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(54) **Turbulator for an exhaust gas conveyance tube in a heat exchange apparatus**

(57) A turbulator (3) for an exhaust gas conveyance tube in a heat exchange apparatus, comprising at least two helices (3a, 3b) made of metallic wire, which are designed to be inserted in the tube so as to adhere to the inner surface thereof, are arranged side by side and are rendered mutually integral by means of at least one connecting element.

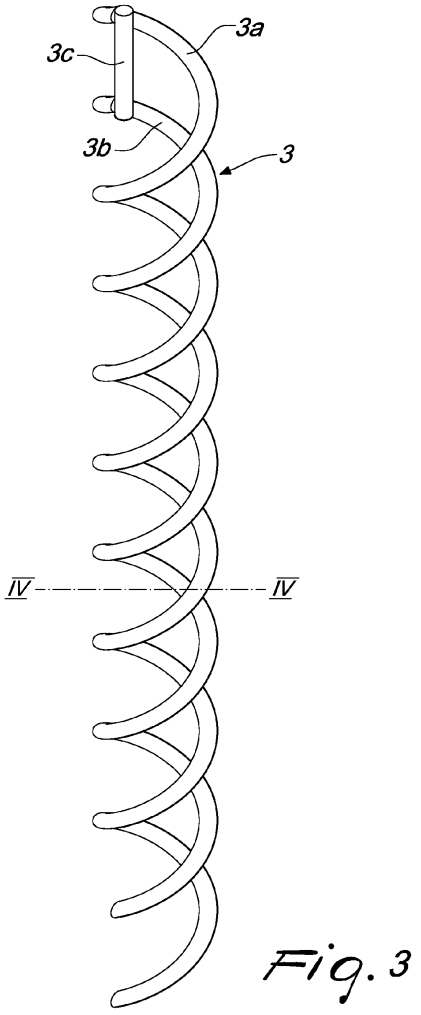

Fig. 3

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Description

[0001] The invention relates to a turbulator for an exhaust gas conveyance tube in a heat exchange apparatus.

[0002] The presence is known of heat exchange apparatuses, such as, for example, exhaust gas boilers for the production of hot water or of other vector fluids, which involve the presence of tubes designed for the conveyance of exhaust gases produced by combustion in adapted furnaces, inserted in a volume containing the fluid to be heated.

[0003] Tubes of this type are not exclusive to boilers, but can also be present in various different apparatuses in industrial cycles.

[0004] Within such exhaust gas conveyance tubes an element known as a turbulator is often inserted, the specific function of which is to break up the boundary layer of the flow of exhaust gases which is in contact with the inner surface of the tubes, and a very common construction form of the turbulator element is constituted by a simple helix of metallic wire which is arranged so as to adhere to the inner surface of the tubes.

[0005] This implementation however is not particularly effective, and thus the aim of the present invention is to provide a turbulator element that optimally performs the function of creating turbulence in the flow of exhaust gases, so as to optimize the transmission of the heat between the exhaust gases and the fluid to be heated.

[0006] The intended aim is achieved by a turbulator for an exhaust gas conveyance tube in a heat exchange apparatus, according to the invention, **characterized in that** it comprises at least two helices made of metallic wire, which are designed to be inserted in said tube so as to adhere to the inner surface thereof, are arranged side by side and are rendered mutually integral by means of at least one connecting element.

[0007] Further characteristics and advantages will become better apparent from the description of a preferred, but not exclusive, embodiment of the invention, which is illustrated by way of non-limiting example in the accompanying drawings wherein:

Figure 1 is a view of a turbulator according to the known art, partially inserted in an exhaust gas conveyance tube;
Figure 2 is a sectional view taken along the line II-II in Figure 1;
Figure 3 is a view of the turbulator according to the invention;
Figure 4 is a sectional view taken along the line IV-IV in Figure 3.

[0008] With reference to Figures 1 and 2, the reference numeral 1 designates the exhaust gas conveyance tube within which is present the turbulator 2 formed according to the known art from a single helix of metallic wire, inserted in contact with the inner surface of the tube 1, as highlighted by Figure 2.

[0009] Figure 3 shows the turbulator 3 according to the invention which comprises two helices 3a, 3b that are substantially identical, made of metallic wire, arranged side by side and rendered integral by way of a connecting element constituted by the bar 3c welded thereto.

[0010] This turbulator 3 is very effective in preventing the formation of a boundary layer of the flow of exhaust gases in contact with the inner surface of the wall of the tube, and the turbulence that derives therefrom creates optimal conditions for the transmission of the heat between the exhaust gases and the fluid to be heated that surrounds the tube.

[0011] The invention thus described is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims. Thus, for example, more than two helices can be present.

[0012] In practice the materials employed, provided they are compatible with the specific use, and the dimensions and shapes, may be any according to requirements.

[0013] Moreover, all the details may be substituted by other, technically equivalent elements.

[0014] The disclosures in Italian Patent Application No. VR2011A000008 from which this application claims priority are incorporated herein by reference.

[0015] 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 turbulator (3) for an exhaust gas conveyance tube in a heat exchange apparatus, **characterized in that** it comprises at least two helices (3a, 3b) made of metallic wire, which are designed to be inserted in said tube so as to adhere to an inner surface thereof, are arranged side by side and are rendered mutually integral by means of at least one connecting element.

2. The turbulator according to claim 1, **characterized in that** the helices (3a, 3b) comprised therein are substantially identical.

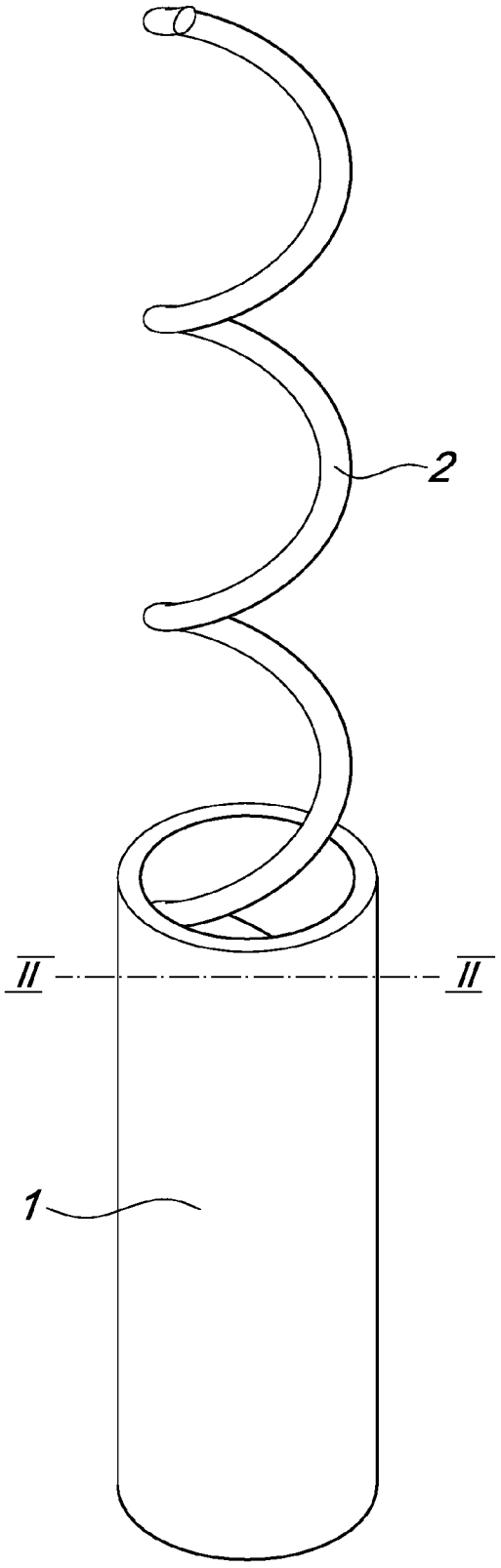

Fig. 1

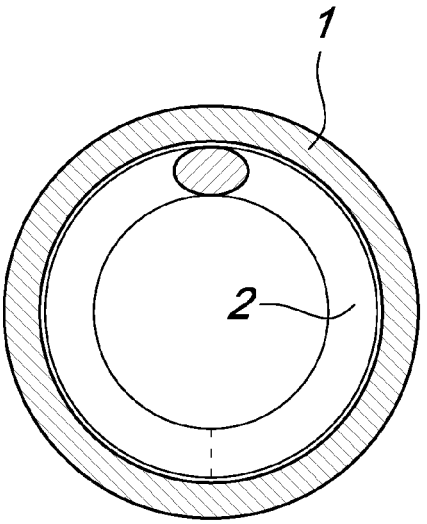

Fig. 2

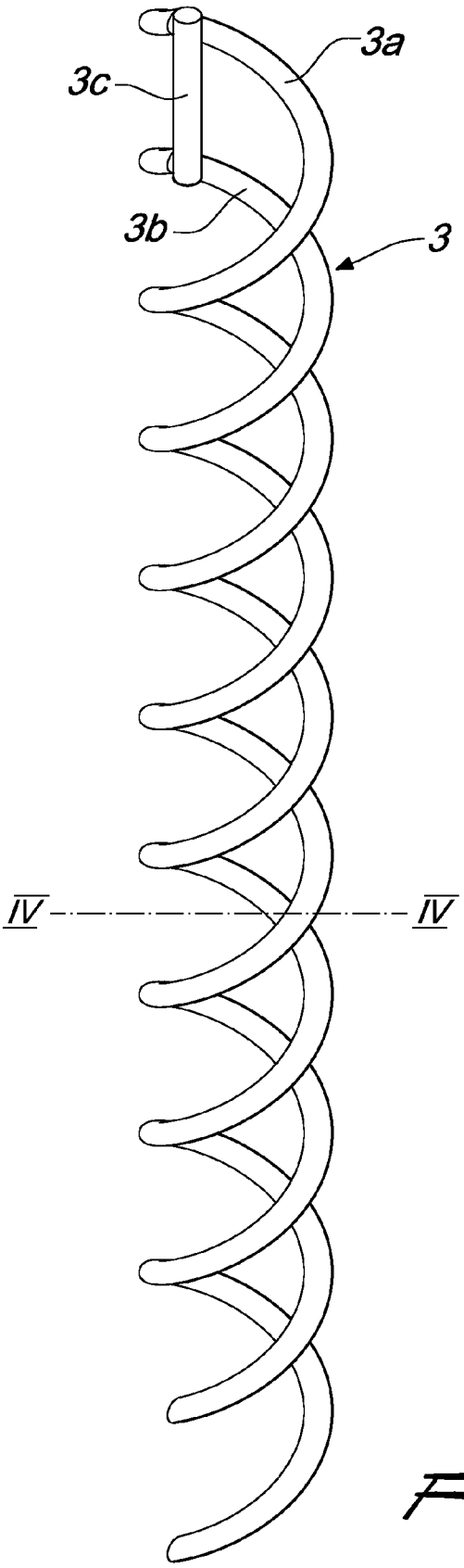

Fig. 3

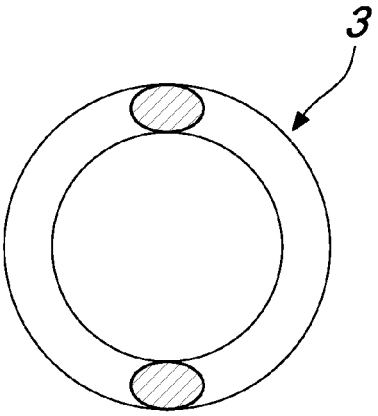

Fig. 4

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EUROPEAN SEARCH REPORT

Application Number
EP 12 15 1358

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 44 17 524 A1 (BEHR GMBH & CO [DE]) 23 November 1995 (1995-11-23) * the whole document *	1,2	INV. F28F1/40
X	US 4 798 241 A (JARRETT FRANK N [US] ET AL) 17 January 1989 (1989-01-17) * the whole document *	1,2	

TECHNICAL FIELDS SEARCHED (IPC)

F28F
F24H
F22B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	20 March 2012	Leclaire, Thomas

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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20-03-2012

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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