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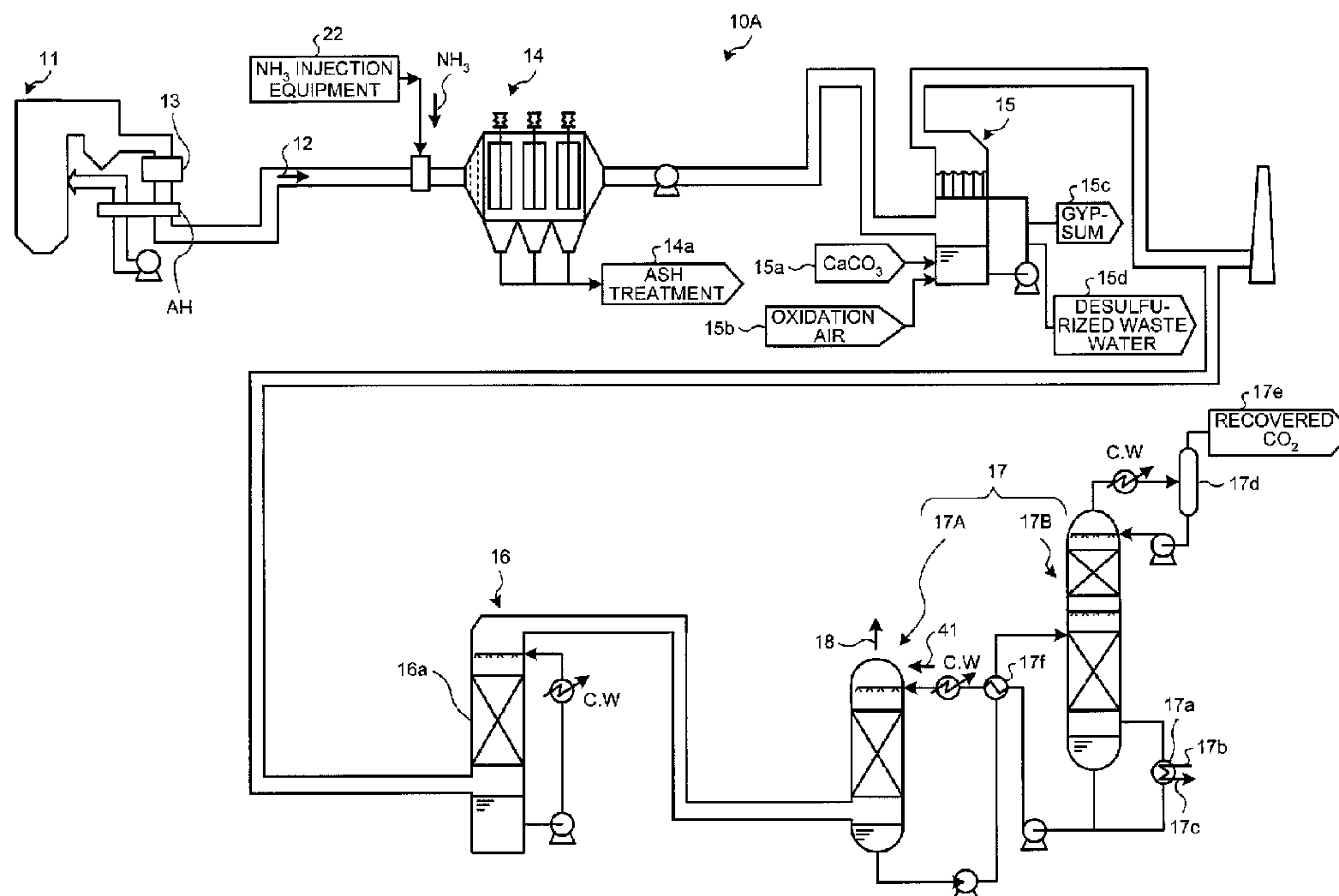
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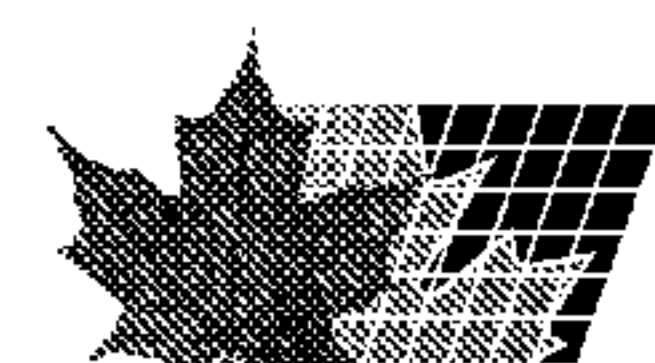
(54) Titre : SYSTEME ET METHODE DE REDUCTION DE LA POLLUTION ATMOSPHERIQUE

(54) Title: AIR POLLUTION CONTROL SYSTEM AND METHOD



(57) Abrégé/Abstract:

An air pollution control system includes sox removal equipment for reducing sulfur oxides from flue gas from a boiler, a cooler which is provided on the downstream side of the sox removal equipment, for reducing the sulfur oxides from the flue gas and for decreasing a gas temperature, CO₂ recovery equipment which includes an absorber for bringing CO₂ in the flue gas into contact with a CO₂ absorption liquid so as to be reduced, and a regenerator for causing the CO₂ absorption liquid to emit CO₂ so as to recover CO₂ and regenerate the CO₂ absorption liquid. An ammonia injection equipment is provided for reducing a mist generation material which is a generation source of mist that is generated in the absorber of the CO₂ recovery equipment before introducing the flue gas to the CO₂ recovery equipment.



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ABSTRACT

An air pollution control system includes SO_x removal equipment for reducing sulfur oxides from flue gas from a boiler, a cooler which is provided on the downstream side of the SO_x removal equipment, for reducing the sulfur oxides from the flue gas and for decreasing a gas temperature, CO₂ recovery equipment which includes an absorber for bringing CO₂ in the flue gas into contact with a CO₂ absorption liquid so as to be reduced, and a regenerator for causing the CO₂ absorption liquid to emit CO₂ so as to recover CO₂ and regenerate the CO₂ absorption liquid. An ammonia injection equipment is provided for reducing a mist generation material which is a generation source of mist that is generated in the absorber of the CO₂ recovery equipment before introducing the flue gas to the CO₂ recovery equipment.

DESCRIPTION

AIR POLLUTION CONTROL SYSTEM AND METHOD

Field

[0001] The present invention relates to an air pollution
5 control system and method that reduce CO₂ from flue gas.

Background

[0002] In recent years, the greenhouse effect due to CO₂
is indicated as one of causes of the global warming
phenomenon, and the countermeasures thereof become an
10 internationally urgent matter to protect the global
environment. CO₂ generation sources reach all human
activity fields in which fossil fuels are burned, and there
is a tendency to further strengthen the demand for
suppression of the discharge thereof. For this, for a
15 power generation facility such as a thermal power plant
that uses a large amount of fossil fuels, a method of
bringing combustion flue gas of an industrial facility such
as a boiler or a gas turbine into contact with an amine-
based CO₂ absorption liquid to reduce and recover CO₂ from
20 the combustion flue gas and an air pollution control system
which stores the recovered CO₂ without emission to air has
been energetically researched.

[0003] CO₂ recovery equipment which has, as the process
of reducing and recovering CO₂ from the combustion flue gas
25 using a CO₂ absorption liquid as described above, a process
of bringing the combustion flue gas into contact with the
CO₂ absorption liquid in a CO₂ absorber (hereinafter, also
simply referred to as "absorber"), and a process of heating
the CO₂ absorption liquid that absorbs CO₂ in an absorption
30 liquid regenerator (hereinafter, also simply referred to as
"regenerator") to emit CO₂ and regenerate the CO₂
absorption liquid so as to be circulated through the CO₂
absorber to be reused, is proposed (for example, Patent

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Literature 1).

[0004] In the CO₂ absorber, through countercurrent contact using an amine-based CO₂ absorption liquid such as alkanolamine, CO₂ in the flue gas is absorbed by the CO₂ absorption liquid in a chemical reaction (exothermic reaction), and the flue gas from which CO₂ is reduced is emitted to the outside of the system. The CO₂ absorption liquid that absorbs CO₂ is also called a "rich solution". The rich solution is pressurized by a pump, is heated in a heat exchanger by a high-temperature CO₂ absorption liquid (lean solution) regenerated as CO₂ is emitted in the regenerator, and is supplied to the regenerator.

Citation List

Patent Literature

15 [0005] Patent Literature 1: Japanese Laid-open Patent Publication No. 3-193116

Summary

[0006] However, in the air pollution control system, in a case where a mist generation material that is a generation source of mist generated in the absorber of the CO₂ recovery equipment is included in the flue gas introduced to the CO₂ absorber that absorbs CO₂ in the CO₂ recovery equipment, there is a problem in that the CO₂ absorption liquid is entrained by the mist generation material and thus the amount of CO₂ absorption liquid that scatters to the outside of the system is increased.

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Such a case, where the scattering of the CO₂ absorption liquid to the outside of the system occurs, is connected to a significant loss of the CO₂ absorption liquid reused in the regenerator, and an unnecessary amount of the CO₂ absorption liquid has to be replenished. Therefore, the scattering of the CO₂ absorption liquid to the outside of the system needs to be suppressed.

[0007] Here, the establishment of an air pollution control system which suppresses the scattering of a CO₂ absorption liquid from a CO₂ absorber is desired.

[0008] Some embodiments of the present invention may provide an air pollution control system and method capable of significantly reducing entraining of a CO₂ absorption liquid when flue gas from which CO₂ is reduced is discharged to the outside of a system, and performing an appropriate air pollution control.

[0009] According to a first aspect of invention, there is provided an air pollution control system comprising: SO_x removal equipment for reducing sulfur oxides from flue gas from a boiler; a cooler which is provided on a downstream side of the SO_x removal equipment, for reducing the sulfur oxides that remain in the flue gas and for decreasing a gas temperature; CO₂ recovery equipment including: an absorber for bringing CO₂ in the flue gas into contact with a CO₂ absorption liquid so as to be reduced; and a regenerator for causing the CO₂ absorption liquid to emit CO₂ so as to recover CO₂ and regenerate the CO₂ SO₃ as absorption liquid; and ammonia injection equipment for reducing a mist generation material which is a generation source of mist that is generated in the absorber of the CO₂ recovery equipment before introducing the flue gas to the CO₂

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recovery equipment, the mist generation material containing SO_3 .

[0010] According to some embodiments the air pollution control system further includes NO_x removal equipment for
5 reducing nitrogen oxides from the flue gas; and an electric dust collector for reducing particulates.

[0011] According to a second aspect of invention, there is provided an air pollution control method comprising: on an upstream side of a CO_2 recovery equipment for bringing CO_2 in
10 flue gas into contact with a CO_2 absorption liquid so as to be absorbed and reduced, injecting ammonia into the flue gas generated from a boiler so as to reduce SO_3 as a mist generation material in a gas state, the mist generation material containing SO_3 , and to decrease an amount of SO_3 mist
15 in the flue gas to be introduced to the CO_2 recovery equipment to 3ppm or less.

[0012] According to the air pollution control system of some embodiments, since the ammonia injection equipment is provided as the mist generation material reduction equipment before the
20 introduction to the CO_2 recovery equipment, the amount of mist in the flue gas when being introduced to the CO_2 absorber is decreased. As a result, the amount of CO_2 absorption liquid that is entrained by the mist and is discharged to the outside is decreased. Therefore, the loss of the CO_2 absorption liquid
25 that is discharged to the outside is significantly decreased, and thus an increase in running cost during the air pollution control may be suppressed.

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Brief Description of Drawings

[0013] FIG. 1 is a schematic diagram of an air pollution control system of an embodiment according to the present invention.

5 FIG. 2 is a conceptual diagram of a mechanism of mist generation.

FIG. 3-1 is a photograph illustrating a state where white smoke is decreased in a CO₂ absorber.

10 FIG. 3-2 is a photograph illustrating a state where white smoke is generated in the CO₂ absorber.

FIG. 4 is a schematic diagram of the air pollution control system according to a first embodiment.

FIG. 5 is a schematic diagram of another air pollution control system according to the first embodiment.

15 Description of Embodiments

[0014] Hereinafter, examples of embodiments of the present invention will be described in detail with reference to the drawings. Note that, the present invention is not limited by embodiments and examples. In addition, components in the
20 embodiments and the examples include those that may be easily assumed by those skilled in the art or are practically the same.

[0015] FIG. 1 is a schematic diagram of an air pollution control system of an embodiment according to the present
25 invention.

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As illustrated in FIG. 1, in the air pollution control system 10 of the embodiment according to the present invention, flue gas 12 from a boiler 11 is subjected to a reduction in nitrogen oxides (NO_x) from the flue gas 12 by NO_x removal equipment 13, and thereafter is first guided to an air heater AH to heat air supplied to the boiler 11. Thereafter, the flue gas 12 is introduced to a dry type electric dust collector 14 which is dust reduction equipment so as to reduce particulates. Next, the flue gas 12 is introduced to SO_x removal equipment 15 to reduce sulfur oxides (SO_x). Then, the flue gas 12 is cooled by a cooler 16, is thereafter introduced to CO_2 recovery equipment 17 to reduce carbon dioxide, and purified gas 18 is emitted from the top portion of a CO_2 absorber to the air which is outside the system. Note that, the particulates reduced by the electric dust collector 14 are subjected to an additional ash treatment 14a.

[0016] In the present embodiment, before introducing the flue gas 12 to the CO_2 recovery equipment 17, mist generation material reduction equipment 20 which reduces a mist generation material that is a generation source of mist generated in the CO_2 absorber of the CO_2 recovery equipment 17 is provided.

[0017] According to the air pollution control system according to the present embodiment, since the mist generation material reduction equipment 20 is provided before the introduction to the CO_2 recovery equipment 17, the amount of mist generation material in the flue gas 12 when being introduced to the CO_2 absorber of the CO_2 recovery equipment 17

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is significantly decreased. As a result, the amount of CO₂ absorption liquid (hereinafter, also referred to as "absorption liquid") entrained by mist and dispersed to the outside may be significantly decreased. As a result, the loss of the

5 absorption liquid that scatters to the outside of the system is significantly decreased, and thus an unnecessary replenishment is eliminated, thereby suppressing an increase in running cost during the air pollution control.

[0018] The mist generation material reduced by the mist

10 generation material reduction equipment 20 according to the present embodiment is SO₃ mist, nitric acid mist, hydrochloric acid mist, water vapor mist, or the like and is referred to as a material that becomes a mist generation factor in the CO₂ absorber. Note that, equipment that performs a reduction in a

15 gas state before becoming mist is also included in the mist generation material reduction equipment 20 according to the present embodiment.

[0019] Since the flue gas 12 from the boiler 11 is in a high-temperature state, the mist generation material is present

20 in a gas state at first. Thereafter, in a process of passing through the electric dust collector and the SO_x removal equipment, the flue gas is cooled, and thus the

mist generation material changes from the gas state to a mist state.

The particle size of the mist of the mist generation material in the present invention is referred to as a size
5 of equal to or smaller than $3.0\ \mu\text{m}$.

[0020] The form of mist generation and entraining of the absorption liquid in the CO_2 absorber of the CO_2 recovery equipment 17 will be described using FIGS. 2, 3-1, and 3-2.

FIG. 2 is a conceptual diagram of a mechanism of
10 entraining of the absorption liquid by mist generation. FIG. 3-1 is a photograph illustrating a state where white smoke is decreased in the CO_2 absorber, and FIG. 3-2 is a photograph illustrating a state where white smoke is generated in the CO_2 absorber. Although, SO_3 mist is
15 exemplified as the mist generation material in the description, descriptions with other kinds of mist will be the same. The flue gas 12 from the boiler 11 is subjected to a gas purifying treatment such as NO_x removal, a reduction in particulates, and SO_x removal, and the flue
20 gas 12 is cooled by the cooler 16, resulting in a gas temperature of about 50°C . Since this temperature state is equal to or less than the acid dew point, there is SO_3 mist (for example, 0.1 to $1.0\ \mu\text{m}$).

The SO_3 mist 50 has SO_3 as a nucleus 51 and water
25 vapor 52 that is incorporated into the periphery thereof.

[0021] In the CO_2 absorber, the absorption liquid is sprayed from nozzles and falls, and the falling absorption liquid and the flue gas are subjected to countercurrent contact such that CO_2 is absorbed by the absorption liquid.
30 On the other hand, the flue gas 12 is introduced from the lower side of the CO_2 absorber and is discharged to the upper side. Here, the SO_3 mist 50 is not absorbed by the

absorption liquid and ascends along with the gas stream of the flue gas 12.

[0022] Here, in the CO₂ absorber, when the absorption liquid is supplied from the nozzles, the absorption liquid
5 falls and a part of the absorption liquid and moisture evaporates, and thus a gaseous absorption liquid 41G and water vapor 42 are generated.

In addition, the amount of gaseous absorption liquid 41G and the water vapor 42 further increases as the
10 temperature of the absorption liquid is increased due to, for example, the exothermic reaction of the absorption liquid when CO₂ is absorbed.

[0023] Then, the gaseous absorption liquid 41G and the water vapor 42 are incorporated into the SO₃ mist 50,
15 resulting in a SO₃ mist (bloated mist) 53 including a bloated (for example, about 0.5 to 2.0 μm) absorption liquid.

[0024] As described above, the SO₃ mist 50 in the flue gas 12, before being introduced to the CO₂ recovery
20 equipment 17, incorporates the gaseous absorption liquid 41G and the water vapor 42 in the CO₂ absorber, becomes the SO₃ mist 53 including the absorption liquid, and scatters from the top portion of the CO₂ absorber while being entrained by the flue gas 12. Therefore, the loss of the
25 absorption liquid occurs.

[0025] The form of white smoke generation in the CO₂ absorber is illustrated in FIGS. 3-1 and 3-2.

FIG. 3-1 illustrates a case where the amount of mist generation material is decreased to a predetermined amount
30 or less by providing the mist generation material reduction equipment 20 for the flue gas 12 introduced to the CO₂ absorber and a state where the scattering of the SO₃ mist (bloated mist) 53 including the absorption liquid in the

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CO₂ absorber is significantly reduced and thus generation of white smoke is suppressed. FIG. 3-2 illustrates a case where the flue gas 12 is introduced as it is without providing the mist generation material reduction equipment 20 for the flue
5 gas 12 introduced to the CO₂ absorber and a state where the scattering of the SO₃ mist (bloated mist) 53 including the absorption liquid in the CO₂ absorber occurs and thus white smoke is generated.

[0026] That is, in the present invention, the mist generated
10 in the CO₂ absorber is referred to as the SO₃ mist (bloated mist) 53 including the absorption liquid. Confirming the presence or absence of the generation of bloated mist is referred to as the presence or absence of generation of white smoke, and by suppressing the bloated mist in the CO₂ absorber,
15 generation of white smoke is eliminated. Furthermore, the scattering of the absorption liquid is prevented.

[0027] In addition, regarding the bloated mist, as illustrated in FIG. 2, there may be cases where the gaseous absorption liquid 41G and the gaseous water vapor 42 are
20 separately incorporated into the SO₃ mist 50 in the flue gas 12 in the CO₂ absorber to respectively form a SO₃ mist (bloated mist) 53A including the absorption liquid and a SO₃ mist (bloated mist) 53B including the water vapor.

Here, in the case of the mist (bloated mist) 53B
25 including the water vapor, there is no loss of the absorption liquid. However, since generation of white smoke of the purified gas 18 to be discharged to the outside of a system occurs, a reduction in the mist generation material is also needed.

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Therefore, according to the present embodiment, by providing the mist generation material reduction equipment 20 before introduction to the CO₂ recovery equipment 17, entraining of the CO₂ absorption liquid may be significantly
5 reduced when the flue gas 12 from which CO₂ is reduced is discharged to the outside of the system, and an appropriate air pollution control may be performed.

[0028] Therefore, in the present embodiment, by providing the mist generation material reduction equipment 20 that
10 reduces the mist generation material which is the generation source of the mist (the SO₃ mist including the absorption liquid which is the bloated mist) generated in the CO₂ absorber of the CO₂ recovery equipment 17 before introducing the flue gas 12 to the CO₂ recovery equipment 17, the loss of the
15 absorption liquid that scatters to the outside of the system from the CO₂ absorber may be significantly decreased.

[0029] The mist generation material reduction equipment 20 may be provided on the upstream side of the dry type electric dust collector 14, between the dry type electric dust
20 collector 14 and the SO_x removal equipment 15, or in either of the front and the rear of the cooler 16, or to be integrated into the cooler 16.

Here, before introducing the flue gas 12 to the CO₂ recovery equipment 17, it is preferable that the amount of SO₃
25 mist 50 be decreased to 3 ppm or less for prevention of white smoke and prevention of scattering of the absorption liquid in the CO₂ absorber. This is because when the amount of SO₃ mist 50 is decreased to 3 ppm or less, scattering is

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suppressed, and deterioration of, for example, an amine-based absorption liquid due to SO_3 is prevented.

[0030] According to the present embodiment, since the scattering of the absorption liquid is prevented and the
5 deterioration of the absorption liquid is prevented, a decrease in the number of regeneration treatments performed

in the regeneration equipment (reclaiming equipment) for the absorption liquid may be achieved, and the loss of the absorption liquid is further significantly decreased, so that a decrease in the amount of the replenished absorption liquid may be achieved. Therefore, the system efficiency of the air pollution control system may be significantly enhanced.

[0031] Note that, in this embodiment, the electric dust collector is exemplified as the dust reduction equipment in the description. However, the present invention is not limited to this as long as particulates are reduced from the flue gas 12, and besides the electric dust collector, for example, a bag filter or a venturi scrubber may be exemplified.

[0032] In the following embodiment, a specific form of the mist generation material reduction equipment that reduces the mist generation material will be described.

First Embodiment

[0033] The air pollution control system including the CO₂ recovery equipment according to an embodiment of the present invention will be described with reference to the drawings. FIG. 4 is a schematic diagram of the air pollution control system according to the first embodiment. FIG. 5 is a schematic diagram of another air pollution control system according to the first embodiment. Note that, in the following embodiment, SO₃ is exemplified as the mist generation material in the description, but the present invention is not limited thereto.

As illustrated in FIG. 4, an air pollution control system 10A according to the first embodiment includes the NO_x removal equipment 13 which reduces nitrogen oxides from the flue gas 12 from the boiler (for example, coal-fired boiler) 11, the dry type electric dust collector 14 which

is provided on the downstream side of the NO_x removal equipment 13 and reduces particulates from the flue gas 12, the SO_x removal equipment 15 which is provided on the downstream side of the electric dust collector 14 and
5 reduces sulfur oxides from the flue gas 12, the cooler 16 which is provided on the downstream side of the SO_x removal equipment 15 and has a cooling unit 16a that decreases the gas temperature, and the CO₂ recovery equipment 17 which includes an absorber 17A that brings CO₂ in the flue gas 12
10 into contact with the absorption liquid so as to be reduced and a regenerator 17B that causes the absorption liquid to emit CO₂ to recover the CO₂ and regenerate the absorption liquid.

[0034] In this embodiment, before introducing the SO₃ mist to the CO₂ recovery equipment 17, as a countermeasure to reduce the mist generation material, ammonia injection equipment 22 which injects ammonia (NH₃) between the NO_x removal equipment 13 and the electric dust collector 14 is provided. The ammonia injection equipment 22 according to
20 this embodiment functions as the mist generation material reduction equipment 20 illustrated in FIG. 1.

[0035] As a result, by supplying ammonia into the flue gas 12 having a gas temperature of about 120°C to 160°C on the downstream side of the air heater AH, SO₃ in the gas
25 state is reduced. As a result, the amount of the SO₃ mist introduced to the CO₂ recovery equipment 17 is decreased.

[0036] That is, in this embodiment, on the upstream side of the electric dust collector 14, ammonia (NH₃) gas is sprayed to form ammonium sulfate (NH)₄SO₄ and this is
30 arrested by the dry type electric dust collector 14 along with particulates. In this embodiment, as a result of reducing SO₃ in the gas state which is the mist generation material from the flue gas 12, a decrease in the amount of

the SO_3 mist introduced to the CO_2 recovery equipment 17 is achieved. Therefore, the generation of white smoke of the purified gas 18 discharged from the absorber 17A, which is caused by the mist, is suppressed, and the entraining of the absorption liquid 41 is suppressed. As a result, an air pollution control system in which there is no loss of the absorption liquid 41 may be provided.

In a case where the NO_x removal equipment 13 is present on the upstream side of the air pollution control system, by increasing the supply amount of ammonia (NH_3) used in the NO_x removal equipment 13, an ammonia (NH_3) injection equipment does not need to be newly provided and may be replaced.

[0037] In addition, the flue gas 12 from which particulates are reduced in the electric dust collector 14 is subjected to a reduction in sulfur oxides from the flue gas 12 in the SO_x removal equipment 15, the reduced sulfur oxides are supplied with limestone (CaCO_3) 15a and oxidation air 15b to become gypsum 15c through a limestone-gypsum method, and desulfurized waste water 15d is additionally treated. Note that, in the figures, reference numerals 17a, 17b, 17c, 17d, 17e, and 17f denote a reboiler, saturated water vapor, condensed water, a separation drum, recovered CO_2 , and a heat exchanger, respectively.

[0038] The flue gas 12 desulfurized by the SO_x removal equipment 15 is cooled by the cooler 16 to cause the flue gas temperature to be 50°C or less, and is introduced to the CO_2 recovery equipment 17 including the absorber 17A and the regenerator 17B. Here, CO_2 in the flue gas 12 is reduced by, for example, the amine-based absorption liquid 41. At this time, in this embodiment, as a result of reducing SO_3 in the gas state which is the mist generation material in the flue gas 12, a decrease in the amount of

the SO₃ mist 50 introduced to the CO₂ recovery equipment 17 is achieved. Therefore, the generation of white smoke of the purified gas 18 discharged from the absorber 17A, which is caused by the mist, is suppressed, and the entraining of the absorption liquid 41 is suppressed.

As a result, an air pollution control system in which there is no loss of the absorption liquid may be provided. [0039] Here, in this embodiment, the amine-based absorption liquid is exemplified as the absorption liquid. However, the absorption liquid of the present invention is not limited to the amine-based absorption liquid. As the absorption liquid, besides the amine-based absorption liquid, for example, an amino acid-based absorption liquid, an ionic liquid absorption liquid, a hot potassium carbonate absorption liquid made of potassium carbonate and amines, and the like may be exemplified.

[0040] FIG. 5 is a schematic diagram of an air pollution control system of a modified example of the first embodiment. In the cooler 16 illustrated in FIG. 4, the flue gas 12 is cooled. However, as illustrated in FIG. 5, an air pollution control system 10B is provided with a finishing SO_x removal unit 16b at the lower portion of the cooler 16 and supplies the limestone (CaCO₃) 15a and the oxidation air 15b to form the gypsum 15c through the limestone-gypsum method. Accordingly, sulfur oxides that remain in the flue gas 12 from the SO_x removal equipment 15 is reduced, and thus the SO_x removal efficiency is further enhanced. Note that, a strong alkaline agent such as sodium hydroxide (NaOH) may be added along with the limestone.

In this embodiment, in the finishing SO_x removal unit 16b, a liquid column type is used as a method of supplying a SO_x removal absorption liquid. However, the present

invention is not limited thereto, and any of sprinkling type, jet type, and filling type may also be used.

[0041] Here, as the SO_x removal absorption liquid used in the finishing SO_x removal unit 16b, besides the
5 limestone (CaCO₃), a strong alkaline agent such as NaOH, Na₂CO₃, NaHCO₃, Ca(OH)₂, or Mg(OH)₂ may be exemplified. By using the strong alkaline agent, further enhancement of the SO_x removal performance may be achieved, and this is particularly effective in a case where the flue gas 12
10 having a high sulfur oxide concentration is introduced, thereby decreasing the concentration of sulfur oxides in the flue gas 12 introduced to the CO₂ recovery equipment 17 to an extremely low concentration. The SO_x removal performance is increased compared to the limestone-gypsum
15 method. Therefore, even in a case where the concentration of sulfur oxides in the introduced flue gas 12 is high, favorable SO_x removal performance is exhibited, which is preferable.

[0042] As described above with the embodiment, according
20 to the present invention, the dissolved salt spraying equipment 23 is provided as the ammonia injection equipment 22. Therefore, an air pollution control system in which the absorption liquid 41 is not entrained when the flue gas 12 from which CO₂ is reduced is discharged to the outside
25 may be provided.

Reference Signs List

[0043] 10, 10A, 10B AIR POLLUTION CONTROL SYSTEM
11 BOILER
12 FLUE GAS
30 13 NO_x REMOVAL EQUIPMENT
14 ELECTRIC DUST COLLECTOR
15 SO_x REMOVAL EQUIPMENT
16 COOLER

- 16a COOLING UNIT
- 16b FINISHING SO_x REMOVAL UNIT
- 17 CO₂ RECOVERY EQUIPMENT
- 17A CO₂ absorber
- 5 17B Absorption liquid regenerator
- 18 Purified gas
- 20 Mist generation material reduction equipment
- 22 Ammonia injection equipment

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CLAIMS:

1. An air pollution control system comprising:

SO_x removal equipment for reducing sulfur oxides from flue gas from a boiler;

5 a cooler which is provided on a downstream side of the SO_x removal equipment, for reducing the sulfur oxides that remain in the flue gas and for decreasing a gas temperature;

CO₂ recovery equipment including:

10 an absorber for bringing CO₂ in the flue gas into contact with a CO₂ absorption liquid so as to be reduced; and

a regenerator for causing the CO₂ absorption liquid to emit CO₂ so as to recover CO₂ and regenerate the CO₂ absorption liquid; and

15 ammonia injection equipment for reducing SO₃ as a mist generation material which is a generation source of mist that is generated in the absorber of the CO₂ recovery equipment before introducing the flue gas to the CO₂ recovery equipment, the mist generation material containing SO₃.

20 2. The air pollution control system according to claim 1, further comprising:

NO_x removal equipment for reducing nitrogen oxides from the flue gas; and

an electric dust collector for reducing particulates.

3. An air pollution control method comprising:

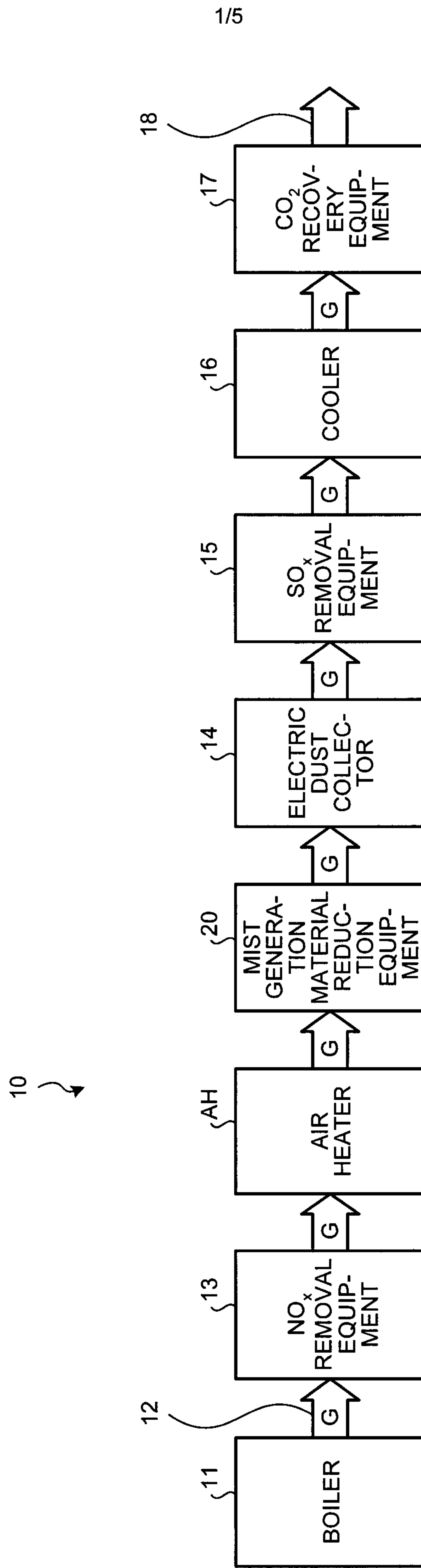
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on an upstream side of a CO₂ recovery equipment for bringing CO₂ in flue gas into contact with a CO₂ absorption liquid so as to be absorbed and reduced,

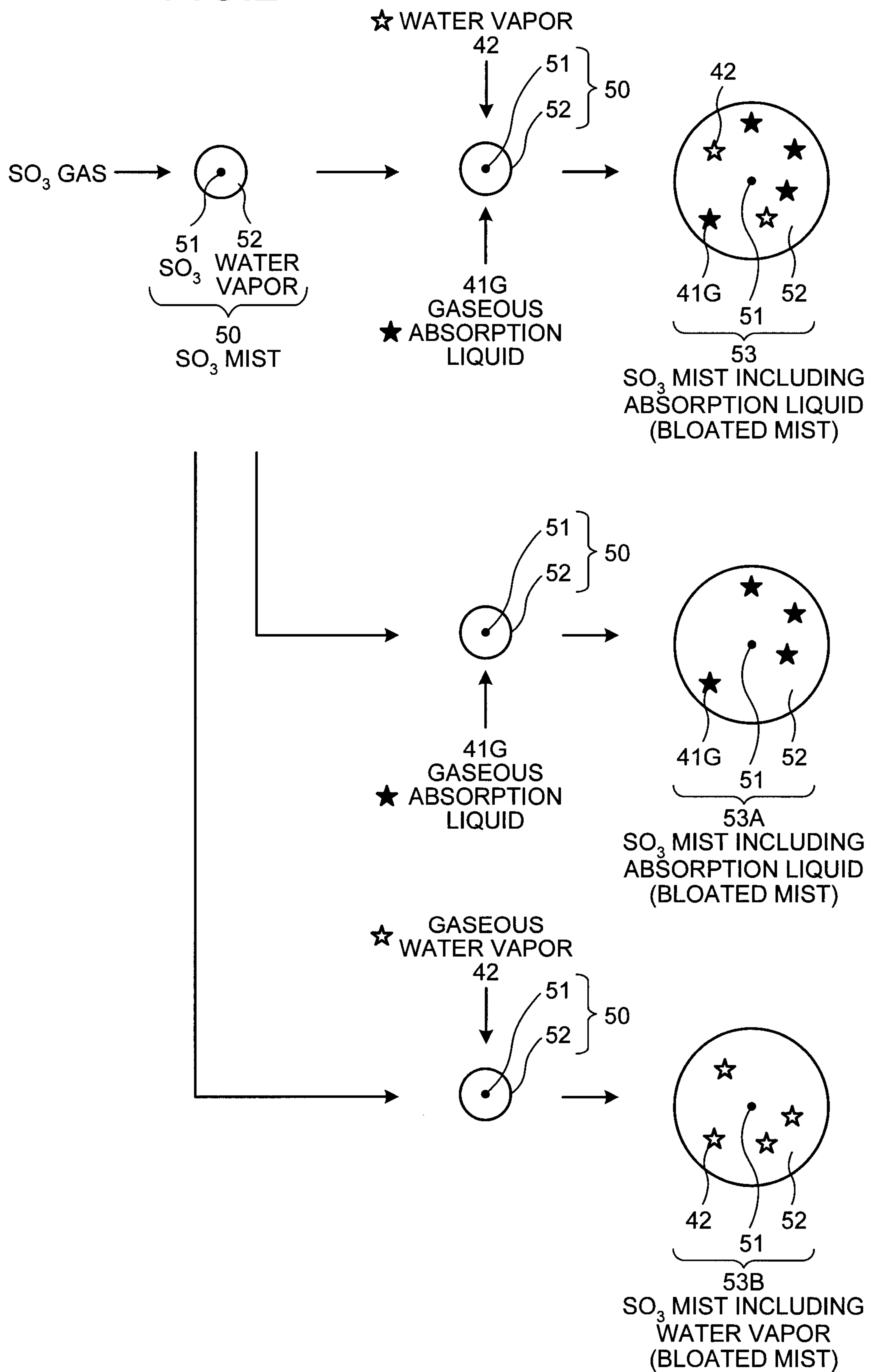
5 injecting ammonia into the flue gas generated from a boiler so as to reduce SO₃ as a mist generation material in a gas state, the mist generation material containing SO₃, and to decrease an amount of SO₃ mist in the flue gas to be introduced to the CO₂ recovery equipment to 3ppm or less.

FIG.1



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FIG.2



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FIG.3-1

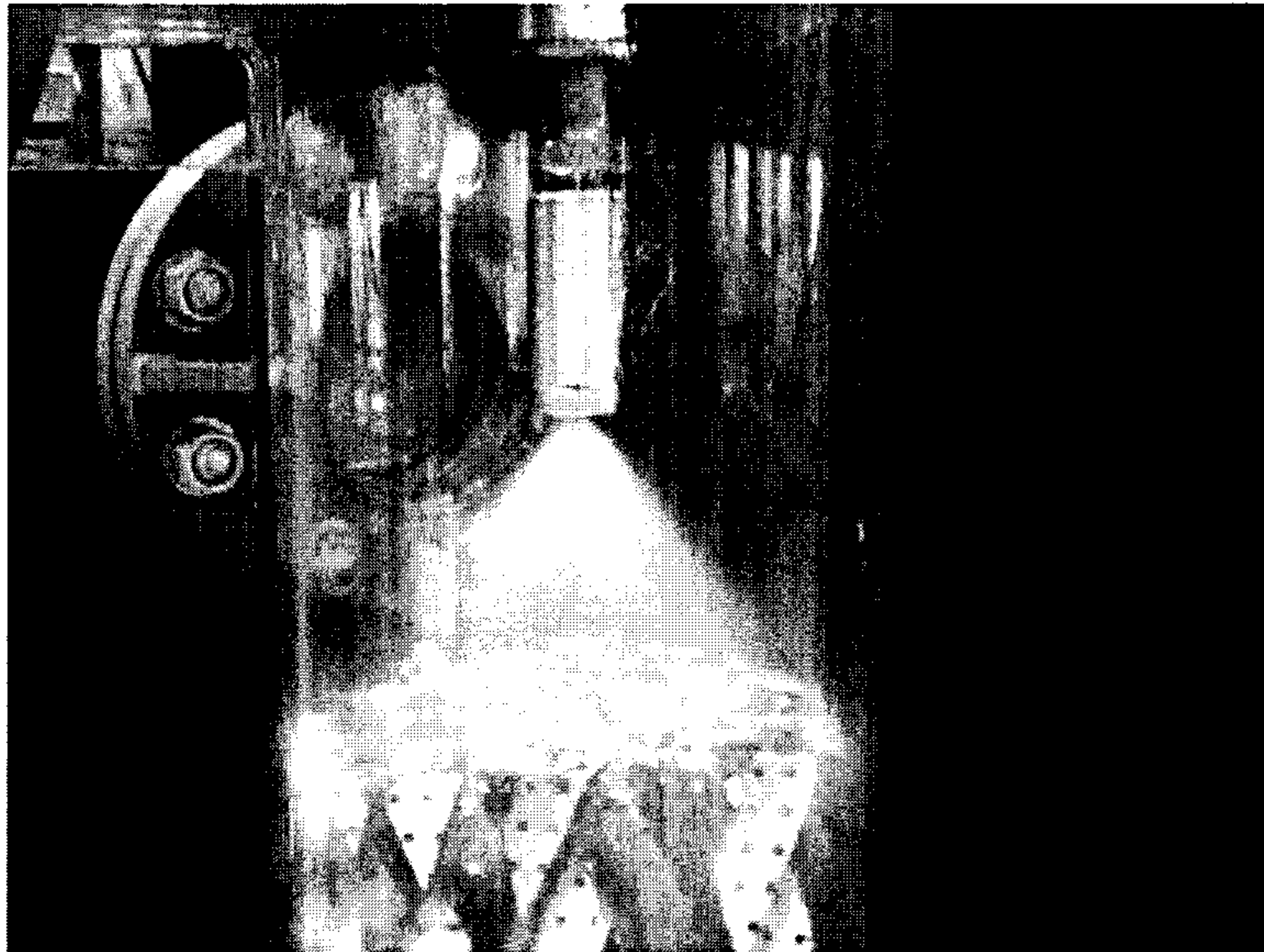


FIG.3-2

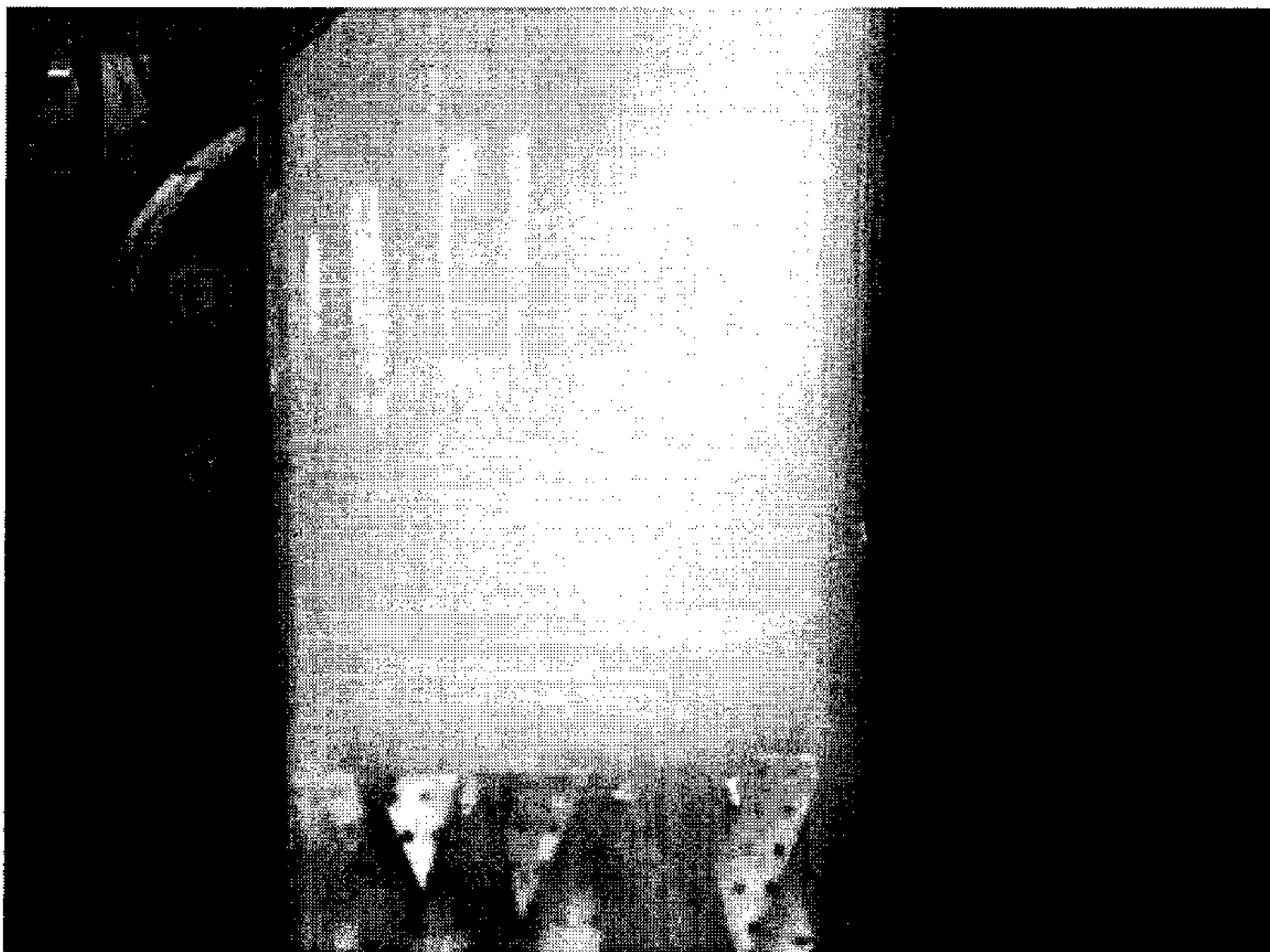


FIG.4

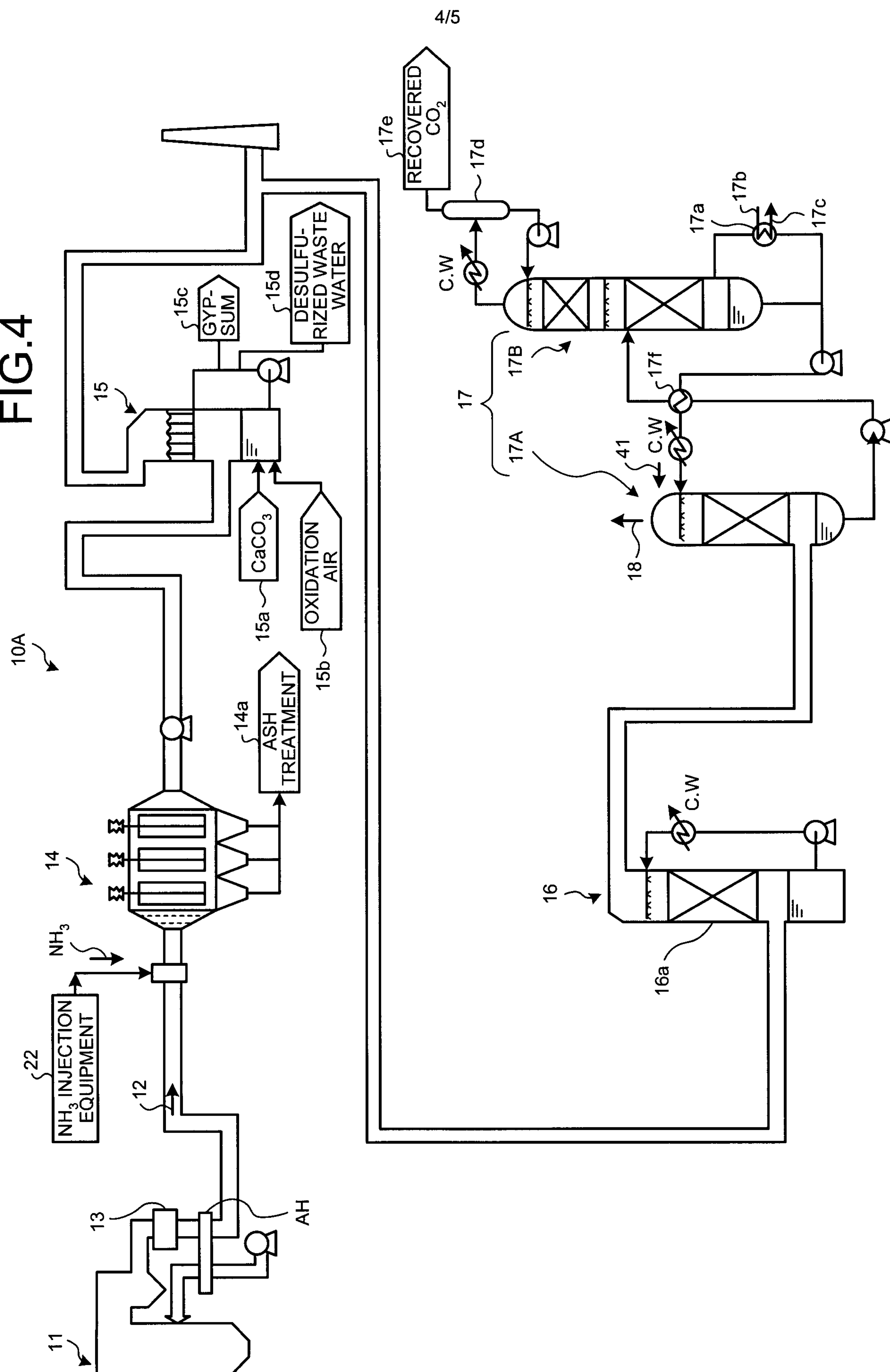


FIG. 5

