fluid medium in order to solve the above-described problems.

Solution to Problem

[0009]

That is, embodiments of the present invention are as shown below.

[0010]

According to a first aspect of the present invention, there is provided a fluid medium regeneration device for a fluidized bed, including: a cooling unit that is supplied with at least, a fluid medium recovered from the fluidized bed of a fluidized bed combustion furnace is supplied, cools the fluid medium by being brought into contact with a liquid medium having a boiling point of -20°C or lower under 1 atmospheric pressure, and separates a coating layer from the fluid medium, wherein the cooling unit includes a screw conveyance machine, and the fluid medium is supplied into the screw conveyance machine.

In an embodiment of the above aspect of the fluid medium regeneration device, the liquid medium is at least one of liquid air, liquid nitrogen, and liquid oxygen.

In an embodiment of the above aspect, the fluid medium regeneration device further includes: sorting means that sorts the fluid medium exhausted from the cooling unit, and the coating layer.

combustion method including: recovering the fluid medium from the fluidized bed of the fluidized bed combustion furnace, cooling the fluid medium recovered from the fluidized bed by being brought into contact with a liquid medium having a boiling point of -20°C or lower under 1 atmospheric pressure in a cooling unit, and separating a coating layer from the fluid medium, wherein the cooling unit includes a screw conveyance machine, and the fluid medium is supplied into the screw conveyance machine.

In an embodiment of the above aspect of the combustion method, the liquid medium is at least one of liquid air and liquid nitrogen.

In an embodiment of the above aspect of the combustion method, the fluid medium and the coating layer are sorted.

In an embodiment of the above aspect of the combustion method, a temperature of the fluid medium recovered from the fluidized bed of the fluidized bed combustion furnace is equal to or lower than a melting point of the coating layer.

In an embodiment of the above aspect of the combustion method, the fluid medium is cooled by an intermediate cooling unit and then brought into contact with the liquid medium.

In an embodiment of the above aspect of the combustion method, the fluid medium from which the coating layer has been separated is recovered, and the fluid medium having a

CLAIMS

1. A fluid medium regeneration device for a fluidized bed, comprising:

a cooling unit that is supplied with at least, a fluid medium recovered from the fluidized bed of a fluidized bed combustion furnace is supplied, cools the fluid medium by being brought into contact with a liquid medium having a boiling point of -20°C or lower under 1 atmospheric pressure, and separates a coating layer from the fluid medium,

wherein the cooling unit includes a screw conveyance machine, and the fluid medium is supplied into the screw conveyance machine.

2. The fluid medium regeneration device for a fluidized bed according to claim 1, wherein

the liquid medium is at least one of liquid air, liquid nitrogen, and liquid oxygen.

3. The fluid medium regeneration device for a fluidized bed according to claim 1 or 2, further comprising:

sorting means that sorts the fluid medium exhausted from the cooling unit, and the coating layer.

4. The fluid medium regeneration device for a fluidized bed according to any one of claims 1 to 3, wherein

a temperature of the fluid medium recovered from the fluidized bed of the fluidized bed combustion furnace is equal to or lower than a melting point of the coating layer.

5. The fluid medium regeneration device for a fluidized bed according to any one of claims 1 to 4, wherein

the cooling unit includes an intermediate cooling unit that further cools the fluid medium, and brings the fluid medium cooled by the intermediate cooling unit into contact with the liquid medium.

6. The fluid medium regeneration device for a fluidized bed according to any one of claims 1 to 5, further comprising:

a return unit that recovers the fluid medium from which the coating layer has been separated, and returns the fluid medium having a particle size adjusted to 50 to 1,000 μm to the fluidized bed.

7. A combustion system comprising:

a fluidized bed combustion furnace; and

the fluid medium regeneration device for a fluidized bed according to any one of claims 1 to 6.

8. A combustion method of a fluidized bed combustion furnace using an alkaline-containing fuel, the combustion method comprising:

recovering the fluid medium from the fluidized bed of the fluidized bed combustion furnace, cooling the fluid medium recovered from the fluidized bed by being brought into contact with a liquid medium having a boiling point of -20°C or lower under 1 atmospheric pressure in a cooling unit, and separating a coating layer from the fluid medium,

wherein the cooling unit includes a screw conveyance machine, and the fluid medium is supplied into the screw conveyance machine.

9. The combustion method of a fluidized bed combustion furnace according to claim 8, wherein

the liquid medium is at least one of liquid air and liquid nitrogen.

10. The combustion method of a fluidized bed combustion furnace according to claim 8 or 9, wherein the fluid medium and the coating layer are sorted.

11. The combustion method of a fluidized bed combustion furnace according to any one of claims 8 to 10, wherein

a temperature of the fluid medium recovered from the fluidized bed of the fluidized bed combustion furnace is equal to or lower than a melting point of the coating layer.

12. The combustion method of a fluidized bed combustion furnace according to any one of claims 8 to 11, wherein

the fluid medium is cooled by an intermediate cooling unit and then brought into contact with the liquid medium.

13. The combustion method of a fluidized bed combustion furnace according to any one of claims 8 to 12, wherein

the fluid medium from which the coating layer has been separated is recovered, and the fluid medium having a particle size adjusted to 50 to 1,000 μm is returned to the fluidized bed.