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(54) **GAS BURNER UNIT FOR A HEAT EXCHANGER**

(57) A gas burner unit intended for a heat exchanger, having a perforated burner wall and an air and fuel duct is characterised in that in the air and fuel duct (2), over the perforated burner wall (1), there is a transverse baffle (3) featuring holes (4) and dividing the air and fuel duct

(2) into two segments, where the baffle is shaped so that the cross section of the segment of the air and fuel duct (2), located between the baffle (3) and perforated burner wall (1), increases along the baffle (3) towards the perforated burner wall (1).

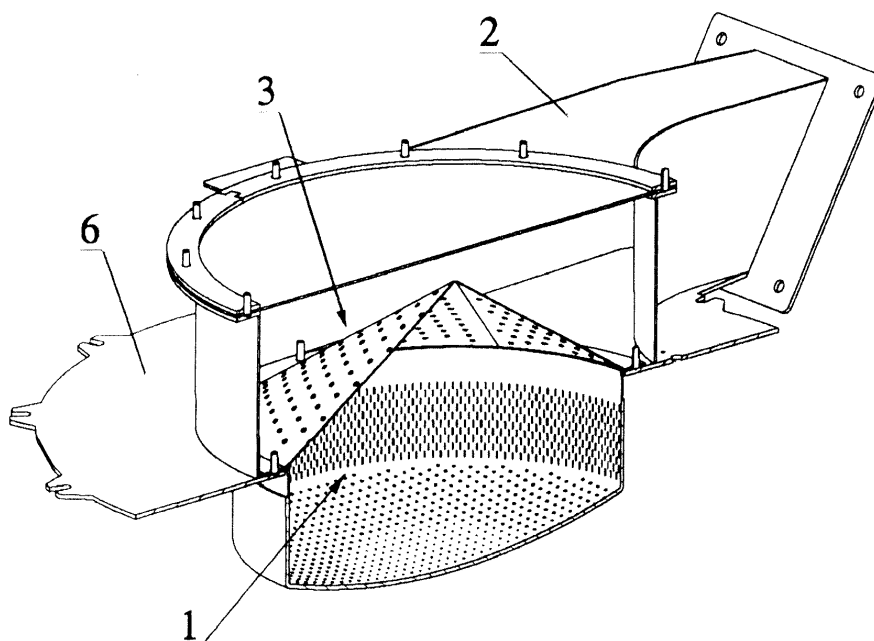


Fig. 1

Description

[0001] The invention concerns a gas burner unit intended for a heat exchanger.

[0002] In the known solutions, the heat exchanger gas burner unit incorporates a perforated burner wall and an air and fuel duct used to supply the air and fuel mix to the perforated burner wall. The operating burner unit generates substantial noise which can be a nuisance to the surrounding environment.

[0003] Known from patent document JPH 0264306 A is a heat exchanger in which the inner space of the chamber for the air and fuel mix supplied to the burner is divided with a flat baffle spreading along the chamber and featuring small holes. The baffle is intended to e.g. suppress the noise generated by the operating burner.

[0004] The purpose of the invention is to develop such burner unit structure which will allow to reduce substantially the noise which is generated by the burner in operation.

[0005] The gas burner unit intended for a heat exchanger, having a perforated burner wall and an air and fuel duct according to the invention is characterised in that in the air and fuel duct, over the perforated burner wall, there is a transverse baffle featuring holes and dividing the air and fuel duct into two segments, where the baffle is shaped so that the cross section of the segment of the air and fuel duct located between the baffle and the perforated burner wall increases along the baffle towards the perforated burner wall. Preferably, the baffle is positioned in the air and fuel duct so that the cross section of the segment of the air and fuel duct located within the inner space delimited by the baffle increases towards the perforated burner wall. Preferably, the baffle is given the shape of the side wall of a cone or truncated cone, closed on the side of the smaller base, or shaped into an open dome, or side wall of a pyramid, or side wall of a truncated pyramid, closed on the side of the smaller base.

Preferably, the total area of the holes in the baffle accounts for 0.3 to 1.2 of the area of the opening of the fan used to supply the air and fuel mix to the air and fuel duct. Preferably, the baffle is fitted with a mounting flange.

[0006] Further benefits and advantages of the present invention will become apparent after a careful reading of the detailed description with appropriate reference to the accompanying drawings.

In the drawings:

Fig. 1 shows the cross section of the burner unit with visible baffle in the shape of the side wall of a cone, in axonometric view;

Fig. 2 depicts the baffle in the shape of the side wall of a cone with round holes and mounting flange, in axonometric view;

Fig. 3 shows the baffle as in Fig. 2, in side view;

Fig. 4 depicts the baffle as in Fig. 2, in bird's eye view;

Fig. 5 shows the baffle in the shape of the side wall

of a truncated cone with rectangular holes, closed on the side of the smaller base, featuring a mounting flange on the side of the larger base, in axonometric view;

Fig. 6 presents the baffle as in Fig. 5, in side view; Fig. 7 depicts the baffle as in Fig. 5, in bird's eye view; Fig. 8 shows the baffle in the shape of an open dome with square holes, in axonometric view;

Fig. 9 depicts the baffle as in Fig. 8, in side view;

Fig. 10 presents the baffle as in Fig. 8, in bird's eye view;

Fig. 11 depicts the baffle in the shape of the side wall of a truncated pyramid with round holes, closed on the side of the smaller base, in axonometric view;

Fig. 12 presents the baffle as in Fig. 11, in side view;

Fig. 13 -shows the baffle as in Fig. 11, in bird's eye view.

[0007] In the first exemplary embodiment of the invention (Fig. 1 to Fig. 4), the gas burner unit intended for a heat exchanger incorporates a perforated wall 1 of the burner, air and fuel duct 2, where there is a transverse baffle 3 over the perforated wall 1 of the burner, and further includes the plate 6 of the burner. Fixed to the plate 6 of the burner is the baffle 3, air and fuel duct 2, and perforated wall 1 of the burner. The baffle 3 is given the shape of the side wall of a cone hollow inside (Fig. 2 to Fig. 4), where the apex of the cone points in the direction opposite to the perforated wall 1 of the burner and divides the air and fuel duct 2 into two segments: the segment under the baffle 3 and the one over the baffle 3. The cross section of the segment of the air and fuel duct 2 located within the inner space delimited by the baffle 3 increases towards the perforated wall 1 of the burner. The baffle 3 features round holes 4 through which the air and fuel mix is supplied to the perforated wall 1 of the burner, as well as a mounting flange 5 used to screw the baffle 3 to the plate 6 of the burner.

[0008] In the second exemplary embodiment of the invention, the burner unit described in the first example incorporates the baffle 3 in the shape of the side wall of a truncated cone (Fig. 5 to Fig. 7) closed with a wall on the side of the smaller base, where the baffle is oriented in the direction opposite to the perforated wall 1 of the burner and divides the air and fuel duct 2 into two segments: the segment under the baffle 3 and the one over the baffle 3. The cross section of the segment of the air and fuel duct 2 located within the inner space delimited by the baffle 3 increases towards the perforated wall 1 of the burner. The baffle 3 features rectangular holes 4 arranged axially, and is fitted with a mounting flange 5 used to screw the baffle 3 to the burner plate 6.

[0009] In the third exemplary embodiment the burner unit described in example 1 incorporates the baffle 3 in the shape of an open dome (Fig. 8 to Fig. 10), oriented in the direction opposite to the perforated wall 1 of the burner, where the baffle divides the air and fuel duct 2 into two segments: the segment under the baffle 3 and

the one over the baffle 3. The cross section of the segment of the air and fuel duct 2 located within the inner space delimited by the baffle 3 increases towards the perforated wall 1 of the burner. The baffle 3 features square holes 4. The baffle 3 is welded to the burner plate 6.

[0010] In the fourth exemplary embodiment the burner unit described in example one incorporates the baffle 3 in the shape of the side wall of a truncated pyramid (Fig. 11 to Fig. 13) closed with a wall on the side of the smaller base, where the baffle is oriented in the direction opposite to the perforated wall 1 of the burner and divides the air and fuel duct 2 into two segments: the segment under the baffle 3 and the one above the baffle 3. The cross section of the segment of the air and fuel duct 2 located within the inner space delimited by the baffle 3 increases towards the perforated wall 1 of the burner. The baffle 3 features round holes 4. The baffle 3 is welded to the burner plate 6.

[0011] In all embodiments of the invention the total area of the holes 4 in the baffle 3 accounts for 0.3 to 1.2 of the area of the opening of the fan used to supply the air and fuel mix to the air and fuel duct 2.

[0012] The air and fuel mix is supplied via the air and fuel duct 3 to the perforated wall 1 of the burner through the holes 4 in the baffle 3. The shape of the baffle 3 and its positioning in the air and fuel duct 2 according to the invention ensures substantial reduction of noise accompanying the work of the burner unit.

wall of a truncated cone, closed on the side of the smaller base.

5. The unit according to Claims 1 or 2, **characterised in that** the baffle (3) is given the shape of an open dome.
6. The unit according to Claims 1 or 2, **characterised in that** the baffle (3) is given the shape of the side wall of a pyramid.
7. The unit according to Claims 1 or 2, **characterised in that** the baffle (3) is given the shape of the side wall of a truncated pyramid, closed on the side of the smaller base.
8. The unit according to Claims 1 to 7, **characterised in that** the total area of the holes (4) in the baffle (3) accounts for 0.3 to 1.2 of the area of the opening of the fan used to supply the air and fuel mix to the air and fuel duct (2).
9. The unit according to Claims 1 to 8, **characterised in that** the baffle (3) is fitted with a mounting flange (5).

Claims

1. A gas burner unit intended for a heat exchanger, having a perforated burner wall and an air and fuel duct, **characterised in that** in the air and fuel duct (2), over the perforated burner wall (1), there is a transverse baffle (3) featuring holes (4) and dividing the air and fuel duct (2) into two segments, where the baffle is shaped so that the cross section of the segment of the air and fuel duct (2) located between the baffle (3) and perforated burner wall (1) increases along the baffle (3) towards the perforated burner wall (1).
2. The unit according to Claim 1, **characterised in that** the baffle (3) is positioned in the air and fuel duct (2) so that the cross section of the segment of the air and fuel duct (2) located within the inner space delimited by the baffle (3) increases towards the perforated burner wall (1).
3. The unit according to Claims 1 or 2, **characterised in that** the baffle (3) is given the shape of the side wall of a cone.
4. The unit according to Claims 1 or 2, **characterised in that** the baffle (3) is given the shape of the side

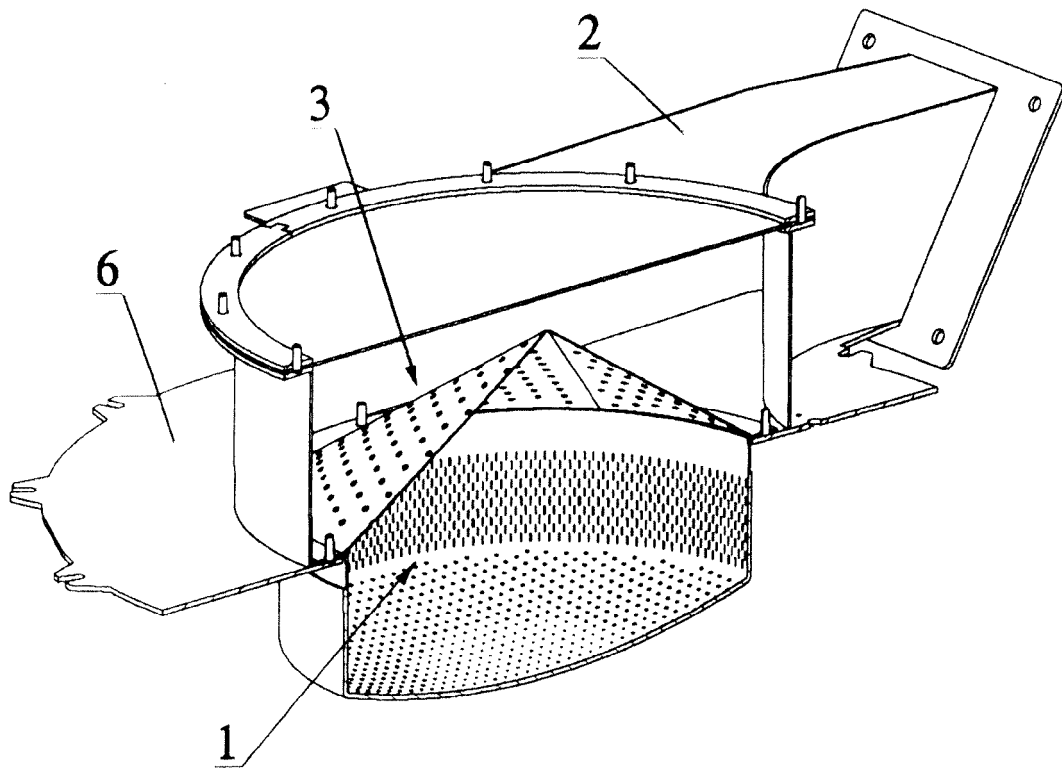


Fig. 1

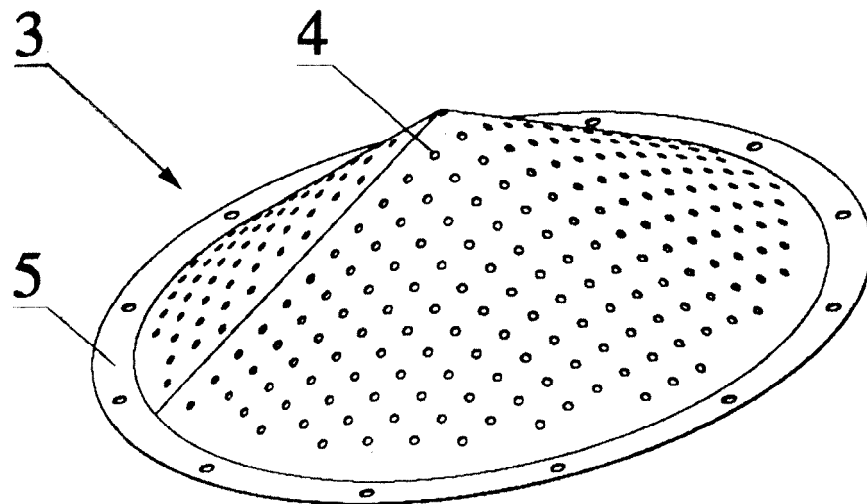


Fig. 2

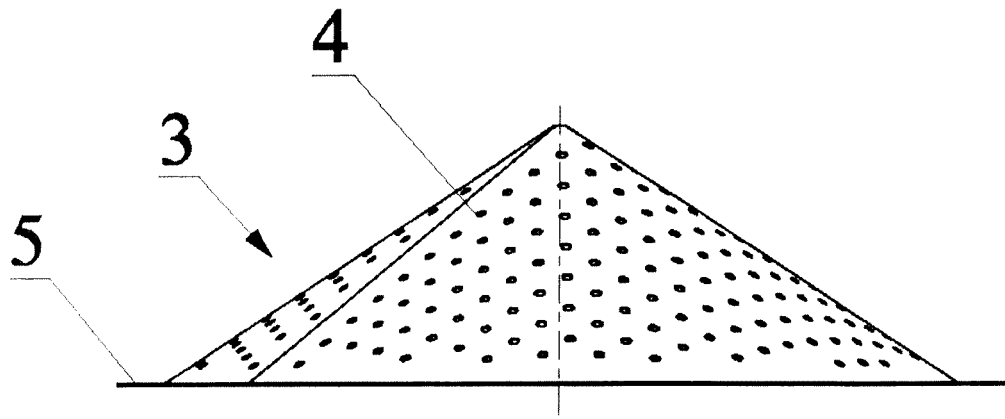


Fig. 3

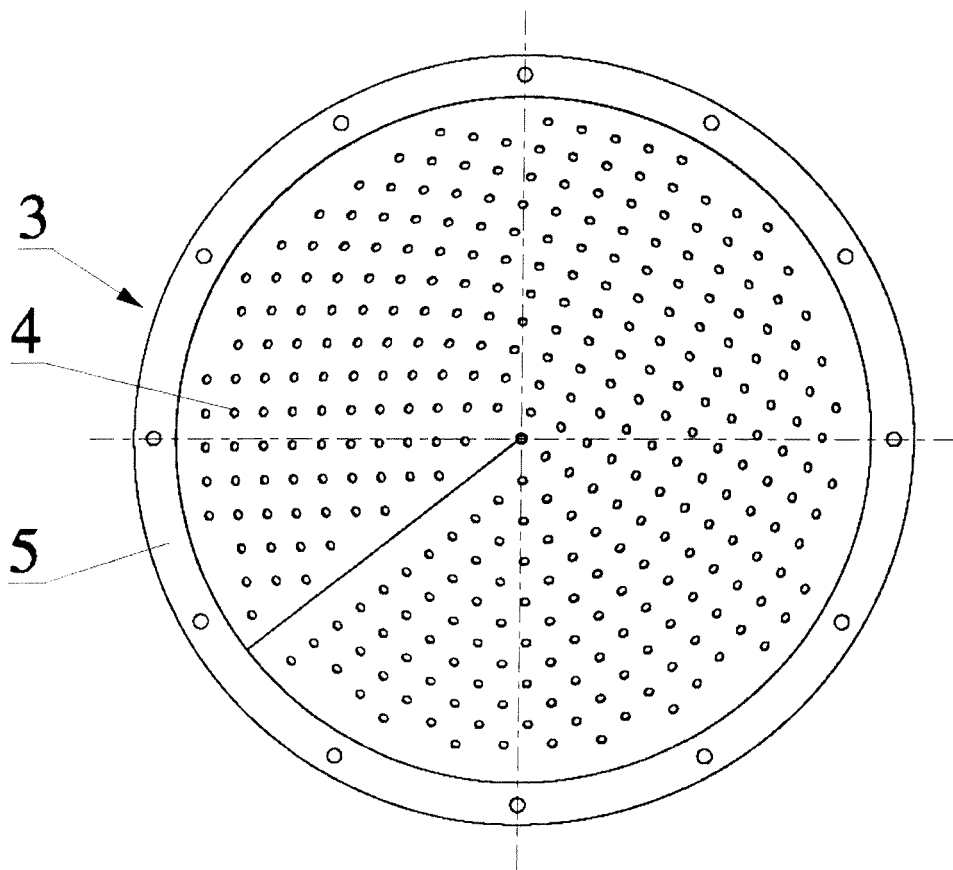


Fig. 4

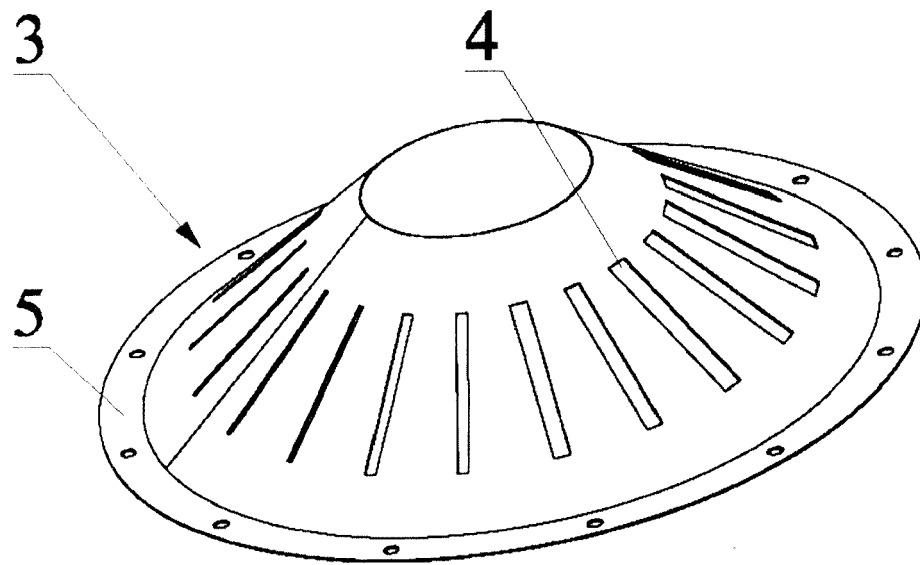


Fig. 5

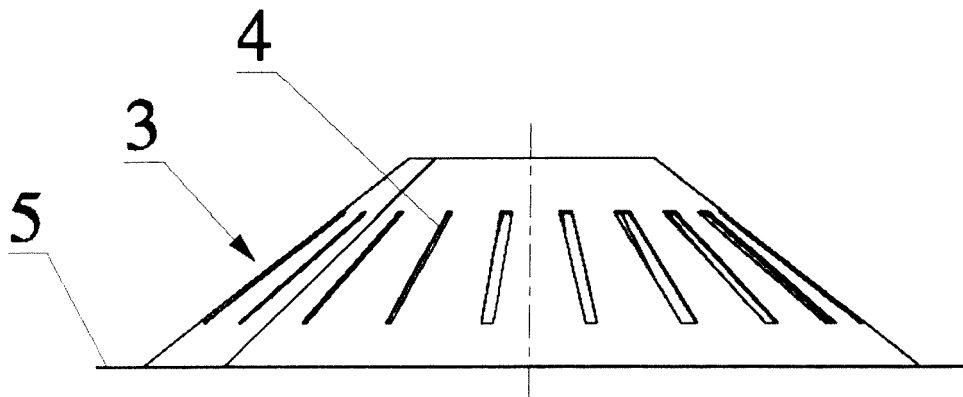


Fig. 6

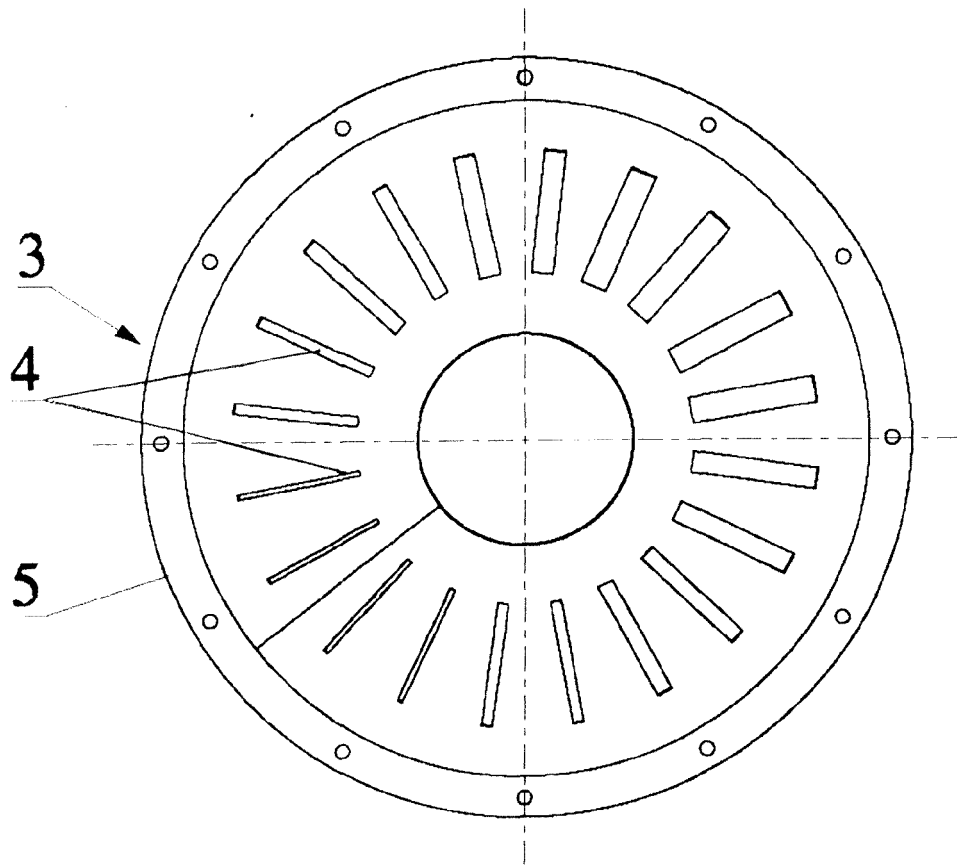


Fig. 7

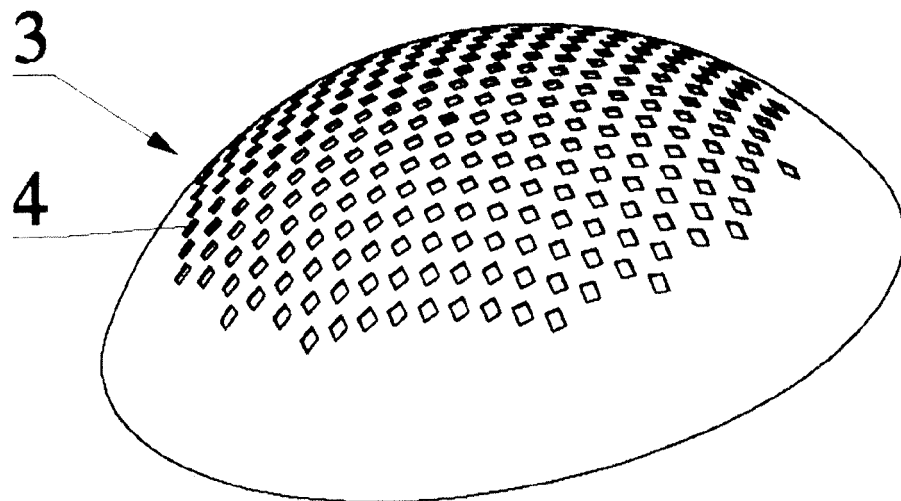


Fig. 8

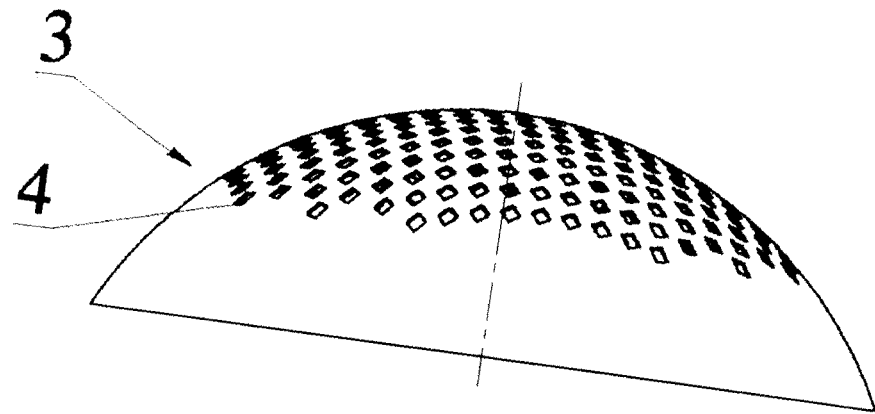


Fig. 9

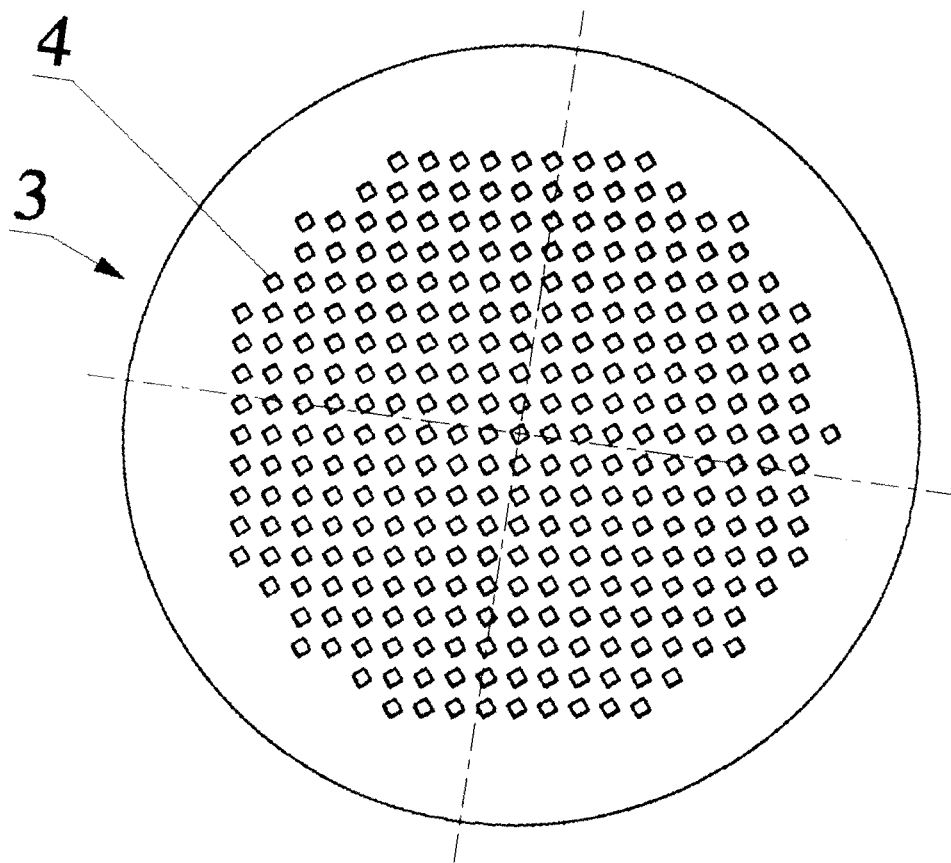


Fig. 10

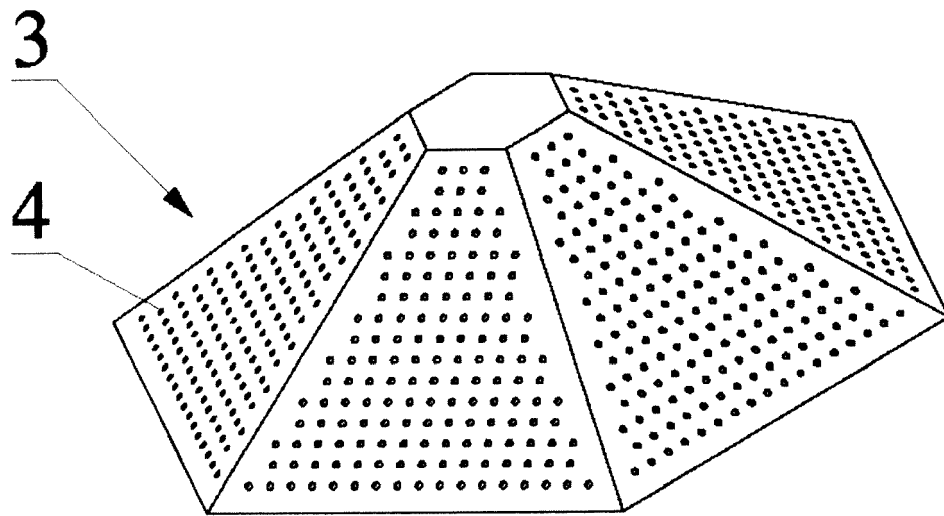


Fig. 11

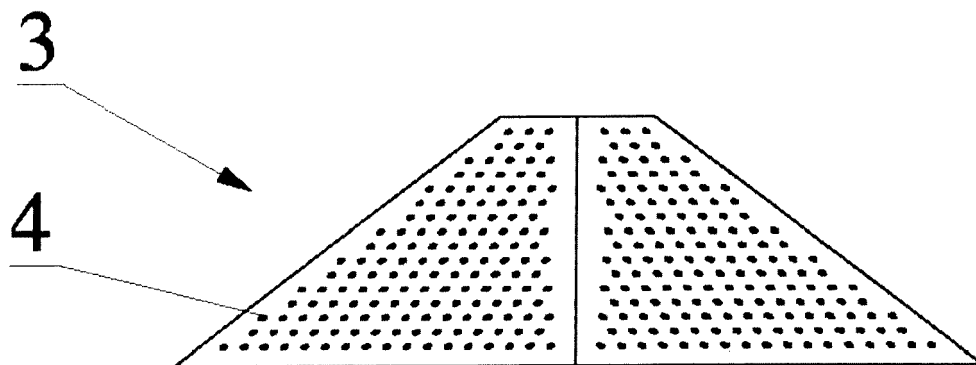


Fig. 12

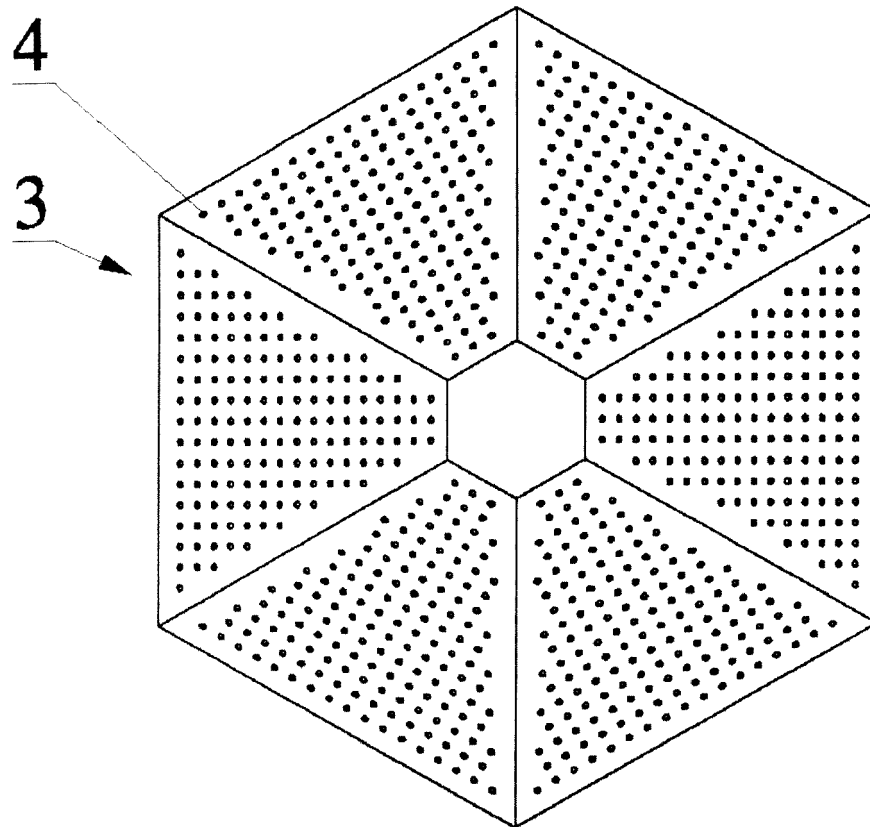


Fig. 13



EUROPEAN SEARCH REPORT

Application Number
EP 19 46 0016

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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	EP 1 498 658 A1 (AEROMATIX LTD [GB]) 19 January 2005 (2005-01-19) * paragraphs [0015] - [0017], [0020] * * figures 1, 2 *	1-9	INV. F23D14/02 F23D14/70 F23D14/62 F23D14/36
X	WO 2014/116970 A2 (BECKETT GAS INC [US]) 31 July 2014 (2014-07-31) * page 11, lines 15-32 * * figures 3, 4 *	1-9	
X	JP 2000 055316 A (TOKYO GAS CO LTD) 22 February 2000 (2000-02-22) * paragraphs [0027], [0028] * * figures 3, 4 *	1-9	
X	WO 2017/194395 A1 (BEKAERT COMBUSTION TECH B V [NL]) 16 November 2017 (2017-11-16) * paragraph [0029] * * figure 1 *	1-9	
			TECHNICAL FIELDS SEARCHED (IPC)
			F23D
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 13 August 2019	Examiner Vogl, Paul
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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ON EUROPEAN PATENT APPLICATION NO.**

EP 19 46 0016

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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13-08-2019

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1498658 A1	19-01-2005	EP 1498658 A1	19-01-2005
		GB 2404008 A	19-01-2005
-----	-----	-----	-----
15 WO 2014116970 A2	31-07-2014	EP 2976576 A2	27-01-2016
		US 2015369495 A1	24-12-2015
		WO 2014116970 A2	31-07-2014
-----	-----	-----	-----
JP 2000055316 A	22-02-2000	NONE	
-----	-----	-----	-----
20 WO 2017194395 A1	16-11-2017	CN 109196275 A	11-01-2019
		EP 3455555 A1	20-03-2019
		US 2019113228 A1	18-04-2019
		WO 2017194395 A1	16-11-2017
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Patent documents cited in the description

- JP 0264306 A [0003]