PROBLEMS TO BE SOLVED BY THE INVENTION

[0006]

Reflecting on this situation, an object of the present invention is to provide an air separation device capable of lowering the share of height associated with a condenser installed on top of a high pressure distillation column without reducing product production efficiency compared with a conventional air separation device, without enlarging the installation area, and without dividing a low pressure distillation column.

MEANS OF SOLVING THE PROBLEMS

[0007]

The air separation device of the present invention is provided with:

a first distillation column (11) provided with a first condenser (121, 122) in a location apart from above the column top (113);

a second distillation column (21) comprising a lower pressure distillation column than the first distillation column (11), and arranged next to the first distillation column (11); and

at least part of a crude argon distillation column (31) or all of a crude argon distillation column (30) arranged above the column top (113) of the first distillation column (11).

[0007a]

In one aspect, there is provided an air separation device, provided with a first distillation column (11) provided with a first condenser (121) in a location apart from above a column top of the first distillation column(113);

a second distillation column (21) comprising a lower pressure distillation column than the first distillation column (11), and arranged next to the first distillation column (11); and

at least part of a crude argon distillation column or all of a crude argon distillation column arranged above the column top of the first distillation column (113);

wherein the first condenser (121) is arranged diagonally above the column top of the first distillation column (113), or below or on a bottom (211) of the second distillation column (21).

[0008]

In the invention:

in the case that a part of the crude argon distillation column is arranged above the column top (113),

the crude argon distillation column may have a lower distillation column (31) arranged above the column top (113), and an upper

distillation column (32) arranged next to the second distillation column (21) and/or the first distillation column (11), and provided with a second condenser (324) inside or above the column top (323) thereof.

In the invention:

in the case that all of the crude argon distillation column is arranged above the column top (113), the crude argon distillation column may be provided with a second condenser (~~324~~304) inside or above the column top (323) thereof, and be arranged only above the column top (113).

[0009]

In the invention:

the first condenser (121) may be arranged diagonally above the column top (113).

[0010]

In the invention:

DOCUMENT TITLE Claims

CLAIM 1

An ~~A~~air separation device, provided with a first distillation column (11) provided with a first condenser (121) in a location apart from above ~~the~~ a column top of the first distillation column (113);

a second distillation column (21) comprising a lower pressure distillation column than the first distillation column (11), and arranged next to the first distillation column (11); and

at least part of a crude argon distillation column or all of a crude argon distillation column is arranged above the column top ~~(113)~~ of the first distillation column (113);

wherein the first condenser (121) is arranged diagonally above the column top of the first distillation column (113), or below, or on a bottom (211) of the second distillation column (21).

CLAIM 2

The ~~A~~air separation device according to Claim 1, characterized in that in the case that a part of the crude argon distillation column is arranged above the column top of the first distillation column (113):

—the crude argon distillation column has a lower distillation column (31) arranged above the column top of the first distillation column (113), and an upper distillation column (32) arranged next to the second distillation column (21) and/or the first distillation column (11), and provided with a second condenser (324) inside or above ~~the~~ a column top of the crude argon distillation column (323) ~~thereof~~; or

in the case that all of the crude argon distillation column is arranged above the column top of the first distillation column (113): the crude argon distillation column is provided with a second condenser (~~324~~304) inside or above the column top of the crude argon distillation column (323) ~~thereof~~, and is arranged only above the column top of the first distillation column (113).

~~CLAIM 3~~

~~Air separation device according to Claim 1 or 2, characterized in that the first condenser (121) is arranged diagonally above the column top (113).~~

~~CLAIM 4~~

~~Air separation device according to Claim 1 or 2, characterized in that the first condenser (122) is arranged below or on the bottom (211) of the second distillation column (21).~~

CLAIM ~~5~~3

The ~~A~~air separation device according to ~~any of~~ Claim~~s~~ 1 ~~to~~ or ~~4~~2, characterized in that the first distillation column (11) contains or

does not contain the first condenser (121), and is arranged inside a first cold box (10a).

CLAIM ~~6~~4

The ~~A~~air separation device according to Claim 1, characterized in that the first distillation column (11) and at least a part of the crude argon distillation column or all of the crude argon distillation column is arranged inside ~~the~~ a first cold box (10a); or the first distillation column (11) is arranged inside the first cold box (10a), and at least a part of the crude argon distillation column or all of the crude argon distillation column is arranged inside a separate cold box from the first cold box (10a).

CLAIM ~~7~~5

The ~~A~~air separation device according to any of Claims 1 to ~~6~~4, characterized in that a pure argon distillation column is also provided, arranged next to one or two or more of the first distillation column (11), the second distillation column (21), and the crude argon distillation column.