CLAIMS

[Claim 1]

A separation method of separating (A) and (B), comprising

a step of separating at least either an active hydrogen-containing compound (A) or a compound (B) that reversibly reacts with (A) from a mixture containing (A) and (B) by distillation in a multistage distillation column, wherein

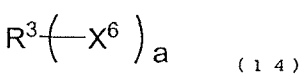
the multistage distillation column is a plate column,

a surface contacting with the mixture is formed by an inactive material, in at least one stage of the multistage distillation column to which the mixture is supplied,

the inactive material is a material in which an Fe atom content, a Ni atom content and a Ti atom content are each 10 mass% or less,

(A) is a compound represented by the formula (14):

[Chemical Formula 1]



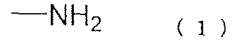
(14)

wherein a represents an integer of 1 to 6,

R^3 represents an aliphatic group, an aromatic group, or a group prepared by bonding an aliphatic group and an aromatic group, having 1 to 85 carbon atoms, and

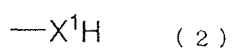
X^6 represents at least one group selected from the group consisting of groups represented by the formulas (1) to (4):

[Chemical Formula 2]



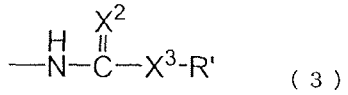
(1)

[Chemical Formula 3]



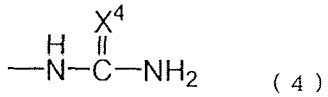
(2)

[Chemical Formula 4]



(3)

[Chemical Formula 5]

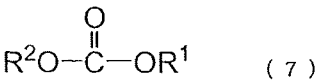


(4)

wherein X^1, X^2, X^3 and X^4 each independently represent an oxygen atom or a sulfur atom, and R' represents an organic group having 1 to 44 carbon atoms, and

(B) is a compound represented by the formula (7) or (19):

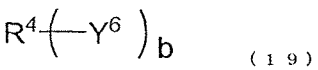
[Chemical Formula 6]



(7)

wherein R^1 and R^2 each independently represent an aliphatic group, an aromatic group, or a group formed by an aliphatic group and an aromatic group, having 1 to 30 carbon atoms,

[Chemical Formula 7]

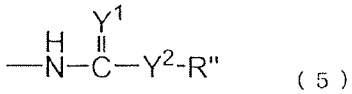


(1 9)

wherein R^4 represents an aliphatic group, an aromatic group, or a group prepared by bonding an aliphatic group and an aromatic group, having 1 to 80 carbon atoms, b represents an integer of 1 to 10, and Y^6 represents at least one group selected from the group consisting of

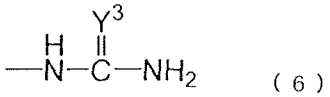
groups represented by the formula (5), (6) or (8):

[Chemical Formula 8]



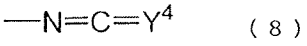
(5)

[Chemical Formula 9]



(6)

[Chemical Formula 10]



(8)

wherein Y^1, Y^2, Y^3 and Y^4 each independently represent an oxygen atom or a sulfur atom, and R" represents an organic group having 1 to 44 carbon atoms.

[Claim 2]

A separation method of separating (A) and (B), comprising

a step of separating at least either an active hydrogen-containing compound (A) or a compound (B) that reversibly reacts with (A) from a mixture containing (A) and (B) by distillation in a multistage distillation column, wherein

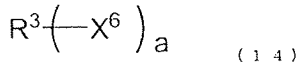
the multistage distillation column is a packed column,

at least one theoretical plate of the multistage distillation, to which the mixture is supplied, is packed with a packing material formed by an inactive material,

the inactive material is a material in which an Fe atom content, a Ni atom content and a Ti atom content are each 10 mass% or less,

(A) is a compound represented by the formula (14):

[Chemical Formula 11]



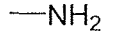
(1 4)

wherein a represents an integer of 1 to 6,

R^3 represents an aliphatic group, an aromatic group, or a group prepared by bonding an aliphatic group and an aromatic group, having 1 to 85 carbon atoms, and

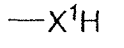
X^6 represents at least one group selected from the group consisting of groups represented by the formulas (1) to (4):

[Chemical Formula 12]



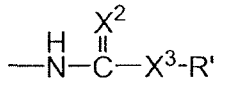
(1)

[Chemical Formula 13]



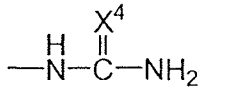
(2)

[Chemical Formula 14]



(3)

[Chemical Formula 15]

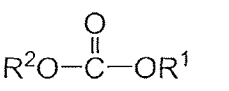


(4)

wherein X^1, X^2, X^3 and X^4 each independently represent an oxygen atom or a sulfur atom, and R' represents an organic group having 1 to 44 carbon atoms, and

(B) is a compound represented by the formula (7) or (19):

[Chemical Formula 16]

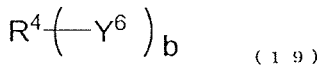


(7)

wherein R^1 and R^2 each independently represent an aliphatic

group, an aromatic group, or a group formed by an aliphatic group and an aromatic group, having 1 to 30 carbon atoms,

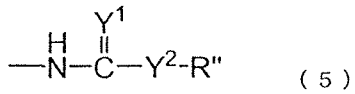
[Chemical Formula 17]



(19)

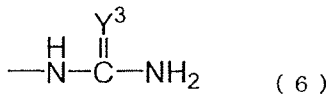
wherein R^4 represents an aliphatic group, an aromatic group, or a group prepared by bonding an aliphatic group and an aromatic group, having 1 to 80 carbon atoms, b represents an integer of 1 to 10, and Y^6 represents at least one group selected from the group consisting of groups represented by the formula (5), (6) or (8):

[Chemical Formula 18]



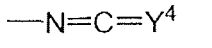
(5)

[Chemical Formula 19]



(6)

[Chemical Formula 20]



(8)

wherein Y^1, Y^2, Y^3 and Y^4 each independently represent an oxygen atom or a sulfur atom, and R" represents an organic group having 1 to 44 carbon atoms.

[Claim 3]

The separation method according to claim 1 or 2, wherein

(X) an area of an inner surface of the multistage distillation column contacting with the mixture (unit: m^2) and

(Y) a volume of the mixture (unit: m^3)

satisfy (X)/(Y) ≤ 100.

[Claim 4]

The separation method according to any one of claims 1 to 3, wherein the step of distillation separation is performed in the presence of a compound (C) that has a normal boiling point between a normal boiling point of (A) and a normal boiling point of (B) and is chemically inactive to (A) and (B).

[Claim 5]

The separation method according to any one of claims 1 to 4, wherein X^6 is a group represented by the formula (2).

[Claim 6]

The separation method according to any one of claims 1 to 5, wherein

(B) is a compound represented by the formula (19), and

Y^6 is a group represented by the formula (8).

[Claim 7]

The separation method according to any one of claims 1 to 4, wherein X^6 is a group represented by the formula (1).

[Claim 8]

The separation method according to any one of claims 1 to 4 and 7, wherein (B) is a compound represented by the formula (7).

CLAIMS

[Claim 1] A separation method of separating (A) and (B), comprising:

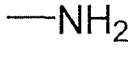
a step of separating at least either an active hydrogen-containing compound (A) or a compound (B) that reversibly reacts with (A) from a mixture containing (A) and (B) by distillation in a multistage distillation column; and

a step of supplying the mixture to an inactive region formed within the multistage distillation column.

[Claim 2] The separation method according to claim 1, wherein (A) is a compound having a hydrogen atom bonded to a heteroatom or a halogen atom.

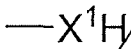
[Claim 3] The separation method according to claim 1 or 2, wherein (A) is a compound having at least one group selected from the group consisting of a group represented by the following formula (1), a group represented by the following formula (2), a group represented by the following formula (3) and a group represented by the following formula (4):

[Chemical Formula 1]



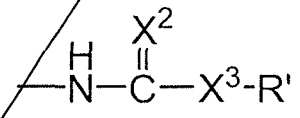
(1)

[Chemical Formula 2]



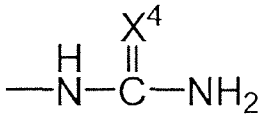
(2)

[Chemical Formula 3]



(3)

~~[Chemical Formula 4]~~



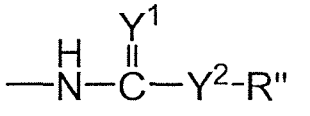
(4)

[wherein X^1, X^2, X^3 and X^4 each independently represent an oxygen atom or a sulfur atom, and R' represents an organic group].

[Claim 4] The separation method according to any one of claims 1 to 3, wherein (B) is a compound having a carbonyl group.

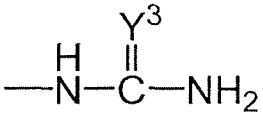
[Claim 5] The separation method according to any one of claims 1 to 4, wherein (B) is a compound having at least one group selected from the group consisting of a group represented by the following formula (5), a group represented by the following formula (6), a group represented by the following formula (7) and a group represented by the following formula (8):

[Chemical Formula 5]



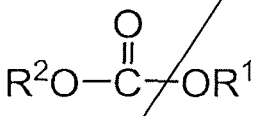
(5)

[Chemical Formula 6]



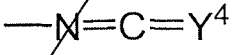
(6)

[Chemical Formula 7]



(7)

[Chemical Formula 8]



(8)

[wherein Y^1, Y^2, Y^3 and Y^4 each independently represent an oxygen atom or a sulfur atom, R^1 and R^2 each independently represent an

~~organic group having 1 to 30 carbon atoms, and R" represents an~~ organic group].

[Claim 6] The separation method according to any one of claims 1 to 5, wherein

the multistage distillation column is a plate column, and

the inactive region is a region in which a surface contacting with the mixture is formed of a material inactive to a reaction between (A) and (B).

[Claim 7] The separation method according to any one of claims 1 to 5, wherein

the multistage distillation column is a packed column, and

the inactive region is a region in which a surface contacting with the mixture is packed with a packing material formed by a material inactive to a reaction between (A) and (B).

[Claim 8] The separation method according to claim 6 or 7, wherein the inactive material is a material in which an Fe atom content, a Ni atom content and a Ti atom content are each 10 mass% or less.

[Claim 9] The separation method according to any one of claims 1 to 8, wherein

(X) an area of an inner surface of the multistage distillation column contacting with the mixture (unit: m^2) and

(Y) a volume of the mixture (unit: m^3)

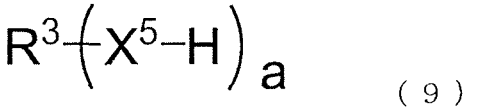
satisfy $(X)/(Y) \leq 100$.

[Claim 10] The separation method according to any one of claims 1 to 9, wherein the step of distillation separation is performed in the presence of a compound (C) that has a normal boiling point between a

~~normal boiling point of (A) and a normal boiling point of (B) and is~~ chemically inactive to (A) and (B).

[Claim 11] The separation method according to any one of claims 1 to 10, wherein (A) is a compound represented by the following formula (9):

[Chemical Formula 9]

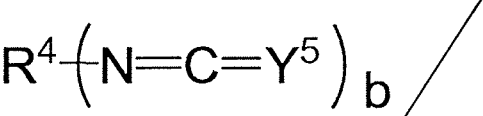


(9)

[wherein R^3 represents an organic group having 1 to 44 carbon atoms, X^5 represents an oxygen atom or a sulfur atom, and a represents an integer of 1 to 6].

[Claim 12] The separation method according to any one of claims 1 to 11, wherein (B) is a compound represented by the following formula (10):

[Chemical Formula 10]



(10)

[wherein R^4 represents an organic group having 1 to 80 carbon atoms, Y^5 represents an oxygen atom or a sulfur atom, and b represents an integer of 1 to 10].