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(54) **Pipe in a fire tube boiler**

(57) A pipe (1) in a fire tube boiler, designed to convey the combustion gases and to be struck at its outer surface by the water to be heated, comprising a wall (2) which

has a constant thickness along its entire length and a plurality of fins which protrude monolithically from at least one arc-like support (3,4), which is associated in contact with the internal surface of the wall.

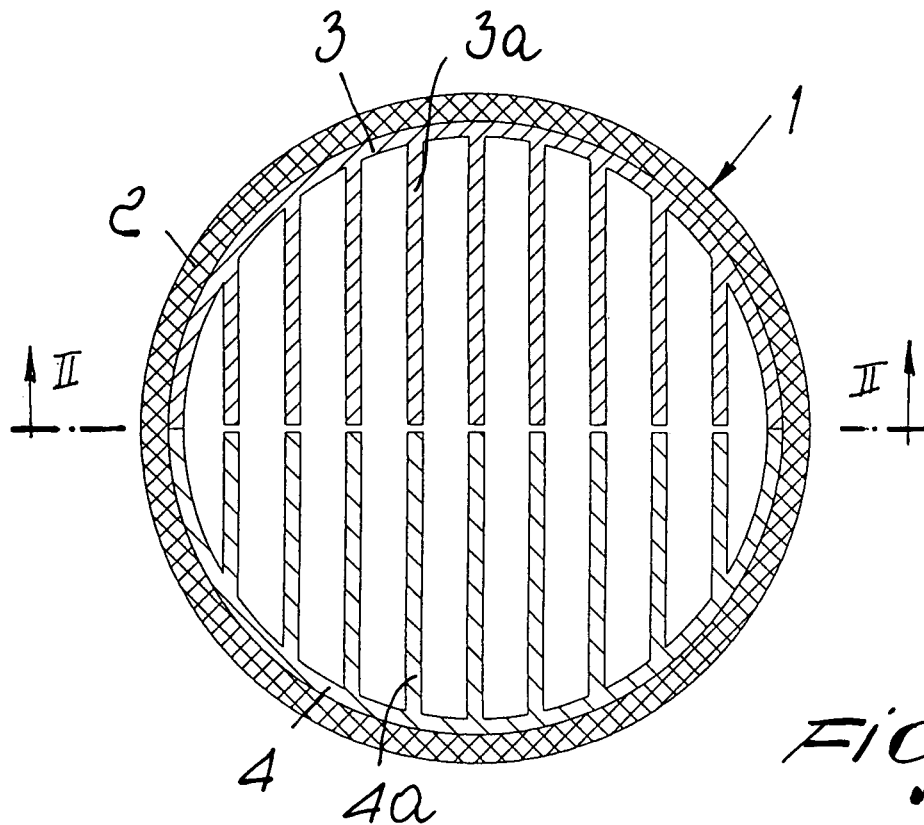


Fig. 1

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Description

[0001] The present invention relates to a pipe in a fire tube boiler.

[0002] It is known that boilers for generating hot water, particularly small boilers for domestic use, quite frequently have a structure that is known as "fire tube", comprising a plurality of pipes designed to convey internally the products of the combustion generated by a burner before sending them to the flue, and to be struck on the outside by the water to be heated.

[0003] The aim of the present invention is to provide a pipe which is adapted to be installed in a fire tube boiler and has high characteristics of heat exchange between the products of combustion and the water to be heated.

[0004] The above aim and other objects that will become better apparent hereinafter are achieved by a pipe in a fire tube boiler according to the invention, designed to convey the combustion gases and to be struck at its outer surface by the water to be heated, characterized in that it comprises a wall having a constant thickness along its entire length and a plurality of fins which protrude monolithically from at least one arc-like support, which is associated in contact with the internal surface of said wall.

[0005] Further characteristics and advantages of the invention will become better apparent from the description of some preferred but not exclusive embodiments of the pipe according to the invention, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a transverse sectional view of the pipe according to the invention, taken along the line I-I of Figure 2;

Figure 2 is a sectional view of a portion of the pipe, taken along the line II-II of Figure 1;

Figures 3 and 4 are transverse sectional views of pipes according to further embodiments.

[0006] With reference to the Figures 1 and 2, the reference numeral 1 generally designates the pipe according to the invention, which is designed to convey internally the products of combustion and to be struck at its outer surface by the water to be heated.

[0007] The pipe 1 comprises a wall 2, which has a constant thickness along its entire length, and at least one and preferably two arc-like sectors 3 and 4 are associated in contact with said wall, for example by means of a mold or by rolling, and a plurality of fins such as 3a, 4a protrude from the sectors.

[0008] Such pipe 1 ensures good heat exchange efficiency and therefore ensures a temperature of the fins that is high enough to prevent condensation of the water vapor that is present in the combustion gases conveyed by the pipe.

[0009] Figures 3 and 4 illustrate further embodiments related to the shape of the fins provided in the pipe: thus,

pipe 5 of Figure 3 comprises a wall 6 having a constant thickness along its entire length, which has in contact therewith three arc-like sectors 7, 8, 9, from which fins such as 7a, 8a, 9a protrude respectively; pipe 10 of Figure 4 comprises a wall 11 with constant thickness, which has in contact therewith four arc-like sectors 12, 13, 14, 15, from which fins such as 12a, 13a, 14a, 15a protrude.

[0010] The described invention is susceptible of numerous other modifications and variations, all of which are within the scope of the appended claims; all the details may further be replaced with other technically equivalent elements.

[0011] The disclosures in Italian Patent Application No. MN2004A000019 from which this application claims priority are incorporated herein by reference.

[0012] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A pipe (1) in a fire tube boiler, designed to convey the combustion gases and to be struck at its outer surface by the water to be heated, **characterized in that** it comprises a wall (2) which has a constant thickness along its entire length and a plurality of fins (3a, 4a, 7a, 8a, 9a, 12a, 13a, 14a, 15a) which protrude monolithically from at least one arc-like support (3,4,7,8,9,12,13,14,15), which is associated in contact with the internal surface of said wall.
2. The pipe according to claim 1, **characterized in that** the fins (3a, 4a, 7a, 8a, 9a, 12a, 13a, 14a, 15a) protrude monolithically from two arc-like sectors (3,4) associated in contact with the internal surface of said wall.
3. The pipe according to claim 1, **characterized in that** the fins protrude from three arc-like sectors (7,8,9) associated in contact with the internal surface of said wall.
4. The pipe according to claim 1, **characterized in that** the fins protrude from four arc-like sectors (12,13,14,15) associated in contact with the internal surface of said wall.

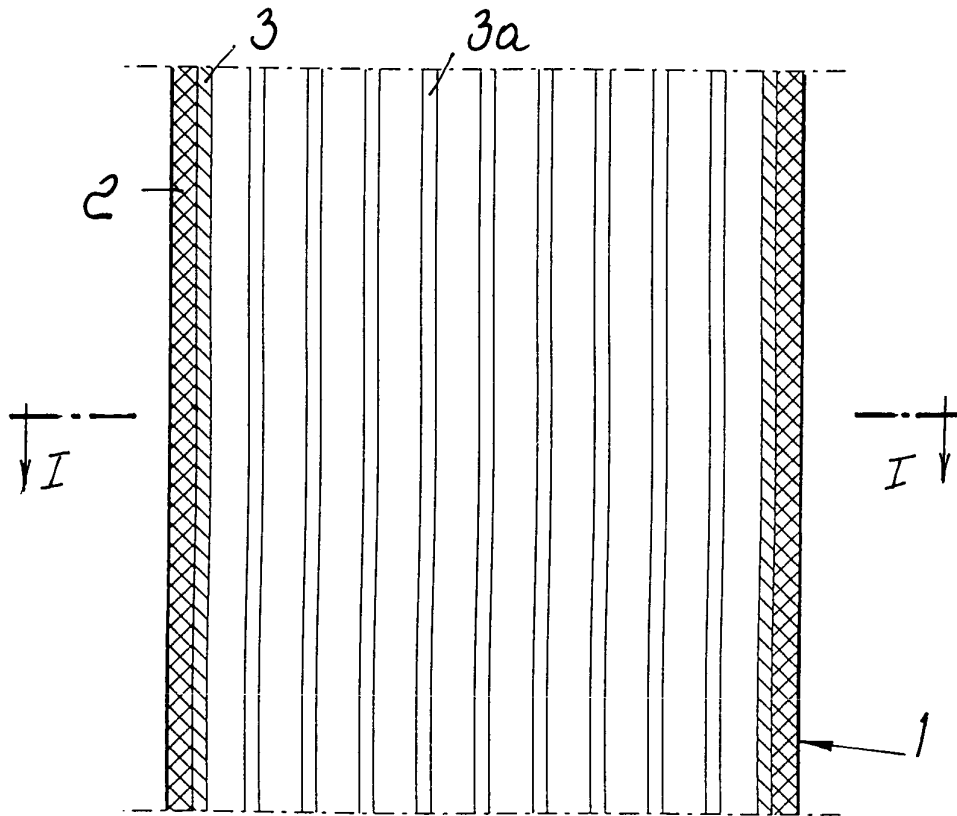


Fig. 2

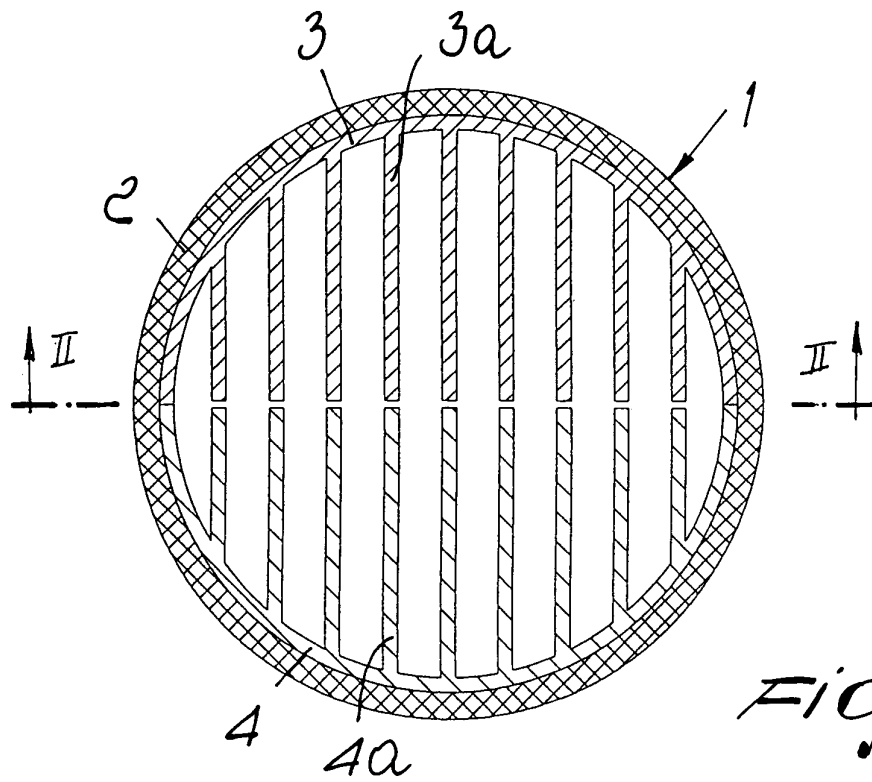
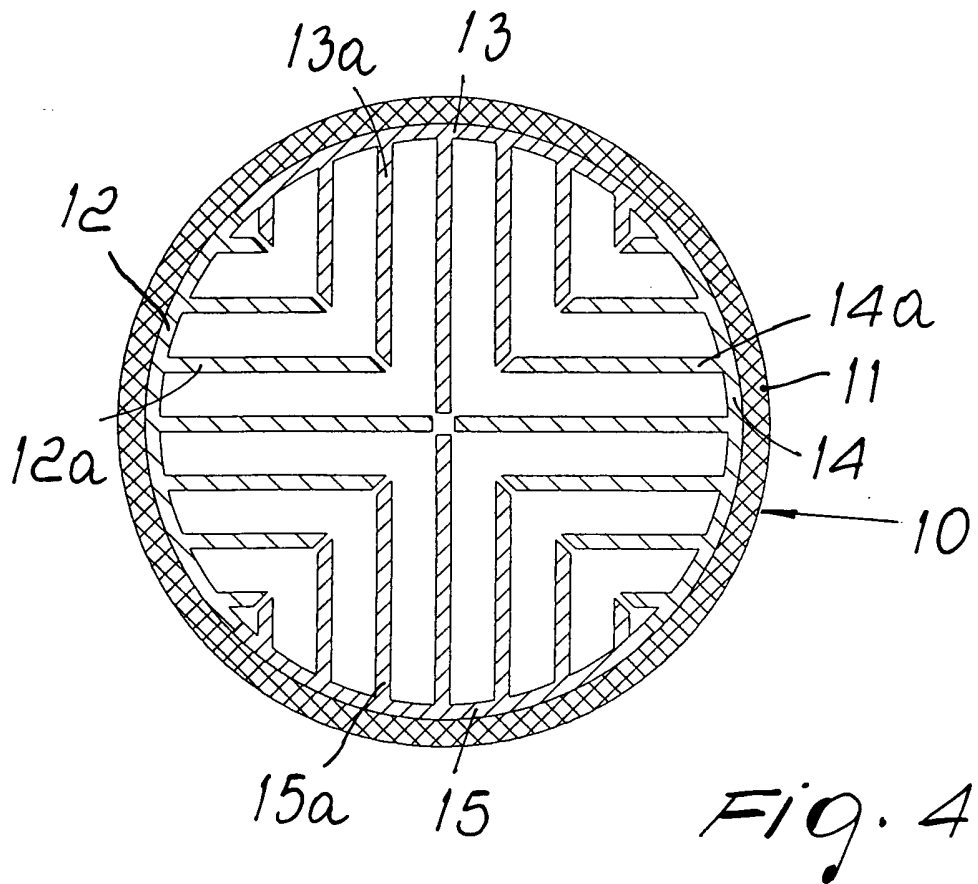
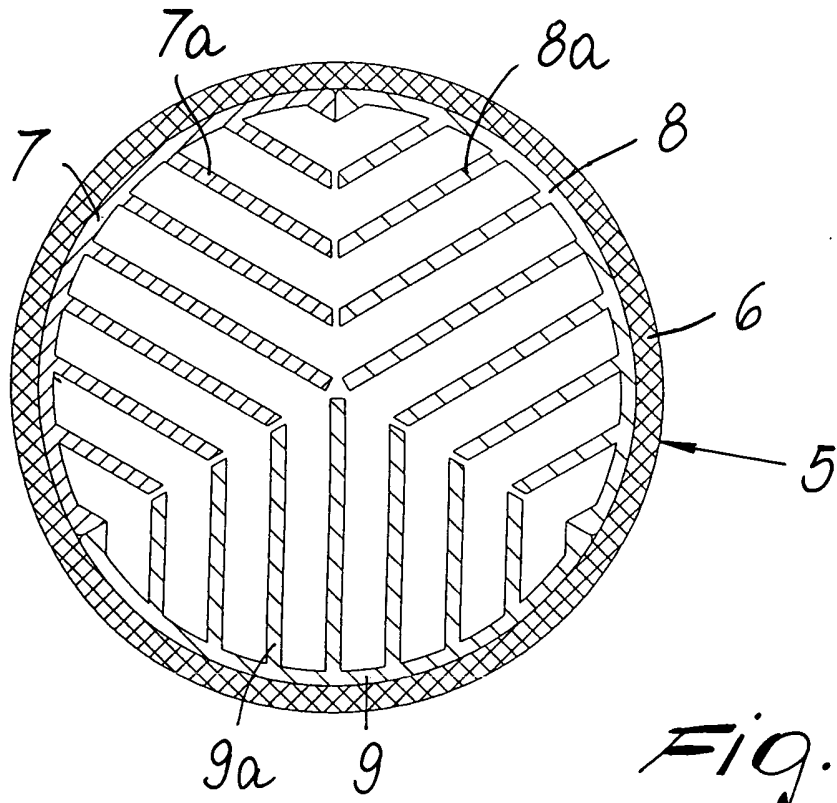


Fig. 1





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EUROPEAN SEARCH REPORT

Application Number
EP 05 01 4961

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 18 October 2005	Examiner Zerf, G
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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