is also beneficial to improving the structural strength of the housing body 5.

[0062] Specifically, as shown in FIG. 5, in an example of this application, each of the plurality of connecting portions 54 is formed in a shape of plate, and the connecting portions 54 extend along an axial direction of the first mounting cavity 52. This can reduce blocking of the airflow in the air supply channel 40 by the connecting portions 54, so as to improve the smoothness of the airflow in the air supply channel 40.

[0063] In some embodiments of this application, the mounting housing 51, the mounting portion 53, and the plurality of connecting portions 54 are formed integrally. Therefore, an integral structure can not only ensure the stability of the structure and performance of the mounting housing 51, the mounting portion 53, and the connecting portions 54, but also feature convenient molding and simple manufacturing. Moreover, extra assembly parts and connection processes are omitted, which greatly improves the manufacturing efficiency of the housing body 5, and ensuring the connection reliability of the mounting housing 51, the mounting portion 53, and the connecting portions 54. In addition, the integral structure has higher overall strength and stability, is easier to assemble, and has a longer service life.

[0064] As shown in FIG. 5, in some embodiments of this application, the mounting portion 53 includes a mounting plate 531 and a fitting plate 533. Two axial ends of the mounting plate 531 are open to define the fitting cavity 532, and an outer peripheral wall of the mounting plate 531 is connected to the inner peripheral wall of the mounting housing 51. The fitting plate 533 is located in the fitting cavity 532 and is disposed at one end of the mounting plate 531 close to the air supply device 30 to block the opening of the mounting plate 531, and the fitting plate 533 is provided with the air intake port 5332 and the air guide ports 5331. It can be understood that the mounting plate 531 and the fitting plate 533 have relatively simple structures, with relatively low manufacturing difficulty. Therefore, a manufacturing cycle of the mounting portion 53 can be shortened, production costs of the mounting portion 53 can be reduced, and the processing efficiency of the mounting portion 53 can be improved. Optionally, as shown in FIG. 5, the fitting plate 533 is provided with an air intake port 5332, and the air intake port 5332 is located at the center of the fitting plate 533. There are a plurality of air guide ports 5331, and the plurality of air guide ports 5331 are spaced along a circumferential direction of the air intake port 5332.

[0065] As shown in FIG. 5, in some embodiments of this application, the mounting portion 53 includes a plurality of position limiting plates 534, and the plurality of position limiting plates 534 are spaced along a circumferential direction of the fitting cavity 532. One end of each of the plurality of position limiting plates 534 is connected to an inner peripheral wall of the fitting cavity 532, and another end is adapted to abut against an outer peripheral wall of the fog-generating device 10. Therefore, it can be understood that disposition of the position limiting plates 534 may limit and support the fog-generating device 10, and thereby facilitate the mounting of the fog-generating device 10. In addition, extra connecting pieces may further be omitted, thereby reducing complexity of the structure, which is beneficial to improving the assembly efficiency of the fog-generating device 10.

[0066] As shown in FIG. 5, in some embodiments of this application, there are a plurality of air guide ports 5331, and each of the plurality of air guide ports 5331 faces space defined between two adjacent position limiting plates 534 along the flow direction of the airflow. It can be learned that position arrangement of the air guide ports 5331 and the position limiting plates 534 may effectively avoid the blocking of the airflow in the heat exchange air channel 50 by the position limiting plates 534, and two adjacent position limiting plates 534 also have a guiding effect on the airflow flowing therebetween, so as to improve the smoothness of the airflow in the heat exchange air channel 50, thereby accelerating the heat dissipation of the fog-generating device 10 to a certain extent, and further improving the heat dissipation effect of the atomizer 100 and the reliability of the atomizer 100.

[0067] Specifically, as shown in FIG. 1, FIG. 2 and FIG. 7, the housing body 5 further includes a securing cover 56. The securing cover 56 and the air guide shell 7 are respectively mounted at two opposite ends of the mounting housing 51, and the securing cover 56 is provided with the fluid inlet 5611. One end of the air supply device 30 is secured in the first mounting cavity 52, and another end is connected to the securing cover 56 in a fitting manner. It can be learned that structural disposition of the housing body 5 facilitates the assembly, disassembly, and maintenance of the air supply device 30. In addition, it can be learned that the housing body 5 has a simple structure.

[0068] As shown in FIG. 1, FIG. 2 and FIG. 6, in some embodiments of this application, the housing assembly 20 further includes a securing frame 8, the securing frame 8 is located between the housing body 5 and the air guide shell 7, the securing frame 8 is sheathed on an outer peripheral wall of the fog-generating device 10, and the securing frame 8 is fixedly connected to the housing body 5 by means of a connecting piece to secure the fog-generating device 10 onto the housing body 5. This can improve the reliability of securing the atomizer 10 onto the housing body 5, thereby ensuring the reliability and stability of the structure of the atomizer 100. Specifically, the securing frame 8, the fog-generating device 10, and the housing body 5 are all provided with connecting holes, and the connecting piece successively passes through the connecting holes of the securing frame 8 and the fog-generating device 10, so as to stretch into the connecting hole on the housing body 5. In this way, the reliability of securing the fog-generating device 10 is ensured.

[0069] A structure of the atomizer 100 according to a specific embodiment of this application is described in detail below with reference to FIG. 1 to FIG. 11. However, it should be noted that the following description is merely exemplary. After reading the following technical solution of this application, persons of ordinary skill can obviously make combinations, substitutions, or modifications to the technical solution or some technical features, which also fall within the protection scope claimed by this application.

[0070] As shown in FIG. 11, the vehicle 200 is an unmanned vehicle, and an atomizer 100 is provided on the unmanned vehicle. As shown in FIG. 1, the atomizer 100 according to a specific embodiment of this application includes a fog-generating device 10, an air supply device 30, and a housing assembly 20.

[0071] Specifically, as shown in FIG. 1 and FIG. 2, the housing assembly 20 includes a housing body 5, a securing frame 8, and an air guide shell 7. The housing body 5 includes a mounting housing 51 and a securing cover 56. The securing cover 56 and the air guide shell 7 are respectively located at two opposite ends of the mounting housing 51, and are connected to the mounting housing 51 to define an appearance of the atomizer 100. The securing frame 8 is located between the air guide shell 7 and the housing body 5, and is connected to the housing body 5. A fluid inlet 5611 is provided on the securing cover 56, and one end of the air guide shell 7 away from the housing body 5 is open, so as to define a fluid outlet 71.

[0072] As shown in FIG. 5, the housing body 5 further includes a mounting portion 53, connecting portions 54, and an abutting portion 55. The housing body 5 may be formed integrally, for example, formed through integral injection molding.

[0073] As shown in FIG. 2 and FIG. 5, the mounting housing 51 is substantially formed as a hollow cylindrical structure. The mounting housing 51 defines a first mounting cavity 52. Apart of the first mounting cavity 52 close to a side of the securing cover 56 is adapted to mount the air supply device 30, and a part of the first mounting cavity 52 close to a side of the air guide shell 7 is adapted to mount the fog-generating device 10.

[0074] As shown in FIG. 2 and FIG. 5, the mounting portion 53 is located in the mounting housing 51 and is configured to mount the fog-generating device 10. The mounting portion 53 includes a mounting plate 531, a fitting plate 533 and the position limiting plates 534. The mounting plate 531 is substantially formed as a hollow cylindrical structure and is disposed coaxially with the mounting housing 51, and the air supply channel 40 is defined between an outer peripheral wall of the mounting plate 531 and an inner peripheral wall of the mounting housing 51. There are a plurality of connecting portions 54, and the plurality of connecting portions 54 are evenly spaced along a circumferential direction of the mounting housing 51. Each connecting portion 54 is formed in a plate shape. One end of each connecting portion 54 is connected to the outer peripheral wall of the mounting plate 531, and another end is connected to the inner peripheral wall of the mounting housing 51. An extension direction of each connecting portion 54 is the same as that of a central axis of the mounting plate 531, which is beneficial to improving the stability and reliability of the fitting connection between the connecting portion 54 and the mounting housing 51 and the mounting plate 531, and ensuring the stability and reliability of the structure of the housing body 5 to a certain extent. In addition, the smoothness of the airflow in the air supply channel 40 can be improved to a certain extent, which is beneficial to improving the air guiding capability of the first mounting cavity 52.

[0075] A fitting cavity 532 is formed in the mounting plate 531, and the fitting plate 533 is located in the fitting cavity 532 and is disposed close to the air supply device 30. The fitting plate 533 is formed as an annular plate to define the air intake port 5332 at the center, and an extension direction of the fitting plate 533 is perpendicular to the central axis of the mounting plate 531. An outer peripheral wall of the fitting plate 533 is connected to an inner peripheral wall of the mounting plate 531. The position limiting plates 534 are arranged on an end face of the fitting plate 533 facing the air guide shell 7 and are connected to the inner peripheral wall of the mounting plate 531. There are a plurality of position limiting plates 534, and the plurality of position limiting plates 534 are evenly spaced along a circumferential direction of the fitting plate 533. The fitting plate 533 is provided with a plurality of air guide ports 5331 spaced along the circumferential direction, and each of the plurality of air guide ports 5331 faces space defined between two adjacent position limiting plates 534 along the flow direction of the airflow. At least a part of the fog-generating device 10 is adapted to stretch into the fitting cavity 532 and is clamped between the plurality of position limiting plates 534, so as to define, with the mounting plate 531, a heat exchange air channel 50 communicating with the air guide ports 5331. The heat generated by the fog-generating device 10 during operation can be exchanged with the airflow in the heat exchange air channel 50, so that the heat can be dissipated in time, thereby improving the heat dissipation effect of the atomizer 100.

[0076] As shown in FIG. 1 and FIG. 2, the securing frame 8 is adapted to be sheathed on the fog-generating device 10 and fixedly connected to the mounting portion 53, so as to mount and secure the fog-generating device 10.

[0077] As shown in FIG. 5, an abutting portion 55 is provided on the inner peripheral wall of the mounting housing 1 and is formed as an annular plate. One end of the air supply device 30 abuts against the abutting portion 55 and is connected to the abutting portion 55 in a fitting manner, so as to mount and secure the air supply device 30 in the first mounting cavity 52 of the housing body 5.

[0078] Specifically, as shown in FIG. 2 and FIG. 9, the air supply device 30 includes an air supply rim 301, an

air supply motor 302, and an air supply wind wheel 303. The air supply motor 302 and the air supply wind wheel 303 are located in the air supply rim 301. A draught fan 21 is connected to the air supply wind wheel 303 to drive the air supply wind wheel 303 to rotate, so that air can flow into the first mounting cavity 52 through the fluid inlet 5611. The air supply device 30 abuts against the abutting portion 55 by using the air supply rim 301 and is fixedly connected to the abutting portion 55.

[0079] Specifically, as shown in FIG. 1, FIG. 2 and FIG. 7, the securing cover 56 includes a securing bottom wall 561 and a securing peripheral wall 562. The securing bottom wall 561 is provided with a fluid inlet 5611, and the fluid inlet 5611 is provided with an air-inlet grille 5612. It is known that the air-inlet grille 5612 provides both a filtering function and safety performance, thereby helping to ensure the reliability of the atomizer 100. For example, in practical applications, disposition of the air-inlet grille 5612 can effectively prevent a fault or damage of the air supply motor 302 caused when tree branches and other debris enter the first mounting cavity 52 through the fluid inlet 5611 and are in contact with the air supply motor 302. The disposition of the air-inlet grille 5612 can further effectively prevent clothes of an operator from being drawn into the first mounting cavity 52, thereby effectively improving the reliability and safety of the atomizer 100. A part of the air supply rim 301 is located in the securing cover 56 and is connected to the securing bottom wall 561 in a fitting manner, and the securing cover 56 is connected to the housing body 5 by means of the securing peripheral wall 562 in a fitting manner.

[0080] Specifically, as shown in FIG. 3, the fog-generating device 10 includes a housing 1, a power assembly 2, an atomization assembly 3, and a separator 4.

[0081] As shown in FIG. 3 and FIG. 8, the housing 1 includes a first housing section 11, a second housing section 12, a third housing section 13, a first end cover 14, and a second end cover 15. The first housing section 11, the second housing section 12, and the third housing section 13 are respectively formed as hollow structures to jointly define a second mounting cavity 16. The first housing section 11, the second housing section 12 and the third housing section 13 are arranged coaxially and connected sequentially. The first housing section 11 is a metal piece. The first end cover 14 is arranged at an opening of the third housing section 13 away from one end of the second housing section 12 and is in threaded connection with the third housing section 13. A droplet outlet 141 communicating with the second mounting cavity 16 is disposed at the center of the first end cover 14. The droplet outlet 141 is located in the air guide shell 7 and is disposed directly opposite the fluid outlet 71 on the air guide shell 7, so that the air guide shell 7 can be used to increase the spray range of the atomizer 100. The second end cover 15 is disposed at an opening of the first housing section 11 away from one end of the second housing section 12 and is sheathed on an end of the first housing section 11. The second end cover 15 is provided with an air inlet 151, and the air inlet 151 is provided with a filter, such as dustproof cotton, so as to ensure that when the air can flow into the fog-generating device 10 through the air inlet 51, dust and other debris can be effectively prevented from entering the fog-generating device 10. Therefore, the safety and reliability of the fog-generating device 10 can be ensured to a certain extent. The air inlet 151 and the air intake port 5332 on the fitting plate 533 are disposed facing each other and communicate with each other, so that the second mounting cavity 16 and the first mounting cavity 52 can communicate with each other. After the fog-generating device 10 stretches into the fitting cavity 532, the plurality of position limiting plates 534 of the mounting portion 53 abut against the second end cover 15 and the first housing section 11.

[0082] As shown in FIG. 2 to FIG. 4, the separator 4 is disposed at an end of the second housing section 12 close to the first housing section 11, and is formed integrally with the second housing section 12. The separator 4 separates the second mounting cavity 16 into a first working cavity 161 and a second working cavity 162. The first working cavity 161 communicates with the air inlet 151, the second working cavity 162 communicates with the droplet outlet 141, the separator 4 is provided with air vents 41, and the first working cavity 161 communicates with the second working cavity 162 through the air vents 41. This can effectively prevent failures such as a short circuit caused by the spray flowing back to the housing 1 and contacting with the electrical control board 22, thereby further improving the operation reliability of the power assembly 2 and the working reliability of the fog-generating device 10 to a certain extent.

[0083] Specifically, as shown in FIG. 3 and FIG. 4, a part at the center of the separator 4 is recessed in a direction away from the droplet outlet 141 to form a water-receiving portion 42. An inner wall of the water-receiving portion 42 is provided with a plurality of first reinforcing ribs 421 to separate the water-receiving portion 42 into a plurality of water-receiving troughs 422. A central axis of the water-receiving portion 42 is collinear with a central axis of the droplet outlet 141. The air vents 41 are located at an edge of the separator 4 and extend along a circumferential direction of the separator 4, and are disposed around the water-receiving portion 42. In addition, there are a plurality of air vents 41, and the plurality of air vents 41 are spaced along a circumferential direction of the separator 4. Apart of an outer peripheral wall of the separator 4 and a part of the inner peripheral wall of the second housing section 12 jointly define the air vents 41. A second reinforcing rib 43 is provided between two adjacent air vents 41. This can not only ensure the spray isolation effect of the separator 4, but also can improve the structural strength and reliability of the separator 4.

[0084] As shown in FIG. 3, the power assembly 2 is disposed in the first working cavity 161, the power assembly 2 includes a draught fan 21 and an electrical control board 22, and the electrical control board 22 is con-

nected to the draught fan 21 to control a running status of the draught fan 21. The draught fan 21 includes a power motor 211 and a power wind wheel 212, and the power motor 211 is connected to the power wind wheel 212 to drive the power wind wheel 212 to rotate. The power assembly 2 further includes a power housing 23, and the draught fan 21 and the electric control board 22 are both disposed in the power housing 23. One end of the power housing 23 facing the second end cover 15 is provided with a ventilation opening 231 disposed facing the air inlet 151. The power wind wheel 212 and the ventilation opening 231 are disposed facing each other, and the power motor 211 and the inner peripheral wall of the power housing 23 form a diversion air duct 24. Therefore, the air pressure in the first working cavity 161 can be increased with the rotation of the power wind wheel 212, so that the airflow flows to the second working cavity 162 through the air vents 41 to increase the air pressure inside the second working cavity 162.

[0085] Specifically, the draught fan 21 is located in the first housing section 11, and the first housing section 11 is a metal piece, so that when the power assembly 2 works, the heat generated by the draught fan 21 can be transferred to the first housing section 11. The first housing section 11 is clamped on the plurality of position limiting plates 534, so that when the air supply device 30 works, air can flow into the first mounting cavity 52 from the fluid inlet 5611. The airflow in the first mounting cavity 52 flowing through the plurality of air guide ports 5331 may exchange heat with the first housing section 11, so as to dissipate the heat from the first housing section 11. This can improve the heat dissipation effect of the atomizer 10, improve the reliability of the atomizer 100, and helps to prolong the service life of the atomizer 100 to a certain extent.

[0086] As shown in FIG. 3, the atomization assembly 3 is disposed in the second working cavity 162. The atomization assembly 3 includes a spray nozzle 31 and a liquid guide tube 32. A liquid inlet 3111 of the spray nozzle 31 is connected to the liquid guide tube 32, and a liquid outlet 3112 of the spray nozzle 31 and the droplet outlet 141 are disposed facing each other. One end of the liquid guide tube 32 away from the spray nozzle 31 extends out of the third housing 1 to connect to an external reservoir, so as to guide a liquid to be atomized to the spray nozzle 31.

[0087] Specifically, as shown in FIG. 3 and FIG. 10, the spray nozzle 31 includes a main body of the spray nozzle 31, a water isolation portion 312, and fitting protrusions 315. The main body of the spray nozzle 31 is formed in a tube shape, and a pagoda head is formed at the liquid inlet 3111 of the main body of the spray nozzle 31 to connect to the liquid guide tube 32 reliably in a sealed manner. The liquid outlet 3112 of the main body of the spray nozzle 31 is close to the droplet outlet 141 and is disposed directly opposite the droplet outlet 141. The water isolation portion 312 is sheathed on the main body of the spray nozzle 31 and is connected to the main body of the spray nozzle 31 in a sealed manner. In a direction close to the droplet outlet 141, a cross-sectional area of the water isolation portion 312 gradually increases. A first annular plate 313 is disposed at an end of the water isolation portion 312 close to the droplet outlet 141, and an extension direction of the first annular plate 313 is the same as that of a central axis of the droplet outlet 141. A second annular plate 314 is disposed on an inner wall surface of the water isolation portion 312. The second annular plate 314 is located within the first annular plate 313 and extends in the same direction as the first annular plate 313, so that the spray flowing back from the droplet outlet 141 can be isolated between the first annular plate 313 and the second annular plate 314 and/or between the second annular plate 314 and the main body of the spray nozzle 31 to a certain extent. This can further prevent a short circuit and other failures caused when the spray sprayed by the spray nozzle 31 flows back to the second mounting cavity 16 and is in contact with the electrical control board 22, thereby further improving the operation reliability of the power assembly 2 and the working reliability of the fog-generating device 10.

[0088] As shown in FIG. 10, there are a plurality of fitting protrusions 315, and the plurality of fitting protrusions 315 are spaced on an outer peripheral wall of the first annular plate 313 and are arranged around the first annular plate 313. Each fitting protrusion 315 is formed in a plate shape and extends toward the first end cover 14. The first end cover 14 is provided with a plurality of fitting slots, and the plurality of fitting slots and the plurality of fitting protrusions 315 are arranged in a one-to-one correspondence. Each fitting protrusion 315 is adapted to stretch into a corresponding fitting slot to secure the spray nozzle 31 onto the first end cover 14, so as to improve the spray reliability of the atomizer 100.

[0089] When the atomizer 100 works, the air supply motor 302 drives the air supply wind wheel 303 to rotate, so that the air outside the atomizer 100 can flow into the first mounting cavity 52 through the fluid inlet 5611. The electric control board 22 controls the power motor 211 to drive the power wind wheel 212 to rotate, so that the airflow in the first mounting cavity 52 can enter the first working cavity 161 through the air inlet 151, then flow to the second working cavity 162 through the air vents 41, and finally flow to the droplet outlet 141. The liquid guide tube 32 may guide a liquid to be atomized to the spray nozzle 31, and the liquid is sprayed from the spray nozzle 31 to the droplet outlet 141. In this case, because the air pressure in the housing 1 is higher than the air pressure outside the housing 1, the spray from the spray nozzle 31 is refined and atomized under the action of the high-velocity airflow, and is finally sprayed out of fog-generating device 10 through the droplet outlet 141. The spray sprayed out of the fog-generating device 10 is sprayed out of the wind guide shell 7 under the action of the air supply wind wheel 303.

[0090] In addition, it can be understood that, according

to the atomizer 100 in the specific embodiment of this application, the air supply device 30 is provided with the air supply motor 302 and the air supply wind wheel 303, and the fog-generating device 10 is provided with the power motor 211 and the power wind wheel 212. The air supply motor 302 and the air supply wind wheel 303 of the air supply device 30 may be used for air supply, and the power motor 211 and the power wind wheel 212 in the fog-generating device 10 may be used for producing fog drops. Therefore, compared with a structure in the prior art that uses only one draught fan for liquid atomization and air supply, under a condition that a same spraying effect is achieved, in the atomizer 100 of this embodiment of this application, energy consumption of the air supply motor 302 and the power motor 211 is lower, which reduces the energy consumption of the atomizer 100.

[0091] Other compositions and operations of the atomizer 100 according to this embodiment of this application are known to persons of ordinary skill in the art, and details are not described herein.

[0092] A vehicle 200 according to an embodiment of this application is described below.

[0093] The vehicle 200 according to this embodiment of this application includes the atomizer 100 according to the foregoing embodiment of this application. The vehicle 200 may be a mobile spraying device such as a car, an aircraft, or a ship. For example, as shown in FIG. 11, the vehicle 200 is an unmanned vehicle.

[0094] According to the vehicle 200 of this embodiment of this application, the atomizer 100 according to the foregoing embodiment of this application is disposed, so that a spray range of the atomizer 100 can be increased, and the working efficiency of the vehicle 200 can be improved.

[0095] In the description of this specification, the description with reference to the terms "an embodiment", "some embodiments", "exemplary embodiments", "an example", "specific examples", "some examples", or the like means that specific features, structures, materials, or characteristics described in combination with the embodiments or examples are included in at least one embodiment or example of this application. In this specification, the schematic description of the foregoing terms does not necessarily refer to a same embodiment or example. Moreover, the described specific features, structures, materials, or characteristics may be combined in any one or more embodiments or examples in an appropriate manner.

[0096] Although the embodiments of this application have been illustrated and described, persons skilled in the art may understand that various changes, modifications, substitutions, and variations can be made to these embodiments without departing from the principle and essence of this application, and the scope of this application is limited by the claims and their equivalents.

Claims

1. An atomizer, comprising:

   a housing assembly, wherein at least a part of the housing assembly is configured to guide a flow direction of airflow, the housing assembly is provided with a first mounting cavity, the housing assembly is provided with a fluid inlet and a fluid outlet, and each of the fluid inlet and the fluid outlet communicates with the first mounting cavity;
   a fog-generating device configured to produce and spray fog drops, wherein a part of the fog-generating device is disposed in the first mounting cavity, and other part of the fog-generating device extends toward the fluid outlet; and
   an air supply device, wherein the air supply device is disposed in the first mounting cavity, and the air supply device is located upstream of the fog-generating device along the flow direction of the airflow.

2. The atomizer according to claim 1, wherein the fog-generating device comprises:

   a housing, wherein the housing is provided with an air inlet and a droplet outlet, and the droplet outlet and the fluid outlet are disposed facing each other;
   a power assembly, wherein the power assembly is disposed in the housing, the power assembly comprises a draught fan and an electrical control board, and the electrical control board is connected to the draught fan to control a running status of the draught fan; and
   an atomization assembly, wherein the atomization assembly is disposed in the housing, the atomization assembly comprises a spray nozzle and a liquid guide tube, a liquid inlet of the spray nozzle is connected to the liquid guide tube, and a liquid outlet of the spray nozzle and the droplet outlet are disposed facing each other.

3. The atomizer according to claim 2, wherein the fog-generating device further comprises a separator, the separator is disposed in the housing and is connected to the housing to separate an interior of the housing into a first working cavity and a second working cavity, the first working cavity communicates with the air inlet, the second working cavity communicates with the droplet outlet, the power assembly is located in the first working cavity, the atomization assembly is located in the second working cavity, the separator is provided with air vents, and the first working cavity communicates with the second working cavity through the air vents.

4. The atomizer according to claim 3, wherein a part of the separator is recessed in a direction away from the droplet outlet to form a water-receiving portion.

5. The atomizer according to claim 4, wherein an inner wall of the water-receiving portion is provided with a first reinforcing rib to separate the water-receiving portion into a plurality of water-receiving troughs.

6. The atomizer according to claim 3, wherein there are a plurality of air vents, and the plurality of air vents are spaced along a circumferential direction of the separator.

7. The atomizer according to claim 6, wherein a second reinforcing rib is disposed between two adjacent air vents of the plurality of air vents.

8. The atomizer according to any of claims 1 to 7, wherein the fog-generating device comprises a centrifugal spray head, and the centrifugal spray head is disposed close to the fluid outlet.

9. The atomizer according to any of claims 1 to 8, wherein the fog-generating device comprises a pressure spray head, and the pressure spray head is disposed close to the fluid outlet.

10. The atomizer according to any of claims 1 to 9, wherein the housing assembly comprises a housing body and an air guide shell, the air guide shell is configured to guide the flow direction of the airflow, the housing body is provided with the first mounting cavity, the housing body is provided with the fluid inlet, the air guide shell is disposed on the housing body, the air guide shell is provided with the fluid outlet, and the other part of the fog-generating device stretches into the air guide shell.

11. The atomizer according to claim 10, wherein a cross-sectional area of the air guide shell decreases gradually along the flow direction of the airflow.

12. The atomizer according to claim 10, wherein the housing body comprises:

a mounting housing, wherein the first mounting cavity is defined in the mounting housing; and
a mounting portion, wherein the mounting portion is disposed in the first mounting cavity, the mounting portion is located downstream of the air supply device along the flow direction of the airflow, a fitting cavity is defined in the mounting portion, an air supply channel is provided on the outer side of the fitting cavity, an air intake port and air guide ports are provided at one end, close to the air supply device, of the mounting portion, one end of the fog-generating device stretches into the fitting cavity, a portion of the fog-generating device located in the fitting cavity is provided with the air inlet communicating with the air intake port, and a heat exchange air channel communicating with the air guide ports is provided on the outer side of the fog-generating device.

13. The atomizer according to claim 12, wherein the housing body further comprises a plurality of connecting portions, the plurality of connecting portions are spaced along a circumferential direction of the mounting housing, and one end of each of the plurality of connecting portions is connected to an inner peripheral wall of the mounting housing, and another end is connected to an outer peripheral wall of the mounting portion.

14. The atomizer according to claim 12, wherein the mounting portion comprises:

a mounting plate, wherein two axial ends of the mounting plate are open to define the fitting cavity, and an outer peripheral wall of the mounting plate is connected to an inner peripheral wall of the mounting housing; and
a fitting plate, wherein the fitting plate is located in the fitting cavity and is disposed at one end of the mounting plate close to the air supply device to block the opening of the mounting plate, and the fitting plate is provided with the air intake port and the air guide ports.

15. The atomizer according to claim 12, wherein the mounting portion comprises a plurality of position limiting plates, the plurality of position limiting plates are spaced along a circumferential direction of the fitting cavity, and one end of each of the plurality of position limiting plates is connected to an inner peripheral wall of the fitting cavity, and another end is adapted to abut against an outer peripheral wall of the fog-generating device.

16. The atomizer according to claim 15, wherein there are a plurality of air guide ports, and each of the plurality of air guide ports faces space defined between two adjacent position limiting plates along the flow direction of the airflow.

17. The atomizer according to claim 10, wherein the housing assembly further comprises a securing frame, the securing frame is located between the housing body and the air guide shell, the securing frame is sheathed on an outer peripheral wall of the fog-generating device, and the securing frame is fixedly connected to the housing body by means of a connecting piece to secure the fog-generating device onto the housing body.

18. A vehicle, comprising the atomizer according to any of claims 1 to 17.

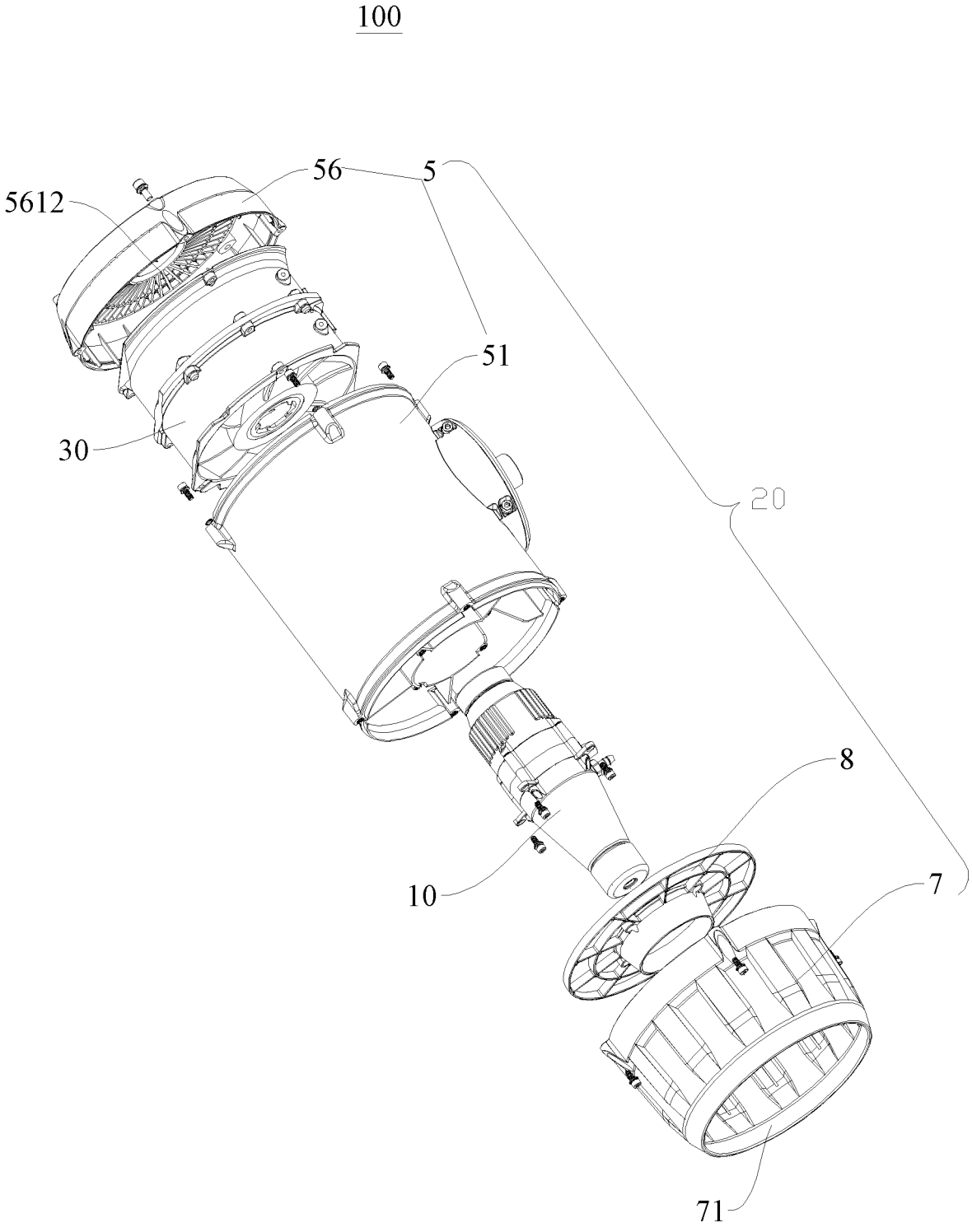

FIG. 1

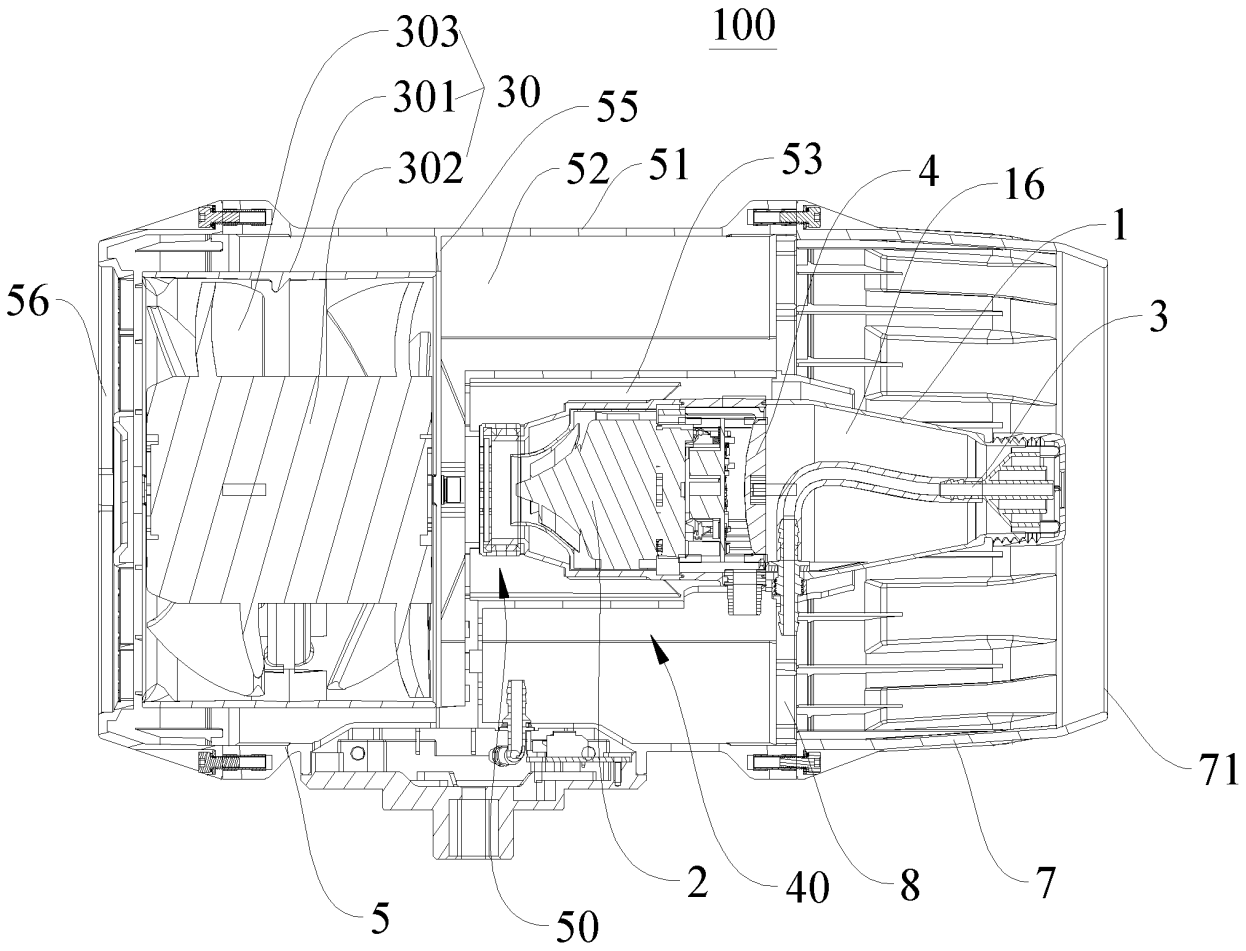

FIG. 2

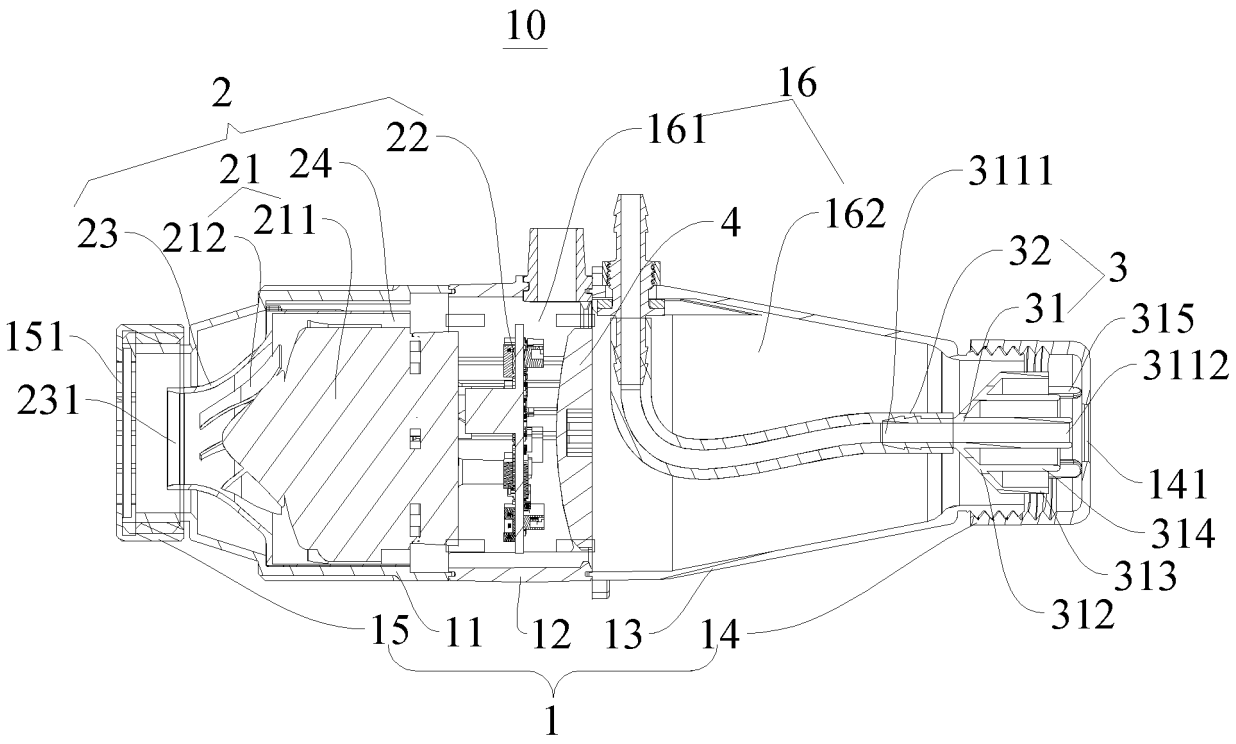
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FIG. 3

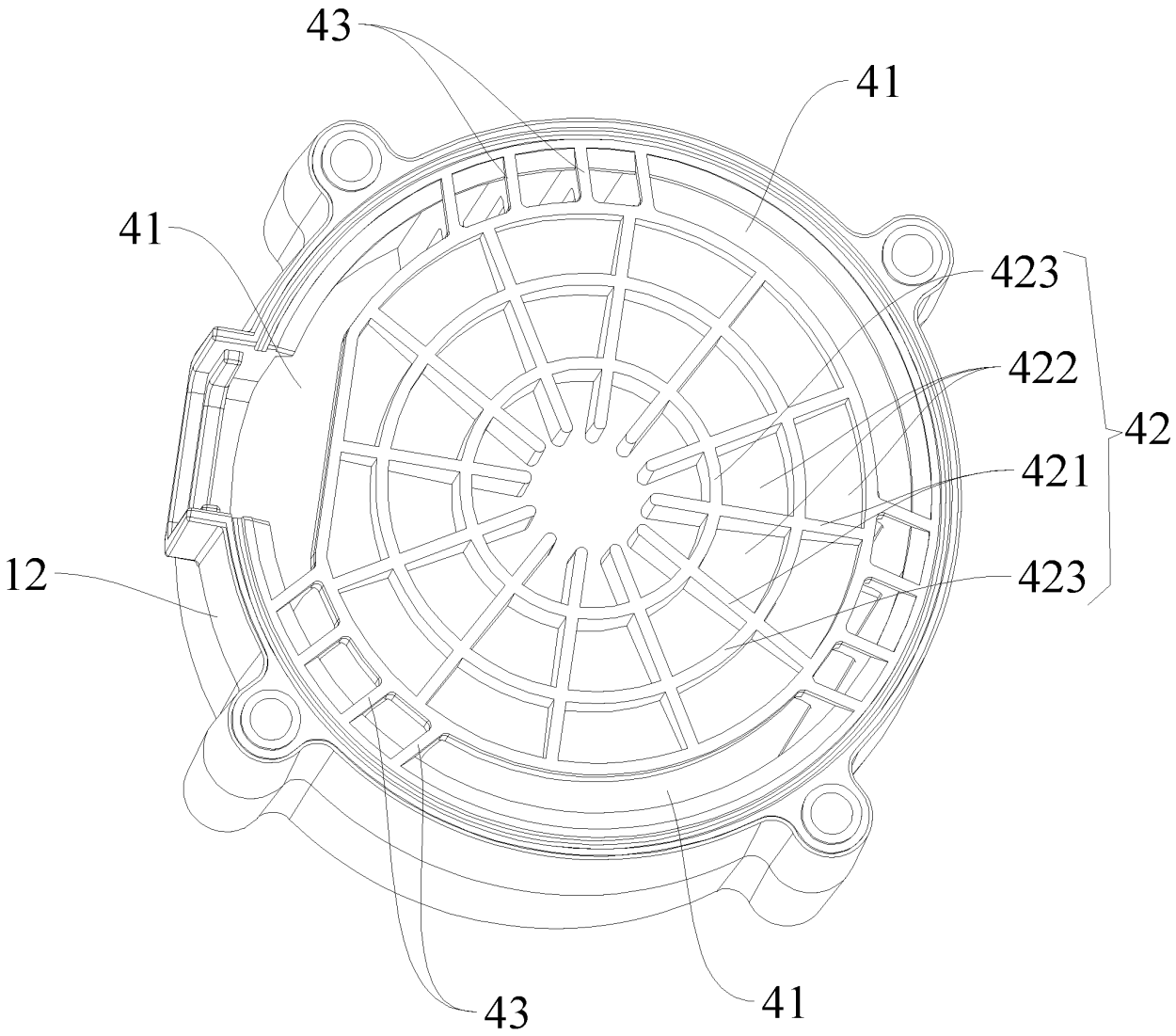

FIG. 4

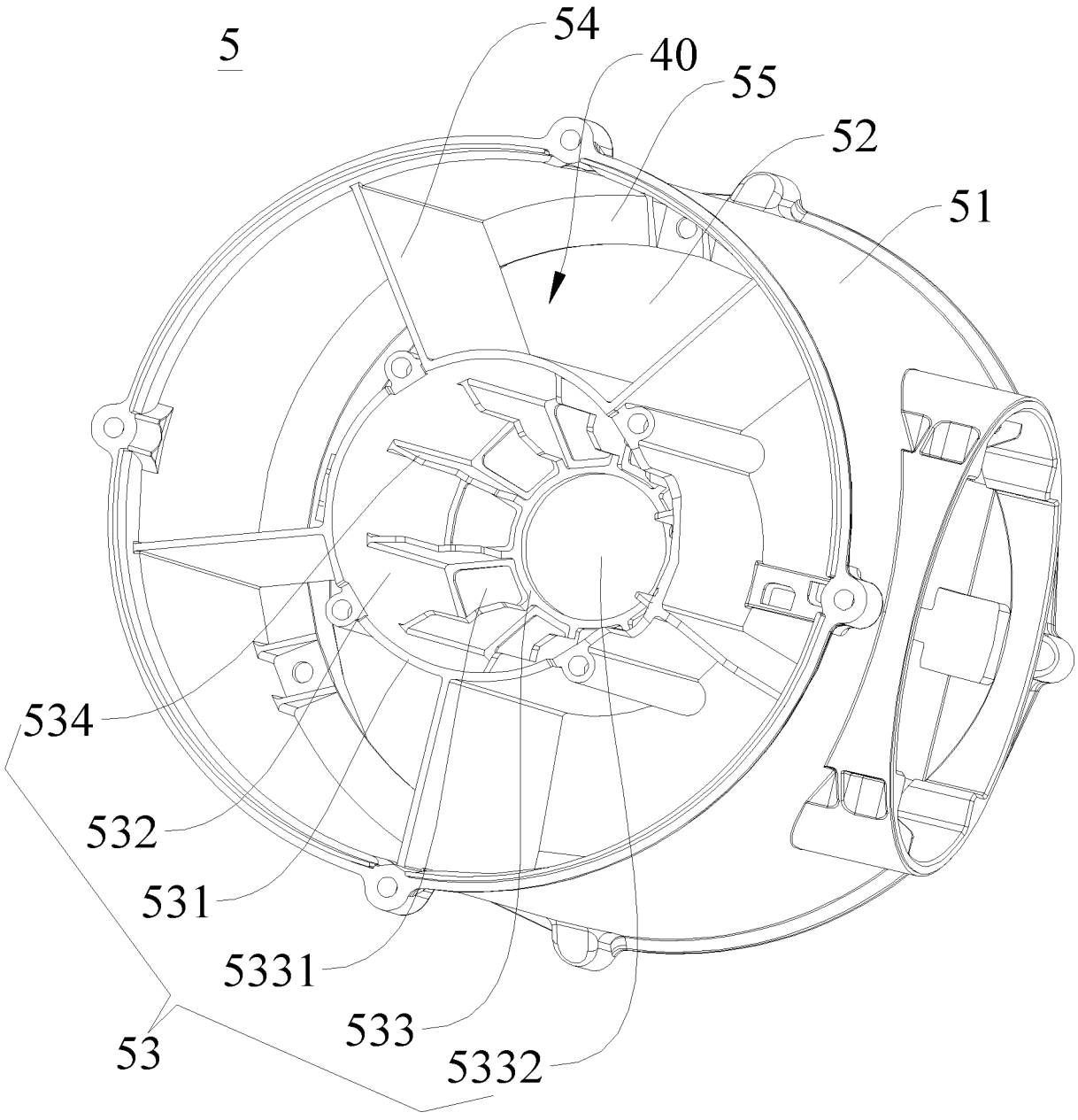

FIG. 5

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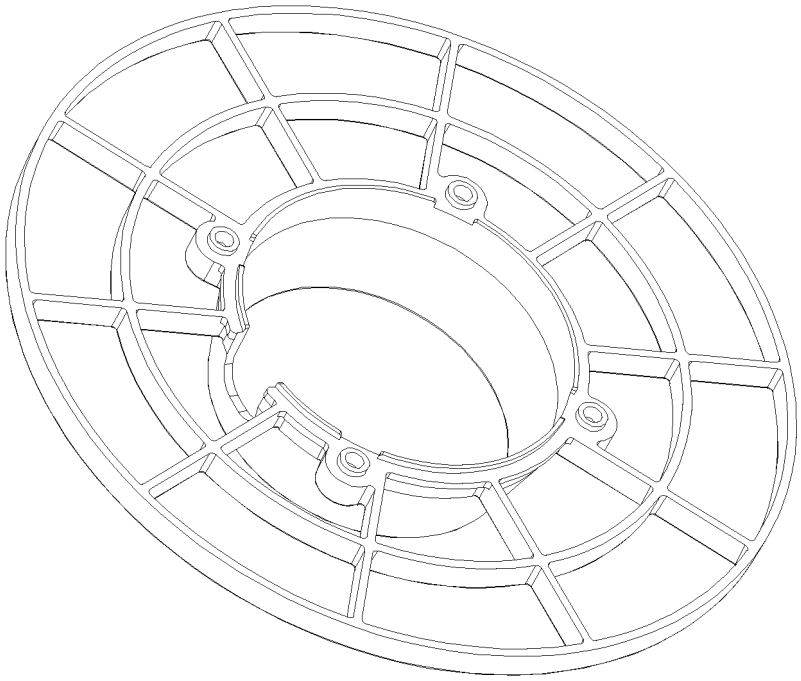

FIG. 6

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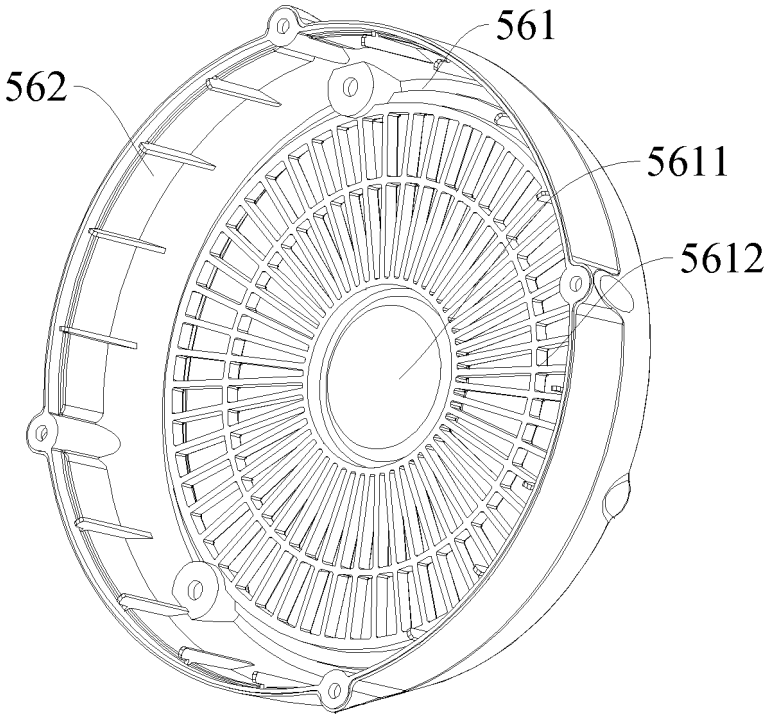

FIG. 7

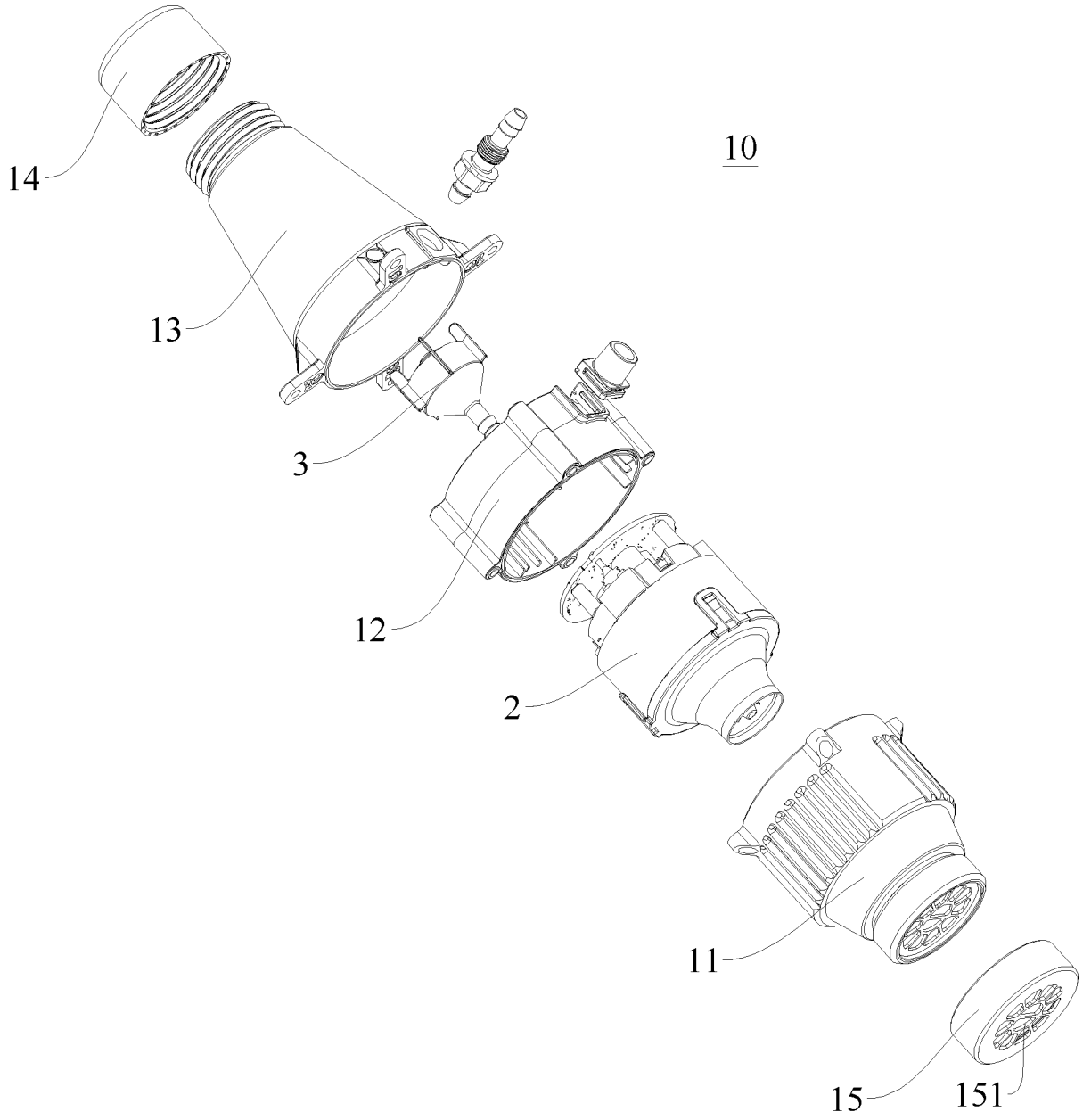

FIG. 8

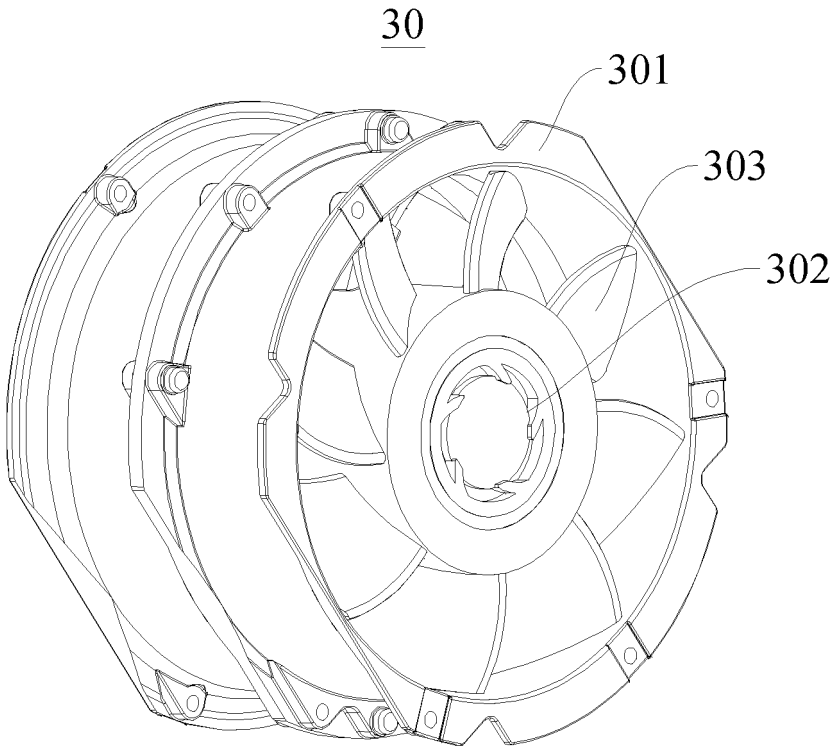

FIG. 9

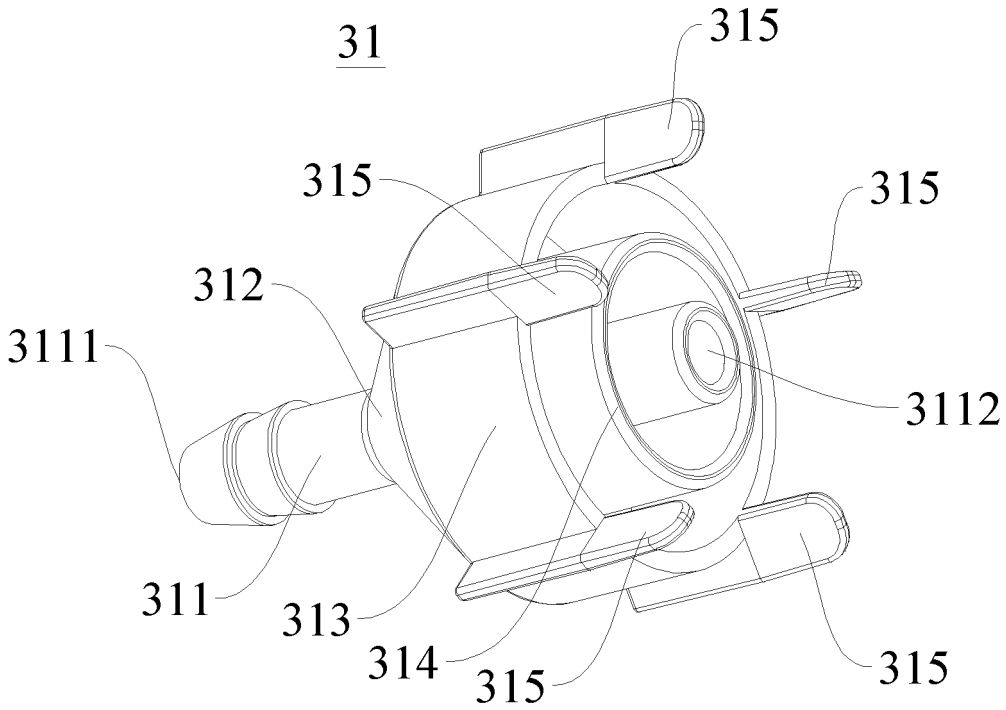

FIG. 10

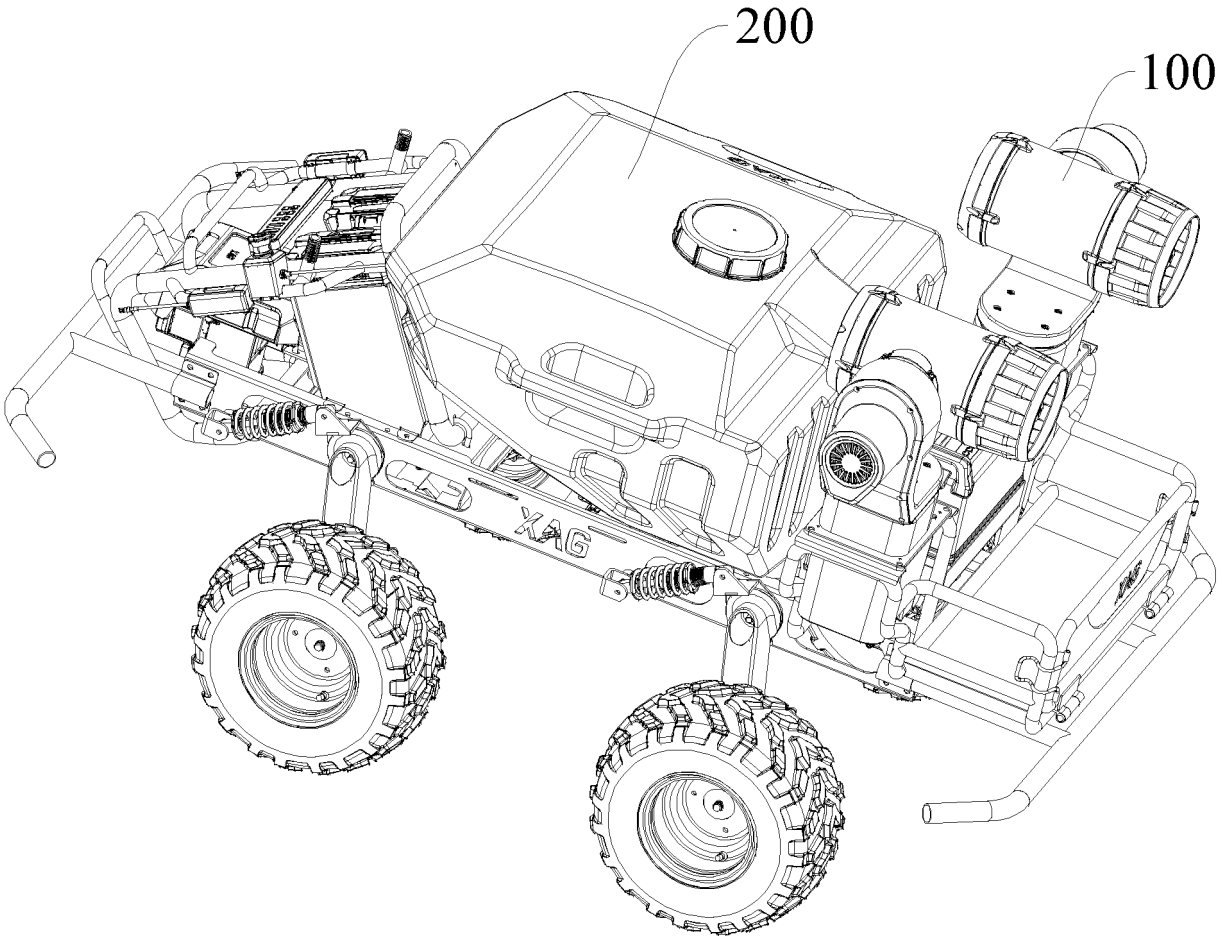

FIG. 11

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2020/110312

A. CLASSIFICATION OF SUBJECT MATTER

B05B 7/04(2006.01)i; B05B 3/08(2006.01)i; B05B 12/18(2018.01)i; B05B 15/00(2018.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B05B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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

VEN; CNABS; CNKI: 极飞科技, 喷雾, 送风, 壳, 风, 雾化, atomizer, atomizing, housing, wind, cavity

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 110841822 A (ABOUT XAG CO., LTD.) 28 February 2020 (2020-02-28) claims 1-18, figures 1-11	1-18
X	CN 208116018 U (LIN, Lisheng) 20 November 2018 (2018-11-20) description, paragraphs 18-22, and figures 1-3	1-10, 12-17
Y	CN 208116018 U (LIN, Lisheng) 20 November 2018 (2018-11-20) description, paragraphs 18-22, and figures 1-3	11, 18
Y	CN 204994473 U (SHANGHAI AINONG ELECTROMECHANICAL EQUIPMENT CO., LTD.) 27 January 2016 (2016-01-27) figure 1	11
Y	CN 208340987 U (HUANG, Siying) 08 January 2019 (2019-01-08) figure 1	18
A	CN 105689172 A (KUNMING AOTU ENVIRONMENTAL PROTECTION EQUIPMENT CO., LTD.) 22 June 2016 (2016-06-22) entire document	1-18
A	US 2017120267 A1 (SPRAYING SYSTEMS CO.) 04 May 2017 (2017-05-04) entire document	1-18

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

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"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
08 November 2020	**19 November 2020**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration (ISA/CN)** **No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088** **China** Facsimile No. **(86-10)62019451**	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2020/110312

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 110841822 A	28 February 2020	None	
CN 208116018 U	20 November 2018	None	
CN 204994473 U	27 January 2016	WO 2017020577 A1	09 February 2017
		US 2018207654 A1	26 July 2018
		US 10478839 B2	19 November 2019
		KR 101844488 B1	02 April 2018
		KR 20170066332 A	14 June 2017
CN 208340987 U	08 January 2019	None	
CN 105689172 A	22 June 2016	None	
US 2017120267 A1	04 May 2017	BR 112018008969 A8	26 February 2019
		EP 3370534 A4	22 May 2019
		US 10399098 B2	03 September 2019
		JP 2018537275 A	20 December 2018
		AR 106558 A1	24 January 2018
		US 10286411 B2	14 May 2019
		AU 2016349382 A1	17 May 2018
		US 2018236468 A1	23 August 2018
		WO 2017079468 A1	11 May 2017
		CA 3003605 A1	11 May 2017
		BR 112018008969 A2	21 November 2018
		KR 20180080285 A	11 July 2018
		US 2017151576 A1	01 June 2017
		US 10543495 B2	28 January 2020
		US 10279359 B2	07 May 2019
		US 2019022675 A1	24 January 2019
		US 2017144120 A1	25 May 2017
		SG 11201803527V A	30 May 2018
		MX 2018005513 A	17 September 2018
		EP 3370534 A1	12 September 2018
		CN 108601363 A	28 September 2018

Form PCT/ISA/210 (patent family annex) (January 2015)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 201911315718 **[0001]**
- CN 201922301609 **[0001]**