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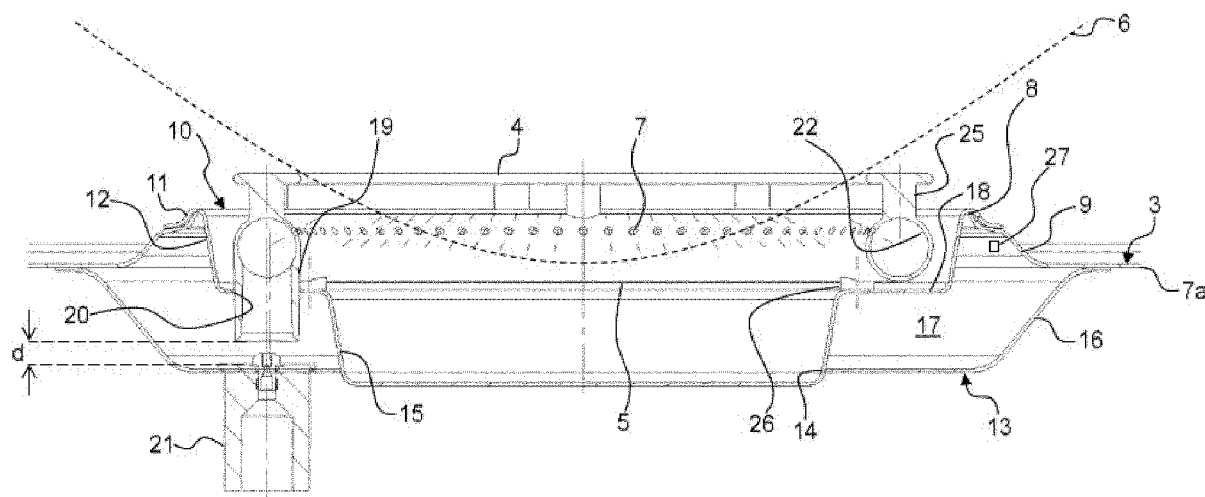


Fig. 2

(57) Abstract: A pan support (2) for a gas hob (1), the pan support (2) comprising: a pan support structure (4) configured for supporting a pan (6), and a gas burner body (5) comprising gas openings (7) for burning an air-fuel-gas-mixture, wherein the pan support structure (4) and the gas burner body (5) are joined in a joining process to form an integral unit (37).

PAN SUPPORT FOR A GAS HOB, GAS HOB AND METHOD FOR MANUFACTURING A PAN SUPPORT

5 The present invention relates to a pan support for a gas hob, a gas hob and a method for manufacturing a pan support.

10 A commonly known gas hob comprises a cooking surface, a gas burner and a pan support. The gas burner is arranged in a recess in the cooking surface. The gas burner comprises a channel conducting an air-gas-mixture towards gas openings where the gas is burnt. The pan support supports a pan or the like above the gas burner.

15 The pan support and the gas burner are usually provided as separate components. The pan support may be provided as a removable part, e.g. for facilitating cleaning of the cooking surface and/or the pan support itself. Conventionally, the pan support and the gas burner are made from cast iron since the geometries tend to be complex. However, casting molds are expensive and have a limited life. Further, a gas hob usually comprises gas burners and pan supports of different sizes which tends to increase the number of casting molds required.

20 It is one object of the present invention to provide an improved pan support.

25 According to a first aspect of the invention, a pan support for a gas hob is provided. The pan support comprises a pan support structure configured for supporting a pan. The pan support further comprises a gas burner body. The gas burner body has gas openings for burning an air-gas-mixture. The pan support structure and the gas burner body are joined in a joining process to form an integral unit.

30 A pan herein relates likewise to a pot or a wok. A joining process herein relates to joining of semi-finished parts such as tubes, profile parts or flat steel to each other by forming a material bond between the semi-finished parts. This has the advantage that expensive casting molds can be avoided.

Further, since the pan support and the gas burner form an integral unit, they can be removed and handled as a single piece.

According to an embodiment, the gas burner body has a channel, the channel being
5 configured for conducting the air-fuel-gas-mixture to the gas openings.

Preferably, the channel is implemented such that the air-fuel-gas mixture is mixed more homogenously to improve burning. For example, the channel has a rough inner surface.

10 According to a further embodiment, the gas burner body is a tubing with the channel being formed inside the tubing, the tubing being ring-shaped with both ends joined together in a joining process.

Thus, the gas burner body can be adapted to different requirements, for example
15 geometries, easily. Because a plurality of different prefabricated cross-sectional geometries of tubing are readily available, the channel can be optimized to improve the mixing of the injected air-fuel-gas at low cost.

According to a further embodiment, the gas openings are punched into the gas burner
20 body.

Punching allows realizing of a large variety of different shapes and diameters for the gas openings. Thus, punching allows producing the gas burner body with such gas openings at low cost compared to other techniques such as drilling.
25

According to a further embodiment, the pan support structure surrounds an opening configured to receive a pan configured as a wok.

According to a further embodiment, the pan support structure is made of flat steel being
30 ring-shaped, in particular with both ends joined together in a joining process.

This allows to easily manufacture different sizes of the pan support structure, for example, by adjusting the length of the flat steel. Or, the ring-shaped flat steel may be produced in a

punching process from a flat piece of metal or sheet metal (in this case there are no free ends that still need to be joined).

5 According to a further embodiment, the pan support comprises a venturi portion for being arranged opposite an injector to receive the air-fuel-gas-mixture, wherein the venturi portion provides the gas burner body with the air-fuel-gas mixture, the venturi portion being joined to the gas burner body in a joining process.

10 The venturi portion and the injector are part of the air-fuel-gas-supply system of the gas burner. The venturi portion provides entrainment of air, which supports formation of a stable flame. The joining process allows to use separate semi-finished parts for the venturi portion and the gas burner body.

15 According to a further embodiment, the pan support comprises a plurality of first column elements, wherein the pan support structure is spaced apart upwardly from the gas burner body by the first column elements, the first column elements being joined to the gas burner body and the pan support structure in a joining process.

20 It is desirable that the lower surface of the pan is in the vicinity of the highest temperature of the flame. By using the first column elements the position of the pan is adjusted easily in the upward direction.

25 According to a further embodiment, the pan support comprises a plurality of second column elements protruding downwards from the gas burner body and configured to space apart the gas burner body from a receptacle of the gas hob for receiving the pan support.

30 By adjusting the distance between the gas burner body (comprising the venturi portion) and the receptacle the mixing ratio of the air-fuel-gas mixture can be adjusted to optimize combustion.

According to a further embodiment, the first and/or second column elements are made from round bar.

This allows adapting the pan support to different specifications, for example geometries. Because a plurality of different prefabricated diameters for round bars are readily available, by choosing a respective diameter and by adjusting a length for each of the first/second columns, the pan support is adapted easily.

5

According to a further embodiment, the joining process is a welding and/or soldering process.

10

By welding and/or soldering the material bond between the semi-finished products is easily obtained.

According to a further aspect of the invention, a gas hob comprising the above-described pan support is provided.

15

According to an embodiment, the gas hob comprises a cooking surface forming a gas chamber within which the venturi portion is supplied with the air-fuel-gas-mixture.

Since the venturi portion is mounted inside the gas chamber it is protected from dirt. Thus, less cleaning is required.

20

According to a further embodiment, the cooking surface comprises a border portion, a disk and a receptacle receiving the pan support, the border portion, the disk and the receptacle forming the gas chamber.

25

The gas chamber provides primary air needed for mixing with the fuel gas. The air inside the gas chamber can be replenished from beneath the cooking surface and thus no opening towards the cooking surface is required. This facilitates cleaning.

30

According to a further aspect of the invention, a method for manufacturing the pan support is provided, wherein the pan support structure and the gas burner body are joined in a joining process.

Features and advantages explained herein in relation to the pan support equally apply to the gas hob and method, and vice versa.

Further possible implementations or alternative solutions of the invention also encompass combinations – that are not explicitly mentioned herein – of features described above or below with regard to the embodiments. The person skilled in the art may also add
5 individual or isolated aspects and features to the most basic form of the invention.

Further embodiments, features and advantages of the present invention will become apparent from the subsequent description and dependent claims, taken in conjunction with the accompanying drawings, in which:

10 Fig. 1 shows a perspective view of an embodiment of a gas hob with a cooking surface comprising four differently sized pan supports.

Fig. 2 illustrates in a cross-sectional view II-II from Fig. 1, one of the pan supports;

15 Fig. 3 shows a perspective view of the pan support of Fig. 2; and

Fig. 4 shows a perspective cross-sectional view of a further embodiment of a pan support.

20 In the Figures, like reference numerals designate like or functionally equivalent elements, unless otherwise indicated.

Fig. 1 shows a gas hob 1 which comprises four differently sized pan supports 2 arranged on a cooking surface 3. The pan supports 2 are partially recessed into the cooking surface
25 3. One such pan support 2 is shown in Fig. 2 illustrating a cross-sectional view II-II from Fig. 1. Fig. 3 illustrates a perspective view of the pan support 2. In the following, the pan support 2 is described with reference to Fig. 2 and Fig. 3.

The pan support 2 comprises a pan support structure 4 and, underneath the pan support
30 structure 4, a gas burner body 5. The pan support structure 4 is ring-shaped and configured for supporting a pan 6 (in this case a wok). The gas burner body 5 comprises gas openings 7 for burning an air-fuel-gas mixture.

The cooking surface 3 (see Fig. 2) comprises a top sheet 7a having a circular cutout 8 with a circumferential border portion 9 adjacent to the circular cutout 8 being bent upwardly. A flange 11 is formed in an upper portion 12 of a receptacle 10. The receptacle 10 is inserted into the circular cutout 8 of the top sheet 7a, wherein the flange 11 rests on the circumferential border portion 9.

The cooking surface 3 further comprises a disk 13 with a circular cutout 14, wide enough to fit a bottom portion 15 of the receptacle 10 therethrough. A side portion 16 of the disk 13 bends upwardly towards the top sheet 7a to attach the disk 13 to the top sheet 7a from below. When the receptacle 10 is placed on the border portion 9, a gas chamber 17 is formed by the border portion 9, the disk 13, the side portion 16 and the receptacle 10. The receptacle 10 can be removed from the top sheet 7a to facilitate cleaning.

The receptacle 10, the disk 13 and the top sheet 7a is made, preferably, from sheet metal. The receptacle 10, the disk 13 and the top sheet 7a are manufactured, for example, by punching and/or by deep drawing the sheet metal.

The gas burner body 5 rests on a step portion 18 of the receptacle 10 extending radially inward from the upper portion 12 as shown in Fig. 2. A venturi portion 19 protrudes downwards from the gas burner body 5 and reaches through an opening 20 formed in the step portion 18. The venturi portion 19 is positioned opposite a fuel-gas injector 21 which is mounted to the disk 13 from below. The fuel-gas injector 21 injects fuel-gas into the venturi portion 19 and upon injection of the fuel-gas, air from the gas chamber 17 is entrained into the venturi portion 19 resulting in an air-fuel-gas mixture. The air-fuel-gas mixture is conducted from the venturi portion 19 into a channel 22. A cross-sectional view of the channel 22 is shown in Fig. 2. The channel 22 (shown partially in dashed lines in Fig. 2) provides the gas openings 7 with the air-fuel-gas mixture. The gas burner body 5 comprises a ring-shaped metal tube.

The gas burner body 5 is manufactured, for example, in a first step by bending a metal tubing into a ring. In a second step, ends 23 are joined by welding. In a third step, the gas openings 7 are punched into the gas burner body 5. In a fourth step, the venturi portion 19 is joined to the gas burner body 5 by welding. The order of the steps can be changed.

The pan support structure 4 comprises a ring of flat steel. For example, a straight piece of flat steel is bent to a ring having an opening 36. Ends 24 of the ring are joined by welding, for example.

- 5 The pan support structure 4 and the gas burner body 5 form an integral unit 37. For example, the pan support structure 4 and the gas burner body 5 are welded together.

In particular, the pan support structure 4 is spaced apart upwardly from the gas burner body 5 by a plurality of first column elements 25 (see Fig. 3). A plurality of second column
10 elements 26 space the gas burner body 5 apart upwardly from the step portion 18 of the receptacle 10 for setting a distance d between the venturi portion 19 and the fuel-gas injector 21 (see Fig. 2). The distance d influences the amount of primary air drawn into the venturi portion 19, which allows tuning of the mixing ratio of the air to fuel-gas mixture (by
15 choosing a length of the second column elements 26). The drawn-in air is replenished by venting the gas chamber 17 through a plurality of slits or through an aperture 27, which is for example formed in the border portion 9 as indicated in Fig. 2. Alternatively, the size of the cutout 14 can be increased whereby air passes through between the bottom portion
20 15 and the cutout 14. This alternative has the advantage that spilt cooking liquids are prevented from entering the gas chamber 17.

20 The first and second column elements 25, 26 are for example rod shaped. The first and second column elements 25, 26 are preferably produced from a metal round bar. For example, by cutting the metal bar into pieces, the first and second column elements 25, 26 are obtained and the first and second column elements 25, 26 are welded to the pan
25 support structure 4 and to the gas burner body 5 to form the integral unit 37.

Fig. 4 shows a perspective cross-sectional view of a further example of a pan support 2. The pan support 2 in this example may have all the features that were described with reference to Figs. 2 and Fig. 3, and includes a further gas burner body 28. The further gas
30 burner body 28 comprises gas openings 29, a venturi portion 30 and a plurality of column elements 31 spacing the further gas burner body 28 apart upwardly from the step portion 18. The venturi portion 30 and a further fuel-gas injector 32 are positioned along a common symmetry axis 33, which vertically extends from the top sheet 7a.

The gas burner body 5 and the gas burner body 28, i.e. their respective ring shapes, are arranged coaxially with respect to a common symmetry axis 35. The gas burner body 28 is, preferably, directly or indirectly attached to the gas burner body 5 (not shown).

5 The gas openings 29 are pointing inwards towards the symmetry axis 35 of the gas burner body 28, and the gas openings 7 are pointing outwards away from the symmetry axis 35. Thus, a dual gas burner is formed, by a first gas burner comprising the gas burner body 5, the gas openings 7, the venturi portion 19 and the fuel-gas injector 21 and a second gas burner comprising the gas burner body 28, the gas openings 29, the venturi portion 30
10 and the fuel-gas injector 32.

Preferably, the first and the second gas burner can be operated independently. This allows realizing of a variety of different operational modes compared to a single gas burner. For example, in a first operational mode, the first gas burner is switched off, that is
15 no fuel-gas is provided by the fuel-gas injector 21, and the second gas burner is switched on to heat the pan 6. In a second operational mode, the second gas burner is switched off, and the first gas burner is switched on to heat the pan 6. The second operational mode serves for example to keep food warm. In a third operational mode, both gas
20 burners are switched on to heat the pan 6.

A large surface area can be heated more homogenously than compared to when a single gas burner is used. For example, a single gas burner tends to heat a middle section of the pan 6 more than an outer section of the pan 6.

25 The pan support structure 4 as shown in Fig. 4 is extended by a bent portion 34, which bends downwards towards the gas burner body 28 and gives improved support when a wok is placed on the pan support structure 4.

Although the present invention has been described in accordance with preferred
30 embodiments, it is obvious for the person skilled in the art that modifications are possible in all embodiments.

Reference Numerals:

	1	gas hob
	2	pan support
	3	cooking surface
5	4	pan support structure
	5	gas burner body
	6	pan
	7	gas openings
	7a	top sheet
10	8	circular cutout
	9	border portion
	10	receptacle
	11	flange
	12	upper portion
15	13	disk
	14	circular cutout
	15	bottom portion
	16	side portion
	17	gas chamber
20	18	step portion
	19	venturi portion
	20	opening
	21	gas injector
	22	channel
25	23	ends
	24	ends
	25	first column elements
	26	second column elements
	27	aperture
30	28	gas burner body
	29	gas openings
	30	venturi portion
	31	column elements

	32	fuel gas injector
	33	symmetry axis
	34	bent portion
	35	symmetry axis
5	36	opening
	37	integral unit

CLAIMS

1. A pan support (2) for a gas hob (1), the pan support (2) comprising:
5 a pan support structure (4) configured for supporting a pan (6), and
a gas burner body (5) comprising gas openings (7) for burning an air-fuel-gas-mixture, wherein the pan support structure (4) and the gas burner body (5) are joined in a joining process to form an integral unit (37).
- 10 2. The pan support according to claim 1, wherein the gas burner body (5) has a channel (22), the channel (22) being configured for conducting the air-fuel-gas-mixture to the gas openings (7).
3. The pan support according to claim 2, wherein the gas burner body (5) is a tubing
15 with the channel (22) being formed inside the tubing, the tubing being ring-shaped with both ends (23) joined together in a joining process.
4. The pan support according to one of claims 1 - 3, wherein the gas openings (7) are punched into the gas burner body (5).
- 20 5. The pan support according to one of claims 1 - 4, wherein the pan support structure (4) surrounds an opening (36) configured to receive a pan configured as a wok (6).
6. The pan support according to one of claims 1 - 5, wherein the pan support structure
25 (4) is made of flat steel being ring-shaped, in particular with both ends (24) joined together in a joining process.
7. The pan support according to any of claims 1 - 6, comprising a venturi portion (19) for being arranged opposite an injector (21) to receive the air-fuel-gas-mixture, wherein the
30 venturi portion (19) provides the gas burner body (5) with the air-fuel-gas mixture, the venturi portion (19) being joined to the gas burner body (5) in joining process.

8. The pan support according to one of claims 1 - 7, comprising a plurality of first column elements (25), wherein the pan support structure (4) is spaced apart upwardly from the gas burner body (5) by the first column elements (25), the first column elements (25) being joined to the gas burner body (5) and the pan support structure (4) in a joining process.

9. The pan support according to one of claims 1 - 8, comprising a plurality of second column elements (26) protruding downwards from the gas burner body (5) and configured to space apart the gas burner body (5) from a receptacle (10) of the gas hob (1) for receiving the pan support (2).

10. The pan support according to one of claims 1 - 9, wherein the first and/or second column elements (25, 26) are made from round bar.

11. The pan support according to one of claims 1 - 10, wherein the joining process is a welding and/or soldering process.

12. A gas hob (1) comprising a pan support (2) according to one of claims 1 – 11.

13. The gas hob according to claim 12, comprising a cooking surface (3) forming a gas chamber (17) within which the venturi portion (19) is supplied with the air-fuel-gas-mixture.

14. The gas hob according to claim 13, wherein the cooking surface (3) comprises a border portion (9), a disk (13) and a receptacle (10) receiving the pan support (2), the border portion (9), the disk (13) and the receptacle (10) forming the gas chamber (17).

15. A method for manufacturing the pan support (2) of one of claims 1 – 11, wherein the pan support structure (4) and the gas burner body (5) are joined in a joining process.

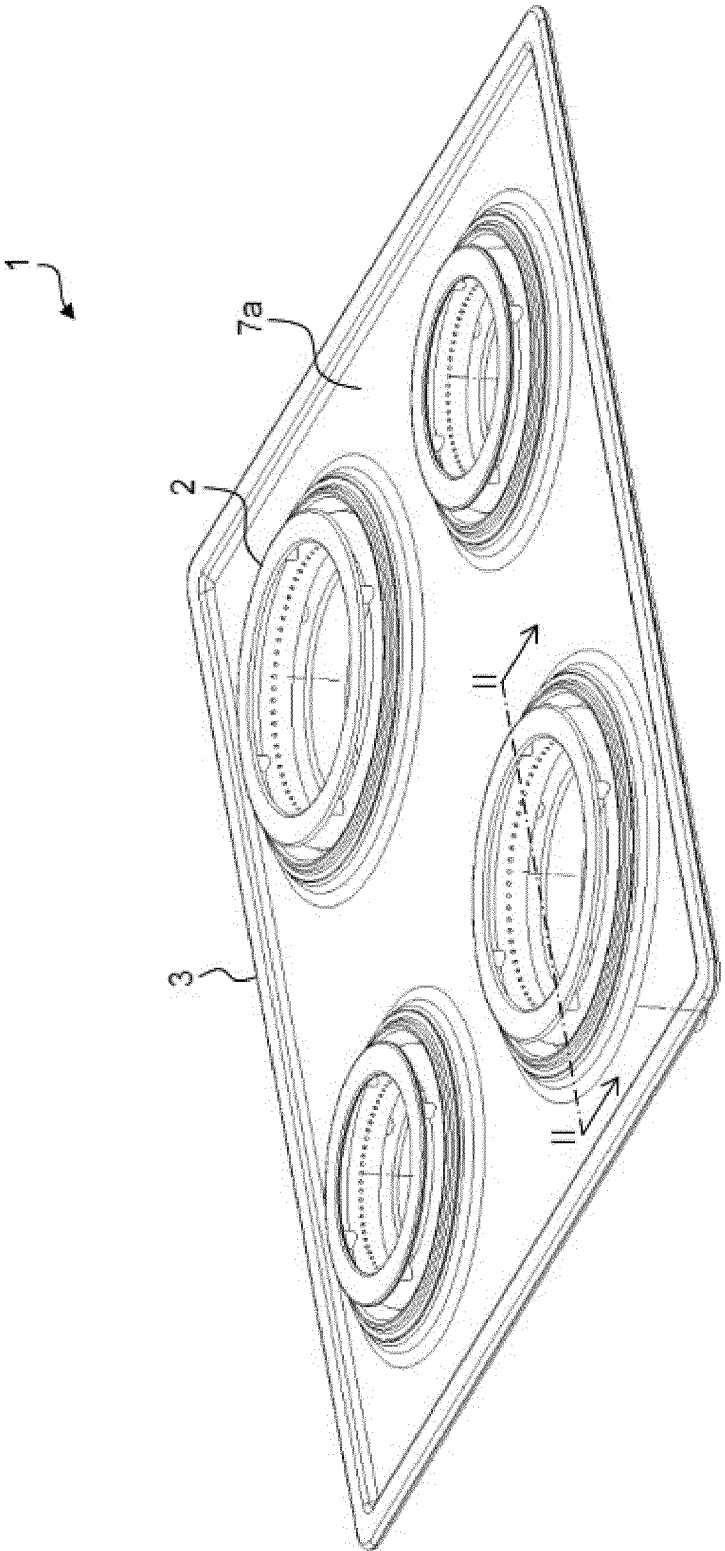


Fig. 1

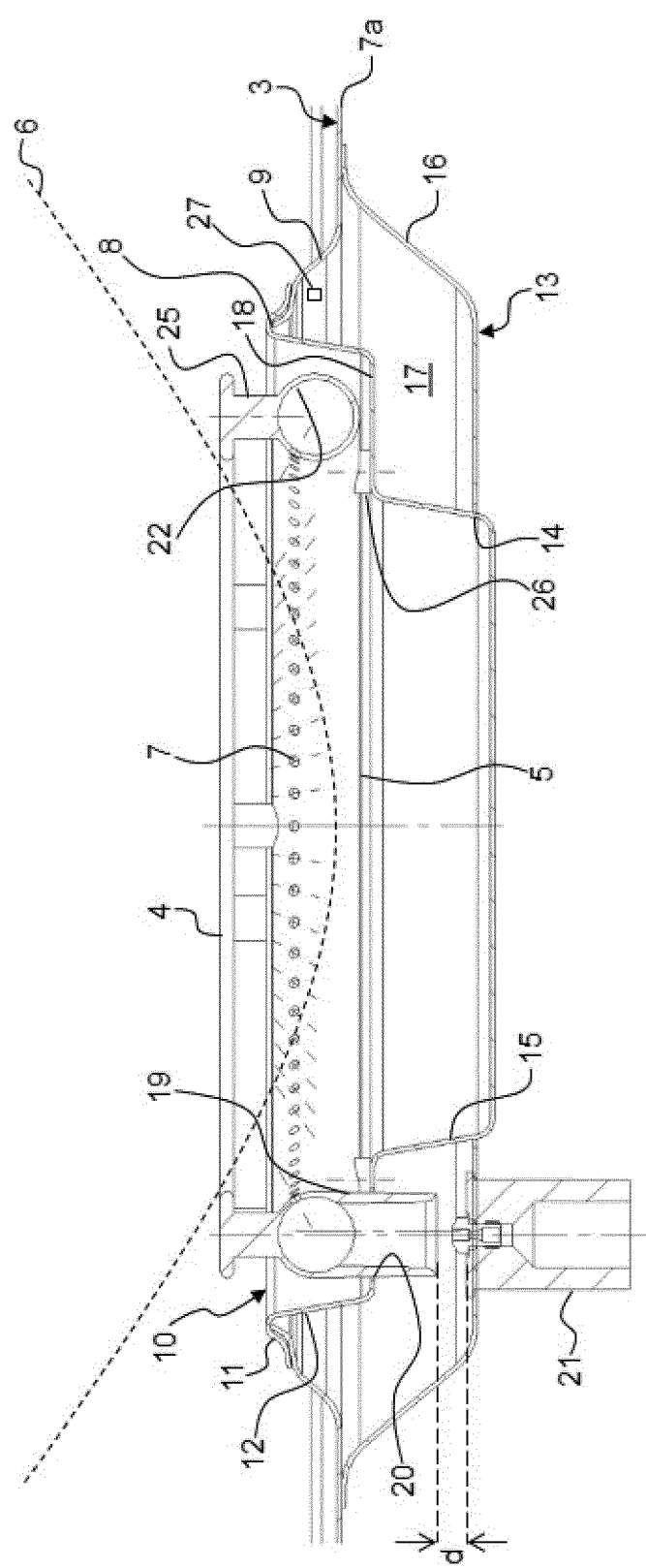


Fig. 2

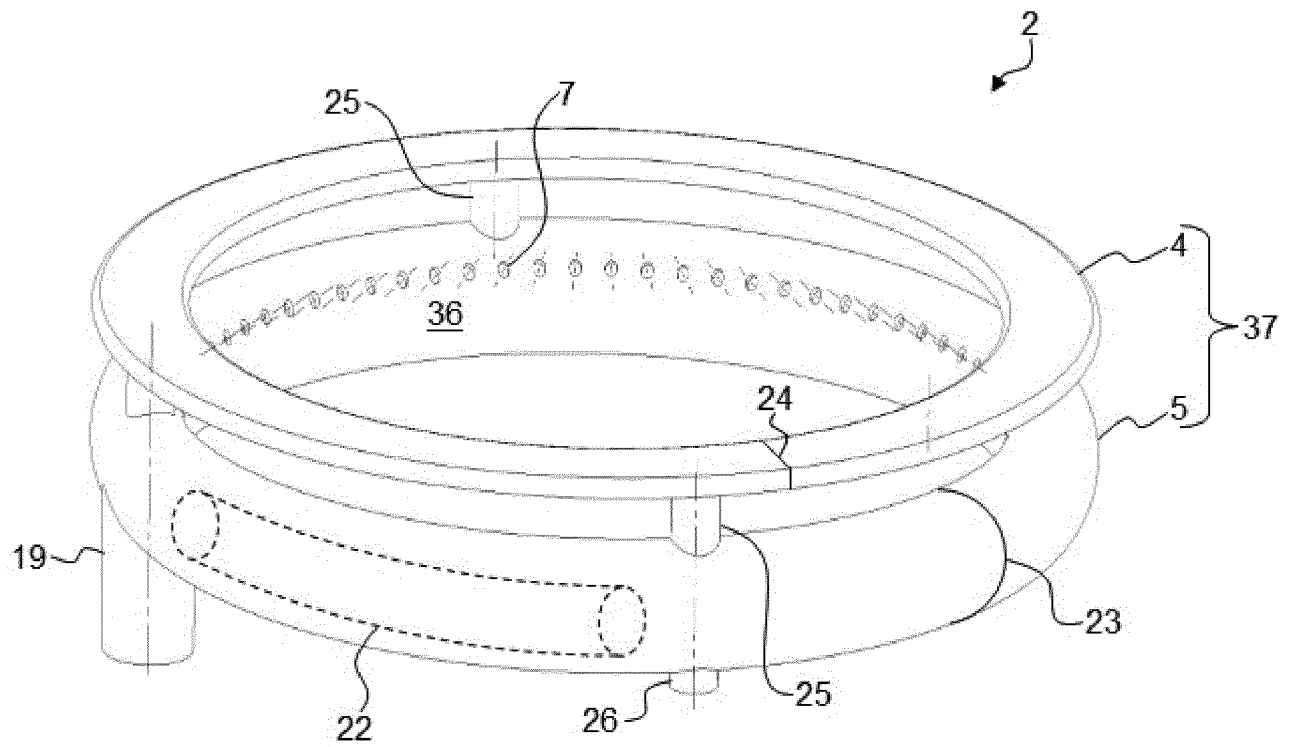


Fig. 3

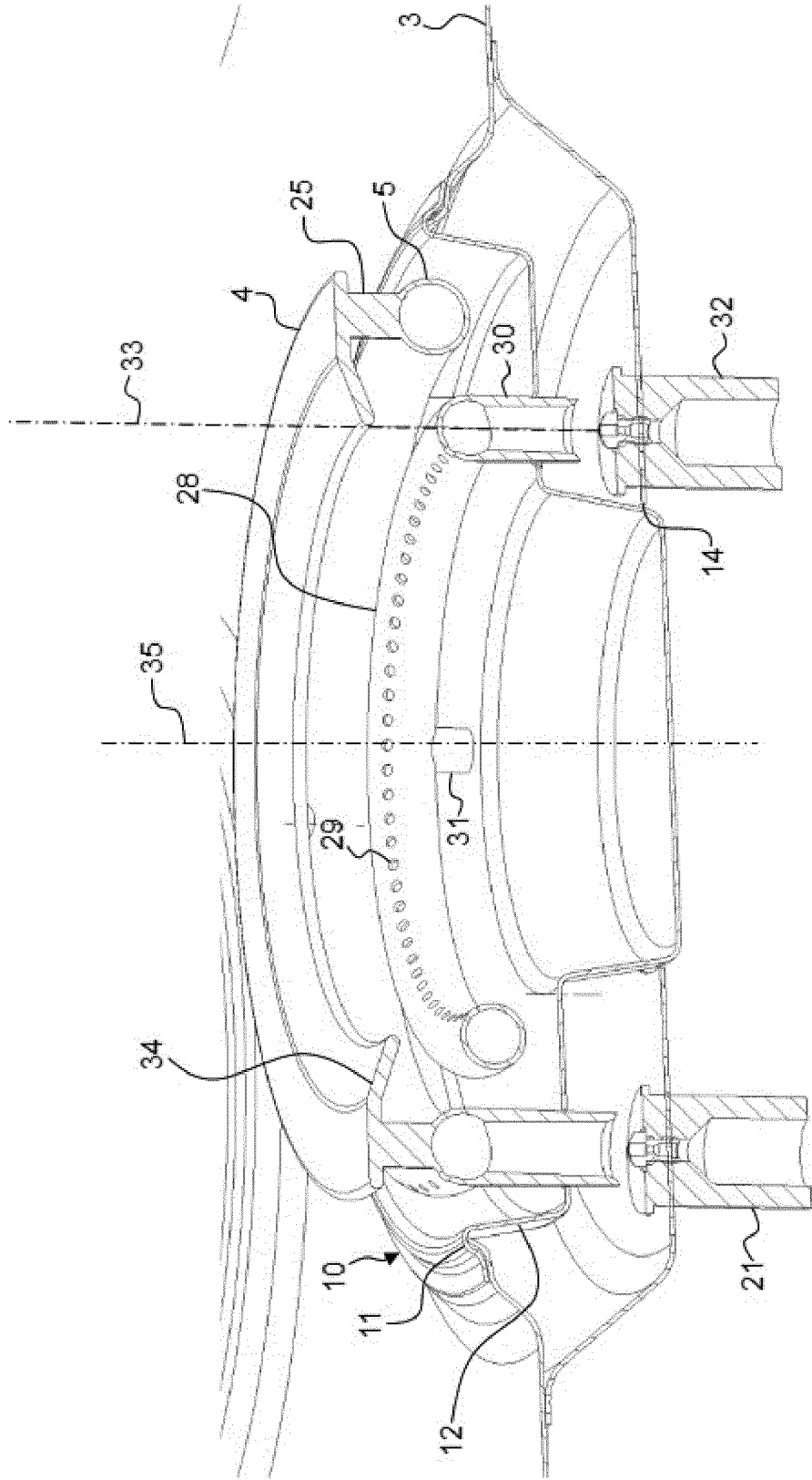


Fig. 4

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2020/050906

A. CLASSIFICATION OF SUBJECT MATTER
INV. F23D14/06 F24C15/10
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
F23D F24C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	US 2017/138605 A1 (CADIMA PAUL BRYAN [US]) 18 May 2017 (2017-05-18) paragraph [0020] - paragraph [0041]; figures 1-9 -----	1,2,4,7, 12,13,15 3,9,10, 14
X A	US 2018/112869 A1 (CADIMA PAUL BRYAN [US]) 26 April 2018 (2018-04-26) paragraph [0023] - paragraph [0047]; figures 1-7 -----	1,2,4,5, 7,8,12, 13,15 3,9,10, 14
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A	US 4 313 416 A (LAU KA K) 2 February 1982 (1982-02-02) the whole document -----	1



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

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Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2020/050906

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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