inner lid 313, straightening plate 330, and annular portion 324. A liquid flow is introduced from a vicinity of an outer peripheral wall surface on an inner end surface 313a side of inner lid 313 which is a flat surface of gas-liquid mixer 315 on an upstream side. A gas flow is introduced from a surface opposite thereto to collide with the liquid flow. A gas-liquid mixed fluid flow advances to spout portion 316 while circulating around an inner surface of annular portion 324 of straightening plate 330 of gas-liquid mixer 315 facing gas-liquid mixer 315, and thereby atomization of the liquid in gas-liquid mixer 315 is promoted. Therefore, it is possible to provide a spraying apparatus capable of spraying a liquid having a small particle diameter, which is quickly vaporized and has little wetting or the like.

SUMMARY

[0005] A spraying apparatus comprising:

a spraying apparatus main body that has a liquid flow passage and a gas flow passage;

a liquid introduction portion that is provided at an end portion of the liquid flow passage;

an annular gas introduction portion that is provided at an end portion of the gas flow passage;

a gas-liquid spout portion that covers the liquid introduction portion and the gas introduction portion;

a liquid inlet that is provided for communicating with the liquid flow passage at at least one place of the liquid introduction portion and allows a liquid flow to enter a gas-liquid mixer which is a space inside the annular gas introduction portion;

a gas inlet that is provided for communicating with the gas flow passage at at least one place of the annular gas introduction portion and allows a gas flow to enter the gas-liquid mixer;

a tubular flow passage, which penetrates the gas-liquid spout portion, mixing the gas flow exited from the gas inlet and the liquid flow exited from the liquid inlet, and allowing a gas-liquid mixed fluid in which a liquid is atomized to exit;

a spout that is provided in the gas-liquid spout portion for communicating with the tubular flow passage and spouts the gas-liquid mixed fluid; a flow passage that is provided in the gas-liquid spout portion and has a taper communicating with the spout;

a straightener that has an opening having an uneven shape provided in the flow passage having the taper; and

a projection portion that is provided in the liquid introduction portion, protrudes to the gas-liquid mixer, and forms a straightening outlet between the straightener that has the opening having the uneven shape,

wherein an area ratio of an area of the straightening outlet to an area of the opening having the uneven shape of the straightener is greater than 0% and 60% or less, and the area of the straightening outlet is greater than an area of the tubular flow passage

A spraying apparatus includes a spraying apparatus main body, a liquid introduction portion, a gas introduction portion, a gas-liquid spout portion, a liquid inlet, a gas inlet, a tubular flow passage, a spout, a flow passage having a taper, a straightener, and a projection portion.

The spraying apparatus main body has a liquid flow passage and a gas flow passage.

The liquid introduction portion is provided at an end portion of the liquid flow passage.

The gas introduction portion having an annular shape is provided at an end portion of the gas flow passage.

The gas-liquid spout portion covers the liquid introduction portion and the gas introduction portion.

The liquid inlet is provided for communicating with the liquid flow passage at at least one place of the liquid introduction portion and allows a liquid flow

Claims

[Claim 1]

A spraying apparatus comprising:

a spraying apparatus main body that has a liquid flow passage and a gas flow passage;

a liquid introduction portion that is provided at an end portion of the liquid flow passage;

an annular gas introduction portion that is provided at an end portion of the gas flow passage;

a gas-liquid spout portion that covers the liquid introduction portion and the gas introduction portion;

a liquid inlet that is provided for communicating with the liquid flow passage at at least one place of the liquid introduction portion and allows a liquid flow to enter a gas-liquid mixer which is a space inside the annular gas introduction portion;

a gas inlet that is provided for communicating with the gas flow passage at at least one place of the annular gas introduction portion and allows a gas flow to enter the gas-liquid mixer;

a tubular flow passage, which penetrates the gas-liquid spout portion, mixing the gas flow exited from the gas inlet and the liquid flow exited from the liquid inlet, and allowing a gas-liquid mixed fluid in which a liquid is atomized to exit;

a spout that is provided in the gas-liquid spout portion for communicating with the tubular flow passage and spouts the gas-liquid mixed fluid; a flow passage that is provided in the gas-liquid spout portion and has a taper communicating with the spout;

a straightener that has an opening having an uneven shape provided in the flow passage having the taper; and

a projection portion that is provided in the liquid introduction portion, protrudes to the gas-liquid mixer, and forms a straightening outlet between the straightener that has the opening having the uneven shape,

wherein an area ratio of an area of the straightening outlet to an area of the opening having the uneven shape of the straightener is greater than 0% and 60% or less, and the area of the straightening outlet is greater than an area of the tubular flow passage.

[Claim 2]

The spraying apparatus of Claim 1,

wherein the projection portion has a tapered shape from a bottom surface of the projection portion on an upstream side toward a tip portion on a downstream side.