CLAIMS

[Claim 1]

A rotating spray unit disposed in a tank and configured to clean an inside of the tank, the rotating spray unit comprising

a plurality of cleaning jet holes formed in a rotating unit main body that rotates, wherein

some or all of the plurality of cleaning jet holes have different jet angles in an elevation angle direction,

wherein

the cleaning jet holes include:

a plurality of high-angle jet holes configured to jet a water stream to a high-angle region;

a plurality of intermediate-angle jet holes configured to jet a water stream to an intermediate-angle region; and

a plurality of low-angle jet holes configured to jet a water stream to a low-angle region, and

with reference to an equator orthogonal to a rotation axis of the rotating unit main body,

an angle formed by the water stream jetted from each of the high-angle jet holes is more than 60° and 85° or less,

an angle formed by the water stream jetted from each of the intermediate-angle jet holes is more than 30° and 60°

or less, and

an angle formed by the water stream jetted from each of the low-angle jet holes is 0° or more and 30° or less,

the cleaning jet holes are further opened in a side wall of the rotating unit main body to be inclined in a rotation direction at a predetermined angle with respect to a straight line orthogonal to the rotation axis in a plane centered on the rotation axis, and

when cleaning is performed with the rotating spray unit rotated, a plurality of water streams jetted from the respective cleaning jet holes are dispersed in the elevation angle direction of an upper hemisphere in the tank.

[Claim 2]

A rotating spray unit disposed in a tank and configured to clean an inside of the tank, the rotating spray unit comprising

a plurality of cleaning jet holes formed in a rotating unit main body that rotates, wherein

some or all of the plurality of cleaning jet holes have different jet angles in an elevation angle direction, wherein

a plurality of jet hole regions in each of which a jet hole group is formed in a line in a direction orthogonal to a rotation direction of the rotating unit main body are

disposed on a side wall of the rotating unit main body,

the jet hole regions include:

a high-angle jet hole region configured to jet a water stream to a high-angle region;

an intermediate-angle jet hole region configured to jet a water stream to an intermediate-angle region; and

a low-angle jet hole region configured to jet a water stream to a low-angle region, and

angles of the water streams jetted from the jet hole groups included in the respective jet hole regions are different from each other,

wherein

the high-angle jet hole region includes a high-angle jet hole group including a plurality of the cleaning jet holes,

an angle formed by an equator and a water stream jetted from the cleaning jet hole closest to the equator of the high-angle jet hole group is in a range of 50° or more, and an angle formed by the equator and a water stream jetted from the cleaning jet hole closest to a pole of the high-angle jet hole group is in a range of 85° or less,

the intermediate-angle jet hole region includes an intermediate-angle jet hole group including a plurality of the cleaning jet holes,

an angle formed by the equator and a water stream jetted from the cleaning jet hole closest to the equator of the intermediate-angle jet hole group is in a range of 10° or more, and an angle formed by the equator and a water stream jetted from the cleaning jet hole closest to the pole of the intermediate-angle jet hole group is in a range of 55° or less,

the low-angle jet hole region includes a low-angle jet hole group including a plurality of the cleaning jet holes, and

an angle formed by the equator and a water stream jetted from the cleaning jet hole closest to the equator of the low-angle jet hole group is in a range of 0° or more, and an angle formed by the equator and a water stream jetted from the cleaning jet hole closest to the pole of the low-angle jet hole group is in a range of 30° or less,

the cleaning jet holes are further opened in the side wall of the rotating unit main body to be inclined in a rotation direction at a predetermined angle with respect to a straight line orthogonal to a rotation axis in a plane centered on the rotation axis, and

when cleaning is performed with the rotating spray unit rotated, a plurality of water streams jetted from the respective cleaning jet holes are dispersed in the elevation

angle direction of an upper hemisphere in the tank.

[Claim 3]

The rotating spray unit according to claim 2, wherein each of the jet hole groups includes two to ten of the cleaning jet holes.

[Claim 4]

A rotating spray unit disposed in a tank and configured to clean an inside of the tank, the rotating spray unit comprising

a plurality of cleaning jet holes formed in a rotating unit main body that rotates, wherein

some or all of the plurality of cleaning jet holes have different jet angles in an elevation angle direction, and

the cleaning jet holes are further opened in a side wall of the rotating unit main body to be inclined in a rotation direction at a predetermined angle with respect to a straight line orthogonal to a rotation axis in a plane centered on the rotation axis, and

wherein the rotating unit main body includes: an upper rotating body including high-angle jet holes, intermediate-angle jet holes, and low-angle jet holes, or a high-angle jet hole region, an intermediate-angle jet hole region, and a low-angle jet hole region; and a lower rotating body that

rotates in a forward direction/a backward direction with respect to the upper rotating body, and the rotating unit main body is formed in a spherical shape by the upper rotating body and the lower rotating body,

rotating jet holes for jetting the cleaning liquid in a tangential direction to rotate the lower rotating body are formed in the lower rotating body,

the sum of the number of the cleaning jet holes and the number of the rotating jet holes formed in the lower rotating body is less than the number of the cleaning jet holes formed in the upper rotating body, and

when cleaning is performed with the rotating spray unit rotated, a plurality of water streams jetted from the respective cleaning jet holes are dispersed in the elevation angle direction of an upper hemisphere in the tank.