combustion. This exhaust gas is sent to the exhaust heat recovery boiler 8 provided downstream of the stoker furnace 1. The exhaust heat recovery boiler 8 heats water by exchanging heat between the exhaust gas and water to generate steam. This steam is used in an external device (not shown). The exhaust gas which has passed through the exhaust heat recovery boiler 8 is cooled in the temperature reducing tower 9 and then sent to the dust collector 11. After the soot and dust are removed in the dust collector 11, the exhaust gas is discharged into the atmosphere through the chimney 12.

[0012]

(Configuration of stoker furnace)

The configuration of the stoker furnace 1 is described below. As shown in Fig. 1, the stoker furnace 1 includes a furnace body 10, a boiler 7 extending upward from the furnace body 10, a hopper 3 having materials to be incinerated temporarily stored therein, a feeder 31 which supplies materials to be incinerated from the hopper 3 into the furnace body 10, a stoker 6 provided at a bottom portion of the furnace body 10, wind boxes 2 provided below the stoker 6, a blower B1, a primary air line L1, a secondary air line L2, and a gas circulation unit 4 through which a part of the exhaust gas is extracted and circulated in the furnace body 10.

[0013]

A processing space V for combusting the materials to be incinerated is formed inside the furnace body 10. In this processing space V, the materials to be incinerated are conveyed in a conveying direction Da (refer to Fig. 2) by the stoker 6. In this embodiment, the conveying direction Da is a horizontal direction. On the other hand, it is also possible to take a direction inclined with respect to a horizontal plane as the conveying direction Da. The boiler 7 extends upward from an upper portion of the furnace body 10. Exhaust gas in the processing space V is sent to the exhaust heat

recovery boiler 8 through the boiler 7. The blower B1 and the wind boxes 2 are connected through the primary air line L1. Air is supplied to the wind boxes 2 through the primary air line L1 by driving the blower B1. Each of the wind boxes 2 supplies air into the processing space V. The blower B1 and the inside of the boiler 7 are connected through the secondary air line L2. Combustion air is supplied into the boiler 7 through the secondary air line L2.

[0014]

(Configuration of gas circulation unit)

The gas circulation unit 4 supplies the exhaust gas extracted from a flow path of the exhaust gas connecting the dust collector 11 and the chimney 12 into the processing space V, thereby adjusting a position, a shape, and a temperature of the flame F formed in the processing space V. The gas circulation unit 4 includes an exhaust gas circulation line L3, blowers B2 and B3, first gas ports 41, and second gas ports 42. An intermediate position of the flow path of the exhaust gas connecting the dust collector 11 and the chimney 12 and the processing space V are connected through the exhaust gas circulation line L3. The blowers B2 and B3 pump the exhaust gas in the exhaust gas circulation line L3 toward the processing space V. Exhaust gas is sprayed toward the flame F in the processing space V through the first gas ports 41 and the second gas ports 42.

[0015]

Referring to Fig. 2, the configuration of the furnace body 10 and the disposition of the first gas ports 41 and the second gas ports 42 are described in detail. As shown in the drawing, the processing space V in the furnace body 10 is defined by an upstream surface 10A located on an upstream side in the conveying direction Da, an upper surface 10B located above the wind boxes 2 across the processing space V, a downstream surface 10C located on a downstream side in the conveying direction Da, and the plurality of wind boxes 2.

be incinerated are dried while the wind is being blown from the wind box 2, and then the materials to be incinerated are ignited. In this state, the materials to be incinerated are conveyed toward downstream in the conveying direction Da by driving the stoker 6. When conveyed, the materials to be incinerated are dried in the drying stage 21 and combusted in the combustion stage 22 and the post-combustion stage 23, and then discharged to the outside through the discharge chute 13. Here, the flame F formed by the combustion of the materials to be incinerated is formed above the combustion stage 22. In the drying stage 21, the materials to be incinerated are dried using the radiant heat of the flame F.

[0021]

Here, in this embodiment, a part of the exhaust gas (circulation) is supplied above the flame F through the first gas port 41. Exhaust gas is sprayed into the processing space V from the drying stage 21 side through the first gas port. Due to a flow A1 of this exhaust gas (refer to Fig. 2), a secondary flow A2 from the combustion stage 22 side toward the drying stage 21 side is formed in the processing space V. Therefore, the flame F formed mainly in the combustion stage 22 is attracted by the secondary flow A2 and grows toward the drying stage 21 side to be away from the combustion stage 22. That is to say, the flame F grows in a direction in which the flame F is away from the boiler 7 in the conveying direction Da. The heat of the flame F promotes the drying of the materials to be incinerated in the drying stage 21. As a result, it is possible to realize reduction in an amount of NOx and reduction in an amount of unburned gas.

[0022]

Furthermore, according to the above configuration, the flame F is disturbed by spraying the exhaust gas from above the processing space V through the second gas port 42. When this disturbance is caused, a combustible gas reacts with oxygen and an

CLAIMS

1. A stoker furnace, comprising:

a furnace body defining a processing space in which materials to be incinerated are conveyed in a conveying direction and which includes a drying stage in which the materials to be incinerated are dried, and a combustion stage and a post-combustion stage in which the materials to be incinerated are combusted;

a boiler which extends upward from the furnace body and discharges exhaust gas generated in the processing space; and

a first gas port through which a part of the exhaust gas is sprayed into the processing space,

wherein a center axis of the boiler is disposed at a position deviated and different from a position of the combustion stage in the conveying direction, and

the exhaust gas is sprayed above the flame formed in the processing space through the first gas port from a side located to be shifted in an opposite direction to a deviation direction of the boiler from the position of the combustion stage in the conveying direction such that the exhaust gas sprayed through the first gas port passes through the drying stage, the combustion stage and the post-combustion stage.

2. The stoker furnace according to claim 1, wherein the center axis of the boiler is disposed deviated toward a post-combustion stage in the conveying direction, and

the first gas port is provided on a drying stage side of the furnace body and the exhaust gas is sprayed through the first gas port from the drying stage side toward the post-combustion stage side.

3. The stoker furnace according to claim 1, wherein the center axis of the boiler is disposed deviated toward a drying stage side in the conveying direction, and

the first gas port is provided on a post-combustion stage side of the furnace body and the exhaust gas is sprayed through the first gas port from the post-combustion stage side toward the drying stage side.

4. The stoker furnace according to any one of claims 1 to 3, further comprising:

a second gas port through which a part of the exhaust gas is extracted and sprayed into the processing space from above,

wherein the second gas port is provided at a position different from that of the first gas port in a horizontal direction orthogonal to the conveying direction.

5. The stoker furnace according to claim 4, further comprising:

a plurality of the second gas ports arranged at intervals in the conveying direction;

a temperature detection unit which detects a temperature distribution in the processing space; and

a flow rate control unit which changes a flow rate distribution of the exhaust gas sprayed from each of the plurality of second gas ports based on the temperature distribution.

6. The stoker furnace according to claim 4, further comprising:

a movement unit which moves the second gas port in the conveying direction;

a temperature detection unit which detects a temperature distribution in the processing space; and

a movement control unit which changes a position of the second gas port or a direction in which the exhaust gas is sprayed from the second gas port in the conveying direction by operating the movement unit based on the temperature distribution.

7. The stoker furnace according to any one of claims 1 to 6, further comprising:

a third gas port which is below the first gas port and through which the exhaust gas is sprayed into the processing space from a side opposite to the first gas port.