【Claims】

【Claim 1】

A ~~mixing~~ module for composition to be sprayed with refrigerant, the ~~mixing~~ module comprising:

~~an insertion hole into which a refrigerant spray unit that sprays the refrigerant is inserted;~~

~~a mixing part providing a passage through which a sprayed refrigerant move;~~

~~an inlet hole formed inner side of the mixing part and fluidly connected to a composition storing part in which a composition is stored; and~~

~~a spreading film comprising a first surface in physical contact with the inner side of the mixing part where the inlet hole is formed, a second surface directly or indirectly connected to the first surface, and a first groove allowing the composition passing through the inlet hole to move to the second surface;~~

~~when the refrigerant is sprayed into the mixing part, negative pressure is formed near the inlet hole due to the movement of the refrigerant, so that the composition stored in the composition storing part flows into the mixing part, wherein a portion of the composition passing through the inlet hole passes through the second surface and is mixed with the sprayed refrigerant.~~

a mixing unit providing a space for the refrigerant and the composition to be met, the mixing unit including an inflow

hole formed on an inner surface of the mixing unit and an insertion hole receiving a refrigerant spraying unit;

a composition storage unit configured to store the composition;

a tube configured to fluidically connect the composition storage unit and the mixing unit, the composition flowing from the composition storage unit to the space of the mixing unit through the tube when negative air pressure is formed at the inflow hole as the refrigerant is sprayed through the mixing unit; and

a guide member arranged in the space of the mixing unit, the guide member including a first part;

wherein one end of the first part is positioned adjacent to the inflow hole and the first part is inclined to a virtual plane containing the inflow hole, such that portion of the composition passed the inflow hole is guided to move along the first part, and

wherein a height of the guide member with respect to the virtual plane is greater than or equal to a height of a center of the insertion hole with respect to the virtual plane.

【Claim 2】

The ~~mixing~~ module of claim 1,

~~Wherein the second surface is inclined by a preset first inclination angle with respect to the inlet hole.~~

wherein the first part has a first angle with respect to the virtual plane, and

wherein the first angle is between 10 to 90 degrees.

【Claim 3】

The ~~mixing~~ module of claim 1,

~~Wherein the spreading film includes at least the first surface, the second surface, and a first portion including the first groove.~~

wherein the guide member includes a curved part extending from the first part, and

wherein the height of the guide member is determined by a height of an end of the curved part with respect to the virtual plane.

【Claim 4】

The ~~mixing~~ module of claim ~~3~~ 1,

~~wherein the first portion includes a third surface extending from the second surface,~~

~~wherein the mixing part has a first height in a direction perpendicular to the cross section of the inlet hole based on the inlet hole,~~

~~wherein the first portion has a second height that is a length in a direction perpendicular to the cross section of the inlet hole based on the inlet hole,~~

~~wherein the second height is 1/2 or more of the first height.~~

wherein the guide member further includes a contact part contact with a particular area of the inner surface.

【Claim 5】

The ~~mixing~~ module of claim ~~3~~ 4,

~~wherein the first distance between the central axis of the insertion hole and the first portion is 1/2 or more of the second distance between the central axis of the insertion hole and the inlet hole.~~

wherein the contact part has a first groove such that the composition passed the inflow hole reaches the first part through the first groove.

【Claim 6】

The ~~mixing~~ module of claim ~~3~~ 1,

~~Wherein the spreading film includes a third surface in physical contact with the inner surface of the mixing part, a fourth surface opposite to the third surface, and a second portion including a second groove enabling the composition passing through the inlet hole to move to the fourth surface.~~

wherein the guide member further includes a second part,

wherein one end of the second part is positioned adjacent to the inflow hole and the second part is inclined to the virtual plane, such that portion of the composition passed the inflow hole is guided to move along the second part, and

wherein the inflow hole is positioned between the one end of the first part and the one end of the second part.

【Claim 7】

The ~~mixing~~ module of claim 6,

~~Wherein the second surface of the first part and the fourth surface of the second part are spaced apart from each other so that a gap exists between the first part and the second part.~~

wherein the guide member includes a third part connecting the first part and the second part.

【Claim 8】

The ~~mixing~~ module of claim ~~6~~ 7,

~~Wherein the inlet hole is located between the first part and the second part.~~

wherein the mixing unit has a virtual central axis,

wherein the guide member is elongated in a direction parallel to the virtual central axis of the mixing module, and

wherein a vent hole is formed on the first part, the second part, or both the first part and the second part.

【Claim 9】

The ~~mixing~~ module of claim ~~6~~ 8,

~~Wherein the spreading film includes a third portion connecting the first portion and the second portion.~~

wherein the vent hole is positioned between the inflow hole and the insertion hole in a direction parallel to the virtual central axis of the mixing unit.

【Claim 10】

The ~~mixing~~ module of claim ~~9~~ 1,

~~wherein the third portion is arch-shaped,~~

~~wherein a central axis of the third part is the same as a central axis of the insertion hole.~~

wherein a height of the first part with respect to the virtual plane is smaller than or equal to the height of the center of the insertion hole with respect to the virtual plane.

【Claim 11】

The ~~mixing~~ module of claim ~~9~~ 1,

wherein the mixing ~~part~~ unit is divided ~~into a first area and a second area by the spreading film on a virtual plane perpendicular to the central axis of the mixing part~~ by at least a side part and a bottom part,

wherein the ~~first region is a region corresponding to inner side of the spreading film~~ side part defines the inner surface where the inflow hole is formed and the bottom part is where the insertion hole is formed, and,

wherein ~~the second region is a region corresponding to outer side of the spreading film~~ a virtual central axis of the side part is perpendicular to the bottom part.

【Claim 12】

The ~~mixing~~ module of claim ~~9~~ 1,

~~wherein a venthole is formed in at least one of the first portion or the second portion.~~

wherein the mixing unit has a virtual central axis,
wherein the first part of the guide member extends from a first end to a second end in a direction parallel to the virtual central axis of the mixing unit, and
wherein the inflow hole is positioned between the first end and the second end of the first part.

【Claim 13】

The ~~mixing~~ module of claim ~~9,~~ 1, further comprising:

~~wherein the mixing part includes a first end at which the insertion hole is formed and a second end at which a mixture spray hole is formed,~~

~~wherein the vent hole is located closer to the first end than the second end.~~

a coupling unit extending from the mixing unit, the coupling unit including at least one fixing part;
wherein the coupling unit is configured to couple with the refrigerant spraying unit by the fixing part.

【Claim 14】

~~The mixing module of claim 1,~~

~~Wherein the spreading film is composed of a metal material.~~

A device for spraying composition and refrigerant, the device comprising:

a cartridge connecting unit configured to receive a cartridge where the refrigerant is stored;

a valve fluidically connected to the cartridge connecting unit, the valve configured to control flow of the refrigerant;

a refrigerant spraying unit configured to spray the refrigerant;

a mixing unit providing a space for the refrigerant and the composition to be met, the mixing unit including an inflow hole formed on an inner surface of the mixing unit;

a composition storage unit configured to store the composition;

a tube configured to fluidically connect the composition storage unit and the mixing unit, the composition flowing from the composition storage unit to the space of the mixing unit through the tube when negative air pressure is formed at the inflow hole as the refrigerant is sprayed through the mixing unit; and

a guide member arranged in the space of the mixing unit, the guide member including a first part;

wherein one end of the first part is positioned adjacent to the inflow hole and the first part is inclined to a virtual plane containing the inflow hole, such that portion of the

composition passed the inflow hole is guided to move along the first part, and
wherein a height of the guide member with respect to the virtual plane is greater than or equal to a height of a center of the insertion hole with respect to the virtual plane.

【Claim 15】

The ~~mixing module~~ device of claim 14,
~~Wherein the spreading film has a thermal conductivity of 12 (W / m K) or more.~~
wherein the mixing unit includes a first coupling member and the refrigerant spraying unit includes a second coupling member to be coupled the first coupling member, and
wherein the mixing unit is detachable to the refrigerant spraying unit.

【Claim 16】

The ~~mixing module~~ device of claim 14,
~~wherein the mixing part includes a first end at which the insertion hole is formed and a second end at which a mixture spray hole is formed,~~
~~wherein the spreading film extends from a first film end to a second film end in a longitudinal direction from the first end to the second end of the mixing part,~~
~~wherein the first film end is closer to the insertion hole among the mixture spray hole and the insertion hole,~~

~~wherein the second film end is closer to the mixture spray hole among the mixture spray hole and the insertion hole,~~
~~wherein the inlet hole is located between the first end and the second end of the mixing part,~~
~~wherein the second film end of the spreading film is located between the second end of the mixing part and the inlet hole.~~
wherein the first part has a first angle with respect to the virtual plane, and
wherein the first angle is between 10 to 90 degrees.

【Claim 17】

The ~~mixing module~~ device of claim 1~~4~~,

~~wherein the first surface has a first side and a second side opposite to the first side,~~

~~wherein the spreading film is processed so that the first surface is curved and is located in the mixing module,~~

~~wherein the first side is in physical contact with the inner surface of the mixing part.~~

wherein the guide member includes a curved part extending from the first part, and

wherein the height of the guide member is determined by an end of the curved part.

【Claim 18】

The ~~mixing module~~ device of claim 1~~4~~,

~~the spreading film is processed by:~~

~~preparing a square plate having a first side and a second side face each other,~~

~~wherein the first side is a side constituting the first surface; and~~

~~curving the square plate so that the first side and the second side face each other.~~

wherein the guide member further includes a contact part contact with a particular area of the inner surface.

【Claim 19】
The device of claim 18,
wherein the contact part has a first groove such that the composition passed the inflow hole reaches the first part through the first groove.

【Claim 20】
The device of claim 14,
wherein the guide member further includes a second part,
wherein one end of the second part is positioned adjacent to the inflow hole and the second part is incline to the virtual plane, such that portion of the composition passed the inflow hole is guided to move along the second part, and
wherein the inflow hole is positioned between the one end of the first part and the one end of the second part.

【Claim 21】
The device of claim 20,
wherein the guide member includes a third part connecting the first part and the second part.

【Claim 22】
The device of claim 21,
wherein the mixing unit has a virtual central axis,
wherein the guide member is elongated in a direction parallel to the virtual central axis of the mixing module, and

wherein a vent hole is formed on the first part, the second part, or both the first part and the second part.

【Claim 23】
The device of claim 21,
wherein the vent hole is positioned between the inflow hole and the insertion hole in a direction parallel to the virtual central axis of the mixing unit.