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(54) Waste incineration plant with introduction of cooling gas

(57) In a waste incineration plant comprising a furnace (1) having a grate (2) on which the waste being incinerated is transported from the waste inlet (3) to the ash outlet (4), side walls extending along said grate, said side walls comprising a wear zone in the form of a fluid-cooled panel (5) positioned immediately adjacent the grate (2), and an upper wall zone (6) above said wear zone, said upper wall zone being provided in the form of refractories (6), the fluid-cooled panel (5) is provided with openings (7) through which cooling gas is introduced for reducing the thermal strain on the upper wall zone (6).

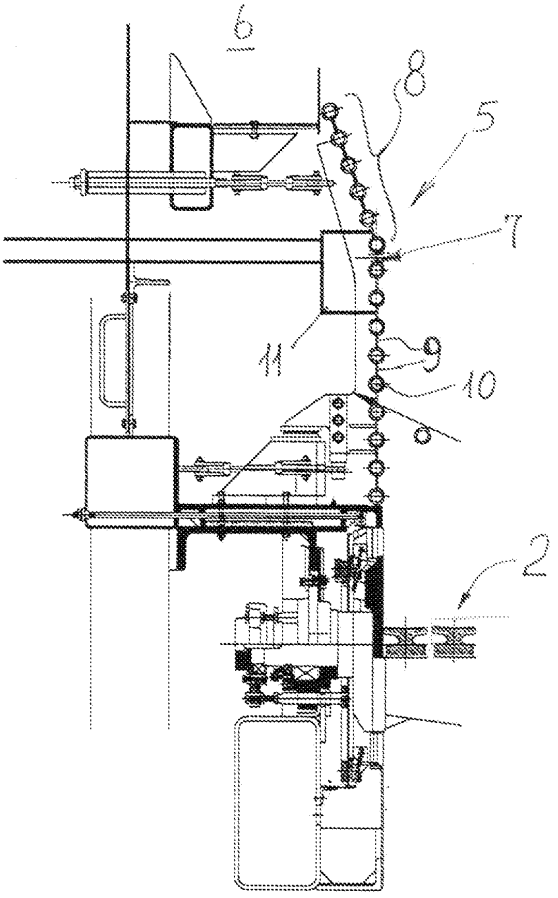

Fig. 1.

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Description

Technical fields

[0001] The present invention relates to a waste incineration plant comprising a furnace having a grate on which the waste being incinerated is transported from the waste inlet to the ash outlet.

[0002] The side walls extending along said grate comprises a wear zone in the form of a fluid-cooled panel positioned immediately adjacent to the grate and the upper wall zone above said wear zone is provided in the form of refractories.

Background art

[0003] In incineration plants of this kind it is known to provide such a wear zone in the form of fluid-cooled panels positioned immediately adjacent to the grate, said wear zone panel being placed mainly horizontally along the grate and comprising a flexible sealing between the wear zone panel and the vertical furnace wall extending above said wear zone panel. Furthermore, said upper wall zone has been protected against excessive temperatures by having perforated wall tiles in said upper wall zone at positions subjected to the most intensive combustion zone on the grate and cooling air being supplied through said perforated wall tiles. However, these perforated wall tiles experience a tendency to clogging and cracking leading to necessary early replacement of said tiles.

Disclosure of the invention

[0004] It is the object of the present invention to provide a waste incineration plant of the kind referred to above, in which it is possible to protect the refractories of the upper wall zone from excessive temperatures without the above-mentioned problems with clogging and early wear of the perforated tiles, and this object is achieved with a waste incineration plant of said kind, which according to the present invention also comprises the feature that the fluid-cooled panel is provided with openings, through which cooling gas is introduced for reducing the thermal strain on the upper wall zone. With this arrangement the cooling gas is introduced through openings in the fluid-cooled panel and moved together with the burning gases along the side wall upwards, thereby cooling the upper wall zone and providing a buffer between the flames above the incinerated waste and said upper wall zone.

[0005] Advantageous embodiments of the invention are indicated in the subordinate claims, and the advantages provided by these preferred embodiments will be evident by reading the following detailed description of the invention.

Description of the drawings

[0006] In the following detailed part of the present description, the invention will be explained in more detail with reference to the exemplary embodiments of a waste incineration plant according to the invention shown in the drawings, in which

Fig. 1 shows a cross-section of a fluid-cooled panel provided with openings for cooling gas in accordance with the present invention,

Fig. 2 schematically shows the position of a plenum for supply of cooling gas to the openings in the fluid-cooled panel, and

Fig. 3 schematically shows a waste incineration plant furnace.

Description of the preferred embodiment

[0007] The side wall section of a waste incineration plant furnace shown in Fig. 1 comprises a fluid-cooled panel 5 positioned immediately adjacent the grate 2. Said fluid-cooled panel 5 is composed of a number of mainly horisontal tubes 10 for circulating the cooling fluid, said mainly horisontal tubes 10 being mutually connected by fins 9 in order to provide a solid wall in the wear zone. A number of openings 7 are provided through the fluid-cooled panel 5 at positions between the tubes 10, i.e. in the fins 9 mutually connecting the tubes 10, whereby cooling gas can be introduced through these openings 7. On the side of the fluid-cooled panel 5 opposite the furnace chamber, a plenum 11 is provided for delivering cooling gas to the openings 7.

[0008] The cooling fluid circulated in the fluid-cooled panel 5 is preferably boiler water.

[0009] As can be seen in Fig. 2, separate plenums 11 may be provided for separate sections in the mainly horisontal direction of the fluid-cooled panel 5, whereby individual adaptation of the supply of cooling gas can be provided. As can been seen in Fig. 1, the openings 7 in the fins between the tubes in the fluid-cooled panel 5 are provided in a mainly vertical part of said fluid-cooled panel 5 and an upper oblique part 8 of the fluid-cooled panel 5 above said openings 7 extends towards the refractories 6 of the upper wall zone 6 above the wear zone 5. By this construction, a possible fluid slag is prevented from running down the fluid-cooled panel 5 to clog the openings 7 therein. The openings 7 may naturally be provided either as circular openings or slits or any other geometrical form of opening. In order to ease the production, it is preferred that the openings 7 are provided in the form of circular holes.

[0010] In order to secure the above-mentioned avoidance of blocking of the openings 7 by liquid slag, the openings 7 are positioned in the vertical part of the fluid-cooled panel 5 and the number of cooling tubes 10 above

said openings 7 is preferably more than three.

[0011] In order to be able to control the flow of cooling gas through the openings 7 a flow measuring device may be provided, possibly in the form of several such measuring devices, one for each of the separate plenums 11 for delivery of the cooling gas. Furthermore, it will naturally be convenient to provide some form of control of the amount of cooling gas delivered to each of said plenums 11, said controlling possibly being provided in dependency of suitably measured parameters, such as measured temperatures in different positions inside the furnace 2, amount of waste incinerated in the plant, etc.

[0012] The cooling gas may be supplied from the air blower for secondary air, whereby the cooling gas is atmospheric air and thus being supplied via said openings 7 instead of or supplementary to secondary air supply via secondary air nozzles. The supply of secondary air via secondary air nozzles is well-known from the prior art of waste incineration plants.

[0013] Another possibility for the supply of cooling gas can be to use re-circulated flue gas taken out, e.g. immediately in front of the stack, or elsewhere in the incineration plant flue gas processing system, where the flue gas has a suitable low temperature for the cooling purpose of the cooling gas. The use of re-circulated flue gas reduces or eliminates the risk of increasing the burning and thus the temperature by the introduction of cooling gas.

[0014] Above the invention has been described in connection with a preferred embodiment thereof and many alternatives may be envisaged by a man skilled in the art without deviation from the boundaries set out in the subsequent claims.

Claims

1. Waste incineration plant comprising a furnace (1) having
   a grate (2) on which the waste being incinerated is transported from the waste inlet (3) to the ash outlet (4),
   side walls extending along said grate, said side walls comprising a wear zone in the form of a fluid-cooled panel (5) positioned immediately adjacent the grate (2), and
   an upper wall zone (6) above said wear zone, said upper wall zone being provided in the form of refractories (6),
   characterized by
   said fluid-cooled panel (5) being provided with openings (7) through which cooling gas is introduced for reducing the thermal strain on the upper wall zone (6).

2. Waste incineration plant in accordance with claim 1, **characterized by** said openings (7) in said fluid-cooled panel (5) being provided in a mainly vertical part of said fluid-cooled panel (5).

3. Waste incineration plant in accordance with any of the preceding claims, **characterized by** said fluid-cooled panel having an upper oblique part (8) positioned closest to the upper wall zone (6).

4. Waste incineration plant in accordance with any of the preceding claims, **characterized by** said openings (7) being provided in the form of slits or circular holes in fins (9) mutually connecting tubes (10) for circulating the fluid for cooling the wear zone panel (5).

5. Waste incineration plant in accordance with any of the preceding claims, **characterized by** at least one, preferably more than three, cooling tubes (10) positioned in the fluid-cooled panel above said openings (7).

6. Waste incineration plant in accordance with any of the preceding claims, **characterized by** comprising a flow measurement device measuring the flow of cooling gas introduced through said openings (7) and a control system controlling the flow of cooling gas dependent on suitably measured parameters, such as measured temperatures in different positions inside the furnace (1), amount of waste incinerated in the plant, etc.

7. Waste incineration plant in accordance with any of the preceding claims, **characterized by** the delivery of cooling gas to said openings (7) being split up in delivery via several plenums (11) for individual control of cooling gas supply to different sections along the grate (2).

8. Waste incineration plant in accordance with any of the preceding claims, **characterized by** said cooling gas being supplied from a secondary air blower.

9. Waste incineration plant in accordance with any of the claims 1-6, **characterized by** said cooling gas being supplied in the form of recirculated flue gas.

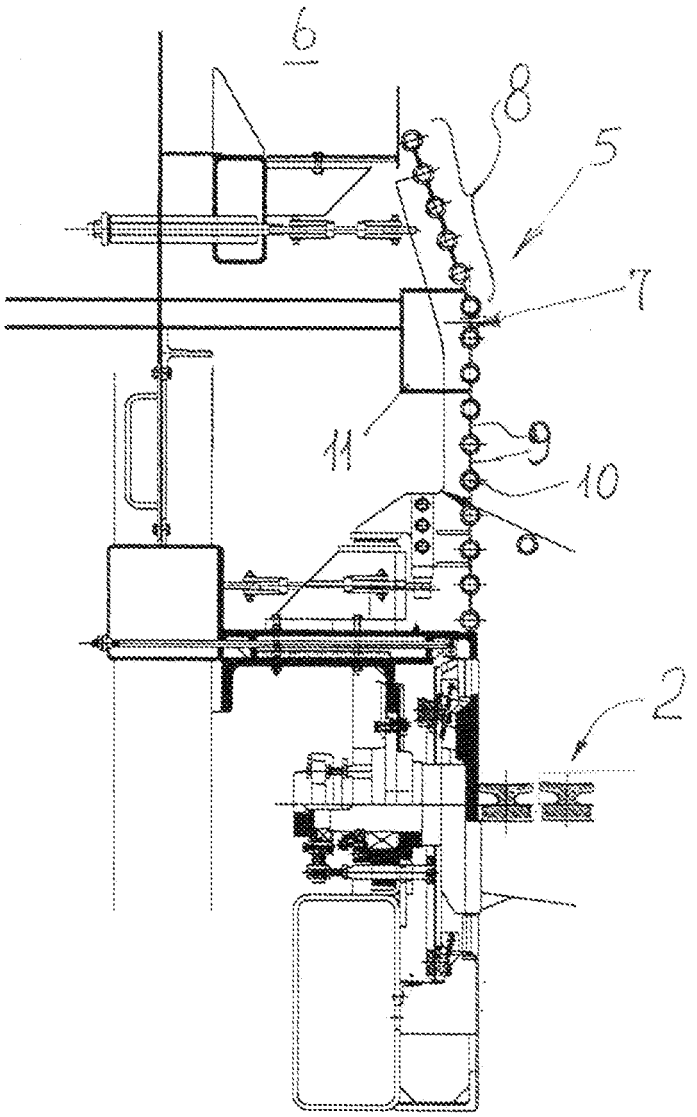

Fig. 1.

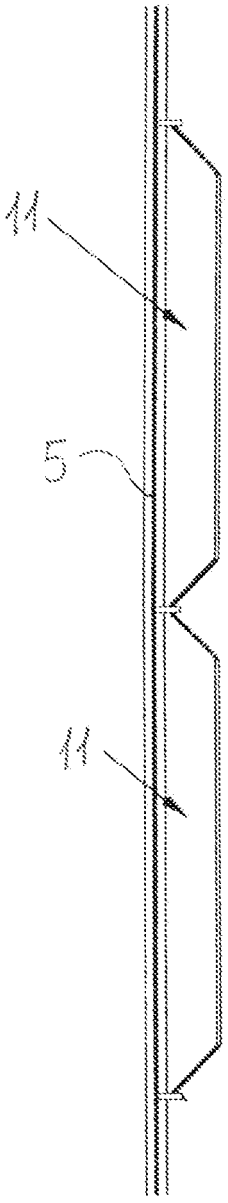

Fig. 2

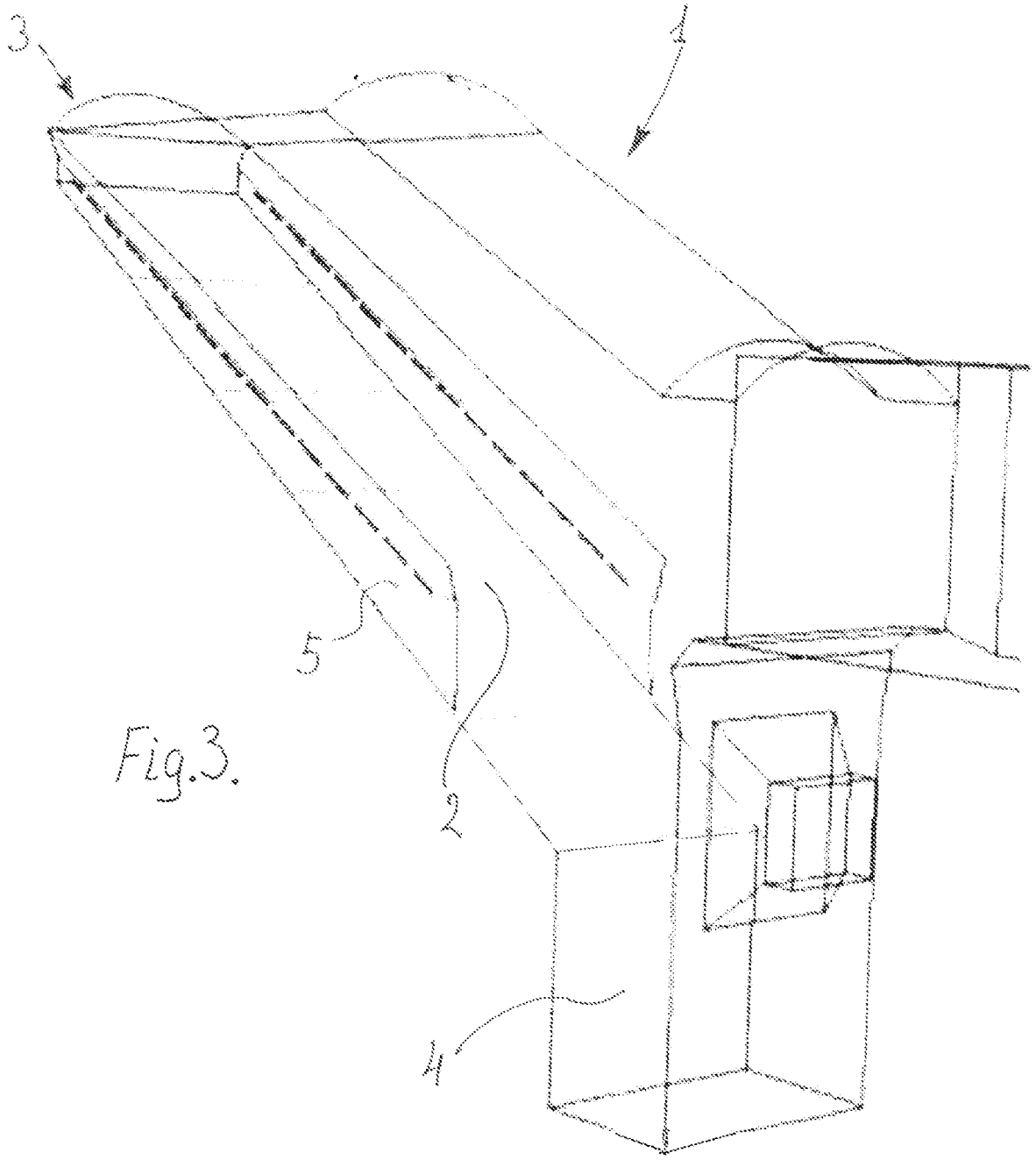

Fig.3.