CLAIMS

[Claim 1]

A power generation facility that incinerates materials to be incinerated to generate power, the power generation facility comprising:

an incinerator in which the materials to be incinerated are incinerated;

a boiler into which exhaust gas generated in the incinerator is supplied;

a carbon dioxide recovery device into which the exhaust gas that has passed through the boiler flows;

an exhaust gas flow path provided between the boiler and the carbon dioxide recovery device;

an adjustment device configured to adjust a flow rate of the exhaust gas flowing through the exhaust gas flow path to a target flow rate and adjust a temperature of the exhaust gas to a target temperature;

a sensor provided in the power generation facility; and

a control device that controls the adjustment device based on a detection result of the sensor.

wherein the adjustment device supplies the materials to be incinerated and combustion air into the incinerator,

the sensor has a camera configured to acquire thermal image information indicating a combustion state of the materials to be incinerated in the incinerator, and

the control device controls one or more of a supply state of the materials to be incinerated supplied into the incinerator and a supply state of the combustion air supplied into the incinerator, by controlling the adjustment device based on the thermal image information.

[Claim 2]

The power generation facility according to claim 1,

wherein the sensor has an oxygen concentration detection unit configured to detect an oxygen concentration of the exhaust gas, and

the control device controls an amount of the combustion air supplied into the incinerator such that an air ratio obtained from the oxygen concentration is 1.1 or more and 1.25 or less, by controlling the adjustment device based on a detection result of the oxygen concentration detection unit.

[Claim 3]

A power generation facility that incinerates materials to be incinerated to generate power, the power generation facility comprising:

an incinerator in which the materials to be incinerated are incinerated;

a boiler into which exhaust gas generated in the incinerator is supplied;

a carbon dioxide recovery device into which the exhaust gas that has passed through the boiler flows;

an exhaust gas flow path provided between the boiler and the carbon dioxide recovery device;

an adjustment device configured to adjust a flow rate of the exhaust gas flowing through the exhaust gas flow path to a target flow rate and adjust a temperature of the exhaust gas to a target temperature;

a sensor provided in the power generation facility;

a control device that controls the adjustment device based on a detection result of the sensor, and

a dust collecting device disposed in the exhaust gas flow path,

wherein the boiler is configured to perform heat exchange between the exhaust gas and a heat medium,

the sensor has

one or more of a first temperature sensor configured to detect a first temperature of the exhaust gas flowing into the dust collecting device and a second temperature sensor configured to detect a second temperature of the exhaust gas that has flowed out from the dust collecting device, and

a nitrogen oxide concentration detection unit configured to detect a nitrogen oxide concentration in the exhaust gas flowing through the exhaust gas flow path, and

the control device controls an amount of the heat medium supplied into the boiler based on correspondence relationship information in which the nitrogen oxide concentration and one or more of the first temperature and the second temperature are associated with each other.

[Claim 4]

A power generation facility that incinerates materials to be incinerated to generate power, the power generation facility comprising:

an incinerator in which the materials to be incinerated are incinerated;

a boiler into which exhaust gas generated in the incinerator is supplied;

a carbon dioxide recovery device into which the exhaust gas that has passed through the boiler flows;

an exhaust gas flow path provided between the boiler and the carbon dioxide recovery device;

an adjustment device configured to adjust a flow rate of the exhaust gas flowing through the exhaust gas flow path to a target flow rate and adjust a temperature of the exhaust gas to a target temperature;

a sensor provided in the power generation facility;

a control device that controls the adjustment device based on a detection result of the sensor, and

a dust collecting device disposed in the exhaust gas flow path,

wherein the adjustment device has an economizer disposed in the exhaust gas flow path on an upstream side with respect to the dust collecting device and configured to perform heat exchange between the exhaust gas and a heat medium,

the sensor has

one or more of a first temperature sensor configured to detect a first temperature of the exhaust gas flowing into the dust collecting device and a second temperature sensor configured to detect a second temperature of the exhaust gas that has flowed out from the dust collecting device, and

a nitrogen oxide concentration detection unit configured to detect a nitrogen oxide concentration in the exhaust gas flowing through the exhaust gas flow path, and

the control device controls an amount of the heat medium supplied into the economizer based on correspondence relationship information in which the nitrogen oxide concentration and one or more of the first temperature and the second temperature are associated with each other.

[Claim 5]

The power generation facility according to claim 1 or 2, further comprising:

a dust collecting device disposed in the exhaust gas flow path,

wherein the adjustment device has a heat recovery unit disposed in the exhaust gas flow path on a downstream side with respect to the dust collecting device and configured to perform heat exchange between the exhaust gas and a heat medium,

the sensor has a third temperature sensor configured to detect a third temperature of the exhaust gas that has flowed out from the heat recovery unit, and

the control device controls an amount of the heat medium supplied into the heat recovery unit based on the third temperature.

[Claim 6]

The power generation facility according to claim 3 or 4,

wherein the adjustment device has

a heat recovery unit disposed in the exhaust gas flow path on a downstream side with respect to the dust collecting device and configured to perform heat exchange between the exhaust gas and a heat medium,

wherein the sensor has a third temperature sensor configured to detect a third temperature of the exhaust gas discharged from the heat recovery unit, and

the control device controls the flow rate of the heat medium supplied to the heat recovery unit based on the third temperature.

[Claim 7]

A power generation facility that incinerates materials to be incinerated to generate power, the power generation facility comprising:

an incinerator in which the materials to be incinerated are incinerated;

a boiler into which exhaust gas generated in the incinerator is supplied;

a carbon dioxide recovery device into which the exhaust gas that has passed through the boiler flows;

an exhaust gas flow path provided between the boiler and the carbon dioxide recovery device;

an adjustment device configured to adjust a flow rate of the exhaust gas flowing through the exhaust gas flow path to a target flow rate and adjust a temperature of the exhaust gas to a target temperature;

a sensor provided in the power generation facility;

a control device that controls the adjustment device based on a detection result of the sensor, and

a dust collecting device disposed in the exhaust gas flow path,

wherein the adjustment device has

a heat recovery unit disposed in the exhaust gas flow path on a downstream side with respect to the dust collecting device and configured to perform heat exchange between the exhaust gas and a heat medium,

an economizer disposed in the exhaust gas flow path on an upstream side with respect to the dust collecting device and configured to perform the heat exchange between the exhaust gas and the heat medium,

a bypass line of which one end is connected to the exhaust gas flow path between the boiler and the economizer and another end is connected to the exhaust gas flow path between the economizer and the dust collecting device, and

a flow rate adjuster disposed in the bypass line and configured to adjust a flow rate of the exhaust gas flowing through the bypass line,

the sensor has a third temperature sensor configured to detect a third

temperature of the exhaust gas flowing through the exhaust gas flow path on a downstream side with respect to the heat recovery unit, and

the control device controls an opening degree of the flow rate adjuster based on the third temperature.

[Claim 8]

A power generation facility that incinerates materials to be incinerated to generate power, the power generation facility comprising:

an incinerator in which the materials to be incinerated are incinerated;

a boiler into which exhaust gas generated in the incinerator is supplied;

a carbon dioxide recovery device into which the exhaust gas that has passed through the boiler flows;

an exhaust gas flow path provided between the boiler and the carbon dioxide recovery device;

an adjustment device configured to adjust a flow rate of the exhaust gas flowing through the exhaust gas flow path to a target flow rate and adjust a temperature of the exhaust gas to a target temperature;

a sensor provided in the power generation facility;

a control device that controls the adjustment device based on a detection result of the sensor, and

a dust collecting device disposed in the exhaust gas flow path,

wherein the adjustment device has

an economizer disposed in the exhaust gas flow path on an upstream side with respect to the dust collecting device and configured to perform heat exchange between the exhaust gas and a heat medium,

a heat recovery unit disposed in the exhaust gas flow path between the economizer and the dust collecting device and configured to perform the heat exchange between the exhaust gas and the heat medium,

a bypass line of which one end is connected to the exhaust gas flow path between the economizer and the heat recovery unit and another end is connected to the exhaust gas flow path between the heat recovery unit and the dust collecting device, and

a flow rate adjuster disposed in the bypass line and configured to adjust a flow rate of the exhaust gas flowing through the bypass line,

the sensor has

one or more of a first temperature sensor configured to detect a first temperature of the exhaust gas flowing into the dust collecting device and a second temperature sensor configured to detect a second temperature of the exhaust gas that has flowed out from the dust collecting device, and

a nitrogen oxide concentration detection unit configured to detect a nitrogen oxide concentration in the exhaust gas flowing through the exhaust gas flow path on a downstream side with respect to the dust collecting device, and

the control device controls an opening degree of the flow rate adjuster based on correspondence relationship information in which the nitrogen oxide concentration and one or more of the first temperature and the second temperature are associated with each other.

[Claim 9]

A power generation facility that incinerates materials to be incinerated to generate power, the power generation facility comprising:

an incinerator in which the materials to be incinerated are incinerated;

a boiler into which exhaust gas generated in the incinerator is supplied;

a carbon dioxide recovery device into which the exhaust gas that has passed through the boiler flows;

an exhaust gas flow path provided between the boiler and the carbon dioxide recovery device;

an adjustment device configured to adjust a flow rate of the exhaust gas flowing through the exhaust gas flow path to a target flow rate and adjust a temperature of the exhaust gas to a target temperature;

a sensor provided in the power generation facility;

a control device that controls the adjustment device based on a detection result of the sensor, and

a dust collecting device disposed in the exhaust gas flow path;

a steam turbine that is driven by supply of main steam from the boiler;

a condenser into which discharged steam from the steam turbine flows;

a connection line through which water from the condenser is guidable to the adjustment device as a heat medium;

a deaerator that deaerates dissolved gas from water from the adjustment device, using extraction steam from the steam turbine; and

a boiler water supply line through which the deaerated water is guidable to the boiler,

wherein the adjustment device has a heat recovery unit disposed in the exhaust gas flow path on a downstream side with respect to the dust collecting device and configured to perform heat exchange between the exhaust gas and the heat medium.

[Claim 10]

A power generation facility that incinerates materials to be incinerated to generate power, the power generation facility comprising:

an incinerator in which the materials to be incinerated are incinerated;

a boiler into which exhaust gas generated in the incinerator is supplied;

a carbon dioxide recovery device into which the exhaust gas that has passed through the boiler flows;

an exhaust gas flow path provided between the boiler and the carbon dioxide recovery device;

an adjustment device configured to adjust a flow rate of the exhaust gas flowing through the exhaust gas flow path to a target flow rate and adjust a temperature of the exhaust gas to a target temperature;

a sensor provided in the power generation facility;

a control device that controls the adjustment device based on a detection result of the sensor, and

a first line that connects the boiler and the steam turbine and through which the main steam is guidable to the carbon dioxide recovery device from a main steam line through which the main steam flows;

a first valve disposed in the first line;

a second line that connects the steam turbine and the deaerator and through which the extraction steam is guidable to the carbon dioxide recovery device from an extraction steam line through which the extraction steam flows; and

a second valve disposed in the second line,

wherein the carbon dioxide recovery device has

a cooling tower that cools the exhaust gas,

an absorption tower that causes an absorbing liquid to absorb carbon

dioxide contained in the cooled exhaust gas, and

a regeneration tower that heats the absorbing liquid that has absorbed the carbon dioxide, by a reboiler into which the main steam and the extraction steam are supplied by connection of the first line and the second line, to separate the carbon dioxide from the absorbing liquid, and

the control device controls one of the first valve and the second valve to be in a closed state based on an operation state of the power generation facility.