CLAIMS

[Claim 1] A combustion facility comprising:

a furnace into which gas after combustion flows;

a furnace body including a drying stage, a combustion stage, and a post-combustion stage and configured to convey an object to be incinerated while combusting the object to be incinerated, the furnace body including, in a case where an upstream side in a conveyance direction of the object to be incinerated is referred to as front and a downstream side in the conveyance direction is referred to as rear, a front ceiling portion extending forward from the furnace, a rear ceiling portion extending rearward from the furnace, and a rear wall extending downward from a rear end portion of the rear ceiling portion;

a first nozzle provided in a region of the rear ceiling portion rearward of a center of the rear ceiling portion in the conveyance direction or in the rear wall and configured to discharge a first gas for combustion forward;

a second nozzle provided at a position forward of the first nozzle in the rear ceiling portion and configured to discharge a second gas for combustion from the rear ceiling portion toward the drying stage or the combustion stage;

a detection unit configured to detect a decrease in NOx concentration in a primary combustion region that is a region in the furnace body; and

a control unit configured to control an amount of the second gas for combustion discharged by the second nozzle based on a target air ratio in the primary combustion region, perform control to decrease a flow rate of the first gas for combustion in a case where the detection unit detects the decrease in NOx concentration in the primary combustion region, and perform control to decrease a flow rate of the second gas for combustion in a case where an increase in NOx concentration in the primary combustion

region or a sign of the increase is not detected even after the control to decrease the flow rate of the first gas for combustion is performed.

[Claim 2] A combustion facility comprising:

a furnace into which gas after combustion flows;

a furnace body including a drying stage, a combustion stage, and a post-combustion stage and configured to convey an object to be incinerated while combusting the object to be incinerated, the furnace body including, in a case where an upstream side in a conveyance direction of the object to be incinerated is referred to as front and a downstream side in the conveyance direction is referred to as rear, a front ceiling portion extending forward from the furnace, a rear ceiling portion extending rearward from the furnace, and a rear wall extending downward from a rear end portion of the rear ceiling portion;

a first nozzle provided in a region of the rear ceiling portion rearward of a center of the rear ceiling portion in the conveyance direction or in the rear wall and configured to discharge a first gas for combustion forward;

a second nozzle provided at a position forward of the first nozzle in the rear ceiling portion and configured to discharge a second gas for combustion from the rear ceiling portion toward the drying stage or the combustion stage;

a detection unit configured to detect a decrease in oxygen concentration in a primary combustion region that is a region in the furnace body; and

a control unit configured to control an amount of the second gas for combustion discharged by the second nozzle based on a target air ratio in the primary combustion region, perform control to increase oxygen concentration of the first gas for combustion in a case where the detection unit detects the decrease in oxygen concentration in the

primary combustion region, and perform control to increase oxygen concentration of the second gas for combustion in a case where an increase in oxygen concentration in the primary combustion region or a sign of the increase is not detected even after the control to increase the oxygen concentration of the first gas for combustion is performed.

[Claim 3] The combustion facility according to Claim 2,

wherein the second nozzle is provided in a region of the rear ceiling portion forward of the center of the rear ceiling portion in the conveyance direction.

[Claim 4] The combustion facility according to Claim 3,

wherein, in a case where the rear ceiling portion is virtually divided into four regions in the conveyance direction, the second nozzle is provided in a frontmost region among the four divided regions.

[Claim 5] The combustion facility according to any one of Claims 2 to 4,

wherein the second nozzle is configured to, in a case where a forward direction in a horizontal direction is defined as 0°, discharge the second gas for combustion in a direction included in an angular range of 60° or more and 90° or less with respect to the horizontal direction.

[Claim 6] The combustion facility according to any one of Claims 1 to 4,

wherein the combustion facility includes a plurality of first nozzles including the first nozzle, the plurality of first nozzles being provided in the region of the rear ceiling portion rearward of the center of the rear ceiling portion in the conveyance direction or in the rear wall and configured to discharge the first gas for combustion forward, and

a plurality of virtual lines extending forward from the plurality of first nozzles are defined, and the second nozzle is disposed between the plurality of virtual lines as viewed from above.

[Claim 7] The combustion facility according to any one of Claims 1 to 4,

wherein the first nozzle is provided in the rear wall and is configured to discharge the first gas for combustion in an orientation in which a wall jet along the rear ceiling portion is formed.

[Claim 8] The combustion facility according to any one of Claims 1 to 4, further comprising:

an angle adjustment mechanism configured to change a discharge direction of the second gas for combustion from the second nozzle;

a sensor configured to detect a component contained in the gas after combustion or gas that has passed through the furnace; and

a control unit configured to control the angle adjustment mechanism based on a detection result of the sensor.

[Claim 9] A control method for a combustion facility, the combustion facility including a furnace into which gas after combustion flows, a furnace body including a drying stage, a combustion stage, and a post-combustion stage and configured to convey an object to be incinerated while combusting the object to be incinerated, the furnace body including, in a case where an upstream side in a conveyance direction of the object to be incinerated is referred to as front and a downstream side in the conveyance

direction is referred to as rear, a front ceiling portion extending forward from the furnace, a rear ceiling portion extending rearward from the furnace, and a rear wall extending downward from a rear end portion of the rear ceiling portion, a first nozzle provided in a region of the rear ceiling portion rearward of a center of the rear ceiling portion in the conveyance direction or in the rear wall and configured to discharge a first gas for combustion forward, a second nozzle provided at a position forward of the first nozzle in the rear ceiling portion and configured to discharge a second gas for combustion from the rear ceiling portion toward the drying stage or the combustion stage, a detection unit configured to detect a decrease in NOx concentration in a primary combustion region that is a region in the furnace body, the control method comprising:

by one or more computers,

controlling an amount of the second gas for combustion discharged by the second nozzle based on a target air ratio in the primary combustion region;

performing control to decrease a flow rate of the first gas for combustion in a case where the decrease in NOx concentration in the primary combustion region is detected; and

performing control to decrease a flow rate of the second gas for combustion in a case where an increase in NOx concentration in the primary combustion region or a sign of the increase is not detected even after the control to decrease the flow rate of the first gas for combustion is performed.

[Claim 10] A control method for a combustion facility, the combustion facility including a furnace into which gas after combustion flows, a furnace body including a drying stage, a combustion stage, and a post-combustion stage and configured to convey an object to be incinerated while combusting the object to be incinerated, the furnace

body including, in a case where an upstream side in a conveyance direction of the object to be incinerated is referred to as front and a downstream side in the conveyance direction is referred to as rear, a front ceiling portion extending forward from the furnace, a rear ceiling portion extending rearward from the furnace, and a rear wall extending downward from a rear end portion of the rear ceiling portion, a first nozzle provided in a region of the rear ceiling portion rearward of a center of the rear ceiling portion in the conveyance direction or in the rear wall and configured to discharge a first gas for combustion forward, a second nozzle provided at a position forward of the first nozzle in the rear ceiling portion and configured to discharge a second gas for combustion from the rear ceiling portion toward the drying stage or the combustion stage, a detection unit configured to detect a decrease in oxygen concentration in a primary combustion region that is a region in the furnace body, the control method comprising:

by one or more computers,

controlling an amount of the second gas for combustion discharged by the second nozzle based on a target air ratio in the primary combustion region;

performing control to increase oxygen concentration of the first gas for combustion in a case where the detection unit detects the decrease in oxygen concentration in the primary combustion region; and

performing control to increase oxygen concentration of the second gas for combustion in a case where an increase in oxygen concentration in the primary combustion region or a sign of the increase is not detected even after the control is performed.