

Description

The invention relates to a secondary air nozzle for furnaces with a curved main body which is provided with pins for supporting a protective ceramic casing.

It is known that in the roof of the combustion chamber above the front edge of the delivery table can be arranged curved secondary air nozzles which emerge perpendicularly from the roof of the combustion chamber and are aligned with the combustion chamber at an angle of about 75° . For in this region a high concentration of low-temperature carbonisation gases is to be found, on account of which secondary air is introduced in this region to allow combustion of these gases. As these low-temperature carbonisation gases are highly corrosive, secondary air nozzles made of metal are subject to high corrosion. In order to protect these nozzles against corrosion, it is known that a protective casing of ceramic compound can be provided. So that this ceramic compound adheres to the outer wall of the secondary air nozzle, a plurality of radially projecting pins are welded onto the outer wall of the secondary air nozzle. As a result, admittedly largely adequate protection against corrosion has been obtained, but the life of such secondary air nozzles is nevertheless limited, because due to the delivery of fuel, in particular refuse, accumulated fuel compositions are moved past the nozzle, so that the ceramic wall is destroyed by mechanical action, which leads to accelerated corrosion of the secondary air nozzle, wherein first the pins for supporting the ceramic compounds, which are exposed by mechanical damage, corrode faster, as a result of which the adhesive effect for the ceramic compound is eliminated and mechanical destruction of the protective casing with subsequent corrosion of the secondary air nozzle is accelerated.

It is the object of the invention, with a simple construction of the secondary air nozzle, to increase the effect of protection against corrosion and mechanical destruction.

This object is achieved in a secondary air nozzle of

the kind mentioned hereinbefore according to the invention by the fact that along the longest arc line, starting from the nozzle mouth to beyond the arcuate portion, is arranged a protective strip which protrudes radially from the main body and of which the extent in the radial direction corresponds to at least the thickness of the protective ceramic casing. Due to the arrangement of this protective strip which extends at least flush with the protective ceramic casing or even protrudes beyond this, the protective ceramic casing is protected against mechanical destruction by passing fuel pieces, in particular refuse pieces.

In its simplest design, the protective strip can be constructed as a flat, radially projecting rib.

In order to provide reliable bonding between protective strip and protective ceramic casing, it is appropriate if in a further development of the invention the protective strip comprises pins projecting at right angles from the rib.

A preferred embodiment consists in that the protective strip is T-shaped with a crossbar located radially on the outside. As a result, not only is the protective surface area which comes into contact with the fuel pieces increased on account of the crossbar, but also better fixing of the protective ceramic casing in this region is obtained, as the protective ceramic compound is formed integrally behind the crossbar and held thereby.

If, in a further embodiment of the invention, the pins arranged on the main body, starting from the fitted position of the secondary air nozzle, are arranged in horizontally extending planes, as a result not only is a particularly good retaining effect obtained with respect to the protective ceramic casing, but the condition is fulfilled for a further advantageous embodiment which consists in that the pins and the protective strip are made in one piece with the main body by casting. Due to this manufacture of the secondary air nozzle by casting, the

manufacturing costs of such a secondary air nozzle are substantially reduced in comparison with the previous design in which the pins were welded on individually. Another substantial advantage which results from casting lies in that there is a homogeneous connection between the pins and the main body on the one hand and the protective strip and the main body on the other hand, as a result of which these components are subject to a better cooling action by the air blown out of the secondary air nozzle. In the nozzles known previously, such a connection existed only via the weld seam, while the individual pin rested loosely on the main body and thus there was no heat conduction or only inadequate heat conduction between the main body and the pin. As a result these pins, in so far as they were exposed by mechanical destruction of the protective ceramic casing, were subject to a particularly strong heat influence, which accelerated the corrosion of these pins.

The invention is described in more detail below with the aid of practical examples. The drawings show:

- Fig. 1 a schematic view of a furnace with the arrangement of secondary air nozzles;
- Fig. 2 a longitudinal section through a secondary air nozzle;
- Fig. 3 a view in the direction of the arrow III in Fig. 2;
- Fig. 4 a section through the line IV-IV in Fig. 2;
- Fig. 5 a side view of a modified embodiment; and
- Fig. 6 a section through the line VI-VI in Fig. 5.

The extremely schematic view in Fig. 1 has been chosen to show at what point a secondary air nozzle according to the invention is arranged. This figure shows a furnace with a charging hopper 1 and a charging chute 2 through which the fuel, preferably refuse, falls onto a delivery table 3 on which charging pistons 4 push the refuse over the charging edge 5 of the delivery table 3 onto a furnace grate 6. The fuel located on the furnace grate 6 is marked

7 and is conveyed slowly to a slag chute 8 where the spent slag drops into a slag removal device 9. The combustion gases rising from the furnace grate pass into an upwardly directed combustion chamber 10, wherein most of the air of combustion is supplied to the furnace grate 6 from below through a pipe 11.

In the furnace shown, in the rear wall 12 are provided two secondary air nozzles 13, while in the wall 14 opposite the charging edge 5 is provided one secondary air nozzle 15. The secondary air nozzles are supplied with air through pipes. The secondary air nozzle 15 is arcuate and serves to supply air of combustion into the region which is located more or less over the charging edge 5 of the delivery table 3. In this region a particularly high concentration of corrosive low-temperature carbonisation gases is detected. The secondary air nozzle is in this case curved in such a way that it blows into the combustion chamber 10 in the direction of fuel flow.

In Figs. 2 to 4 is shown a first embodiment of a secondary air nozzle, while Figs. 5 and 6 show a second embodiment of such a secondary air nozzle which is marked 15 in Fig. 1.

As can be seen from Figs. 2 to 4, the secondary air nozzle 15 consists of a main body 16 which tapers towards the nozzle mouth 17 and, starting from a short connecting piece 18, is curved arcuately, preferably at 75° . Along the longest arc line, a protective strip 19 is formed in one piece with the main body 16. In the fitted state, this protective strip 19 is located on the lower side of the secondary air nozzle. As can be seen from Fig. 3 in conjunction with Fig. 4, on the main body 16 on both sides pins 20 are formed integrally with the main body 16 and, in the fitted state of the nozzle, located in horizontal planes. Additional pins 21 which are also located in horizontal planes in the fitted state of the nozzle are formed on the protective strip 19 integrally with the latter. The main body 16, the protective strip 19 and also

the pins 20 and 21 are made all together in one piece by casting.

The pins 20 and 21 serve to support a protective ceramic casing 27 which surrounds the main body 16 on all sides, this being in a thickness such that the protective strip 19 with its outer surface 22 seals flush with the protective ceramic casing. As the protective strip 19 in the fitted state of the secondary air nozzle 15 extends downwardly into the combustion chamber, it can protect the protective ceramic casing 27 against mechanical damage by passing refuse.

In the embodiment according to Figs. 5 and 6, the main body 16 and the integrally cast pins 20 are designed in the same way as in the embodiment according to Figs. 2 to 4. The only change consists in the design of the protective strip which in this embodiment, as can be seen in particular from Fig. 6, is T-shaped and marked with the reference number 23 as a whole. Here the web projecting radially from the main body 16 is marked 24, and the crossbar which extends at right angles thereto and projects on both sides beyond the web 24 is marked 25, wherein the ceramic compound formed around the main body 16 is held by the pins 20 and the crossbar 25 of the protective strip 23. Here the protective ceramic casing 27 is shaped in such a way that at least the outer surface 26 of the crossbar 25 is exposed and protects the protective ceramic casing against wear by passing hard pieces. This large surface area of the protective strip 23 is made possible in spite of a strong heat influence by the fact that it is made in one piece with the main body and so is connected with good conduction of heat to the main body into which cool air of combustion flows, so that in spite of the strong radiation of heat, the crossbar 25 of the protective strip 23 does not assume excessively high temperatures. The protective effect due to the crossbar 25 is greater than with the protective strip 19 which is relatively narrow. Moreover, the crossbar 25 provides particularly good support for the

protective ceramic casing 27 which is formed integrally on the main body 16 and shown in broken lines.



Patent claims

1. Secondary air nozzle for furnaces with a curved main body (16) which is provided with pins (20) for supporting a protective ceramic casing (27), characterised in that along the longest arc line, starting from the nozzle mouth (17) to beyond the arcuate portion, is arranged a protective strip (19, 23) which protrudes radially from the main body (16) and of which the extent in the radial direction corresponds to at least the thickness of the protective ceramic casing (27).
2. Secondary air nozzle according to claim 1, characterised in that the protective strip (19) is constructed as a flat, radially projecting rib.
3. Secondary air nozzle according to claim 2, characterised in that the protective strip (19) comprises pins (21) projecting at right angles from the rib.
4. Secondary air nozzle according to claim 1, characterised in that the protective strip (23) is T-shaped with a crossbar (25) located radially on the outside.
5. Secondary air nozzle according to any of claims 1 to 4, characterised in that the pins (20) arranged on the main body (16), starting from the fitted position of the secondary air nozzle (15), are arranged in horizontally extending planes.
6. Secondary air nozzle according to any of claims 1 to 5, characterised in that the pins (20, 21) and the protective strip (19, 23) are made in one piece with the main body (16) by casting.