Claims

[Claim 1]

An evaporator comprising:

a housing having a refrigerant outlet discharging an evaporated refrigerant and forming an outer shell;

a first heat transfer pipe group accommodated in the housing, immersed in a liquid-phase refrigerant stored in a storage portion provided in a lower portion of the housing, and having a plurality of first heat transfer pipes in which a medium to be cooled circulates;

a second heat transfer pipe group accommodated in the housing, provided above a liquid surface of the liquid-phase refrigerant stored in the lower portion of the housing, and having a plurality of second heat transfer pipes in which a medium to be cooled circulates;

a refrigerant supply unit accommodated in the housing and supplying a liquid-phase refrigerant from above to the second heat transfer pipe group; and

a flow path guiding a refrigerant evaporated in the second heat transfer pipe group to the refrigerant outlet,

wherein the flow path has a first flow path in which the evaporated refrigerant circulates upward from below, a second flow

path in which the evaporated refrigerant circulates downward from above, and a connecting flow path connecting the first flow path and the second flow path in this order and turning back the evaporated refrigerant, and

the refrigerant outlet is provided above the housing and the evaporated refrigerant is guided from below.

[Claim 2]

The evaporator according to Claim 1, wherein the first flow path or the second flow path connected to an upstream side of the connecting flow path is smaller in flow path area than the first flow path or the second flow path connected to a downstream side of the connecting flow path.

[Claim 3]

The evaporator according to Claim 1 or 2, wherein the flow path has a housing flow path partially defined by an inner peripheral surface of the housing, and

in the housing flow path, the inner peripheral surface of the housing is disposed at a position where the evaporated refrigerant flowing in collides.

[Claim 4]

The evaporator according to Claim 3, wherein the housing flow path is provided upstream of the connecting flow path.

[Claim 5]

The evaporator according to any one of Claims 1 to 4, wherein the flow path is provided with a first drain portion guiding a liquid-phase refrigerant to the storage portion.

[Claim 6]

The evaporator according to any one of Claims 1 to 5, wherein the connecting flow path is provided with a collecting portion collecting a separated liquid-phase refrigerant on a connected downstream-side flow path side.

[Claim 7]

The evaporator according to Claim 6, wherein the collecting portion is provided with a second drain portion guiding the collected liquid-phase refrigerant to the storage portion.

[Claim 8]

The evaporator according to Claim 7, wherein the collecting portion is inclined such that a position where the second drain portion is provided becomes low.

[Claim 9]

The evaporator according to any one of Claims 1 to 8, wherein the flow path has a curved portion where a surface defining the flow path is curved.

[Claim 10]

An evaporator comprising:

a housing having a refrigerant outlet discharging an evaporated refrigerant and forming an outer shell;

a first heat transfer pipe group accommodated in the housing, immersed in a liquid-phase refrigerant stored in a storage portion provided in a lower portion of the housing, and having a plurality of first heat transfer pipes in which a medium to be cooled circulates;

a second heat transfer pipe group accommodated in the housing, provided above a liquid surface of the liquid-phase refrigerant stored in the lower portion of the housing, and having a plurality of second heat transfer pipes in which a medium to be cooled circulates;

a refrigerant supply unit accommodated in the housing and supplying a liquid-phase refrigerant from above to the second heat transfer pipe group; and

a flow path guiding a refrigerant evaporated in the second heat transfer pipe group to the refrigerant outlet,

wherein the flow path has a first flow path in which the evaporated refrigerant circulates upward from below, a second flow path in which the evaporated refrigerant circulates downward from above, and a connecting flow path connecting the first flow path and the second flow path and turning back the evaporated refrigerant, and

the connecting flow path is provided with a collecting portion collecting a separated liquid-phase refrigerant on a connected downstream-side flow path side.