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(54) Gas burner, in particular for a household cooking appliance

(57) The present invention relates to a gas burner (1), in particular for a household cooking appliance, said burner (1) comprising:
- a cup (10) comprising an injector (11) for letting out gas coming from a duct (12) that supplies gas to said burner (1);
- a body (20) associated with said cup (10) and comprising a Venturi effect chamber (21), in particular said chamber (21) being positioned substantially coaxial to said injector (11);
- a cap (30) associated with said body (20) in a manner such as to allow gas to come out through a plurality of apertures (31).

The invention is characterized in that said Venturi effect chamber (21) comprises an inlet portion (21A), an intermediate portion (21B) and an outlet portion (21C), said outlet portion (21C) being positioned in a first horizontal plane (P1) lying above a second horizontal plane (P2) in which said apertures (31) lie.

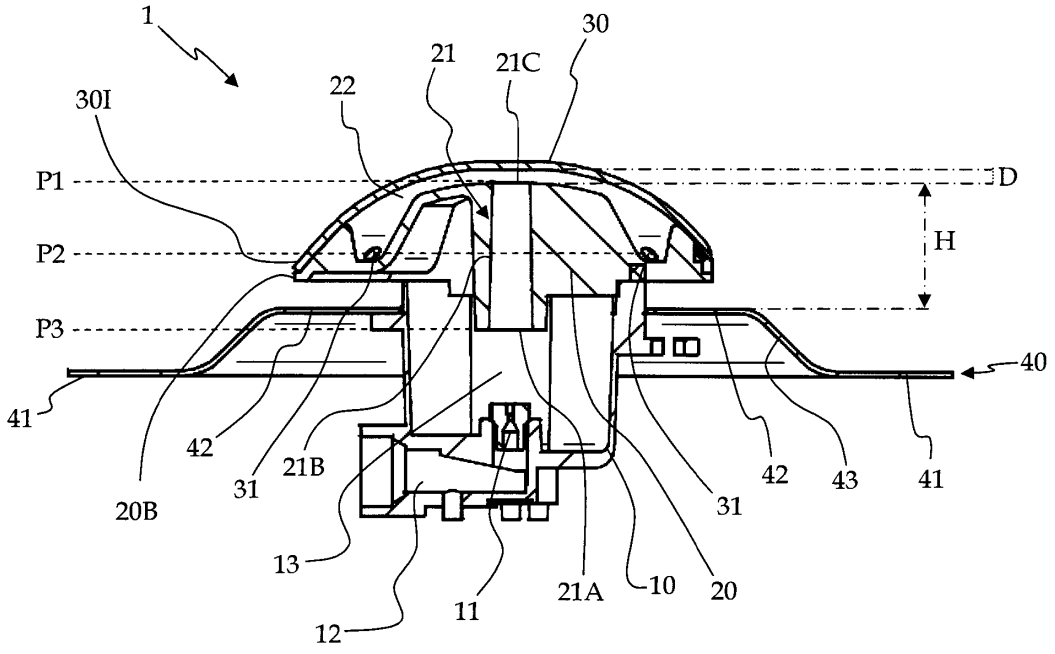

Fig. 2b

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Description

[0001] The present invention relates to a gas burner, in particular for a food cooking appliance, according to the preamble of claim 1.

[0002] In the art a gas burner is known, in particular for a food cooking appliance, which is of the type that comprises a cup within which an injector is positioned for emitting gas coming from a suitable duct that feeds gas to said burner.

[0003] Said burner also comprises a body associated with said cup and comprising a Venturi effect chamber extending vertically; usually the Venturi effect chamber is arranged coaxial to said injector.

[0004] In this known burner, gas is typically mixed with primary air above the cooking top whereon the burner is installed, in particular inside the cup and/or the chamber acting as a Venturi tube.

[0005] In order to allow the air-gas mixture to come out of the burner evenly, said known burner comprises a cap associated with said body, which cap allows the gas to come out through a plurality of apertures, which are usually obtained in an upper surface of said body.

[0006] In particular, in a known burner the cap rests on the body, and the air-gas mixture comes out of said plurality of apertures substantially horizontally; therefore, the flame obtained from said air-gas mixture is also substantially horizontal, i.e. not directly aimed at a cooking container positioned above the burner.

[0007] As a consequence, a substantial drawback of the above-described burner is that its body and cap causing the air-gas mixture to come out substantially horizontally make it very difficult to direct the burner flames upwards, i.e. towards the cooking container.

[0008] Such difficulty in directing the burner flames towards the cooking containers inevitably translates into inadequate and insufficient efficiency of the burner itself.

[0009] In particular, when using cooking containers having a spherical bowl-shaped bottom, the above-described burner system may even require that the caps be replaced with other components having an appropriate profile.

[0010] Therefore, such a solution also suffers from the drawback that it requires the use of a large number of components adapted to constitute the entire burner assembly in such a way as to ensure adequate heating of different cooking containers; this complexity inevitably translates into higher costs.

[0011] As an alternative, it may be necessary to use grates that allow the cooking container to be lifted farther upwards from the cooking top whereon the burner is positioned, so that the point from where the flames exit the burner is adequately spaced from said cooking container; sufficient room may thus be created for the flames to take a substantially vertical direction, thereby ensuring satisfactory burner efficiency.

[0012] In this frame, it is the main object of the present invention to provide a gas burner, in particular for a food cooking appliance, which is so designed as to overcome the drawbacks of prior-art gas burners.

[0013] In particular, it is one object of the present invention to provide a gas burner, in particular for a food cooking appliance, which is so designed as to ensure adequate burner efficiency.

[0014] It is another object of the present invention to provide a gas burner, in particular for a food cooking appliance, wherein it is possible to heat a cooking container in an optimal manner without necessarily having to replace a burner element with other components having an adequate profile.

[0015] It is a further object of the present invention to provide a gas burner, in particular for a food cooking appliance, wherein it is not necessary to use a large number of components adapted to constitute the entire burner assembly in such a way as to obtain adequate heating of different cooking containers, thus also reducing the costs thereof.

[0016] Said objects are achieved by the present invention through a gas burner, in particular for a food cooking appliance, incorporating the features set out in the appended claims, which are intended as an integral part of the present description.

[0017] Further objects, features and advantages of the present invention will become apparent from the following detailed description and from the annexed drawings, which are supplied by way of non-limiting example, wherein:

- Fig. 1 is a perspective view of a gas burner, in particular for a food cooking appliance, according to the present invention;
- Fig. 2a is a front view of the gas burner of Fig. 1, whereas Fig. 2b is a sectional view along a line A-A of the gas burner of Fig. 2a.

[0018] Referring now to the annexed Figures 1 to 2b, reference numeral 1 designates as a whole a gas burner, in particular for a food cooking appliance for household use, in accordance with the present invention.

[0019] The annexed drawings do not show said cooking appliance.

[0020] The burner 1 comprises a cup 10 comprising an injector 11 for letting out gas coming from a duct 12 that supplies gas to said burner 1.

[0021] In the annexed drawings, the duct 12 is made as one piece with said cup 10; it is however clear that said duct 12 may also be provided as a body distinct from the cup 10, and then be associated therewith through fastening means known in the art.

[0022] The burner 1 also comprises a body 20 associated with said cup 10 and comprising a Venturi effect chamber 21, in particular said chamber 21 being positioned substantially coaxial to said injector 11.

[0023] Preferably, said Venturi effect chamber 21 extends substantially vertically within said body 20; it is clear that, for the purposes of the present invention, the term

"vertical" is used with reference to a burner 1 installed on a cooking appliance.

[0024] The chamber 21 also extends in a central position within said body 20, i.e. in such a way as to substantially coincide with an axis (substantially coinciding with the straight line A-A of Fig. 2a) of the body 20; it is however clear the Venturi effect chamber 21 may also be arranged differently within said body 20. The burner 1 further comprises a cap 30 associated with said body 20, so as to allow the gas to come out of a plurality of apertures 31.

[0025] Preferably, said cap 30 has a dome-like shape.

[0026] In the embodiment shown in the annexed drawings, said plurality of apertures 31 are obtained in the cap 30, in particular near a lower portion 30I of said cap 30; the apertures 31 directly obtained in the cap 30 cause the cap 30, which constitutes the upper cover of the body 20, to act also as a flame divider, thus clearly distinguishing the burner 1 according to the present invention from traditional "cup-like" burners, wherein the flame divider means are obtained in the external perimeter of the body (precisely at the external interface between the body and the cap).

[0027] However, said plurality of apertures 31 may also be obtained in the body 20, in particular near an upper edge 20B (visible in Fig. 2b) of said body 20.

[0028] In accordance with the present invention, said Venturi effect chamber 21 comprises an inlet portion 21A, an intermediate portion 21B and an outlet portion 21C, said outlet portion 21C being positioned in a first horizontal plane P1 lying above a second horizontal plane P2 in which said apertures 31 lie.

[0029] As can be seen in particular in Fig. 2b, said inlet portion 21A is that part of the chamber 21 which faces the cup 10 and/or the injector 11 and/or a volume 13 comprised in the cup 10, whereas the outlet portion 21C is that part of the chamber 21 which faces the cap 30.

[0030] It is also clear that, for the purposes of the present invention, the term "horizontal" is used with reference to a burner 1 installed on a cooking appliance.

[0031] As a consequence, said first P1 and second P2 horizontal planes are substantially parallel to at least one straight portion 41 of a cover of the cooking top 40. Preferably, the second horizontal plane P2 in which said apertures 31 lie is positioned substantially in correspondence with the intermediate portion 21B of the Venturi effect chamber 21, so as to allow the chamber 21 to extend above the second horizontal plane P2.

[0032] In Fig. 2b one can also notice that said Venturi effect chamber 21 extends prevalently above the straight portion 41 of the cover of the cooking top 40. In particular, the inlet portion 21A of said chamber 21 lies substantially in a third horizontal plane P3, which in the example of Fig. 2b is positioned above said at least one straight portion 41 of the cover of the cooking top 40. Alternatively, said horizontal plane P3 may be positioned at the same height as the straight portion 41 or under it.

[0033] In a preferred embodiment, said third horizontal plane P3 is located above said at least one straight portion 41 of the cover of the cooking top 40 and under a coupling portion 42 that couples the cooking top 40 to the burner 1.

[0034] The cooking top comprises a junction portion 43 positioned between said straight portion 41 and said coupling portion 42. In the representation of the annexed figures, said junction portion 43 allows obtaining a coupling portion 42 which is higher than the straight portion 41; it is however clear that the junction portion 43 may be so designed as to obtain a straight portion 41 which is higher than the coupling portion 42.

[0035] It must nevertheless be pointed out that the junction portion 43 may even be absent from the cooking top 40 according to the present invention; in such a case, the coupling portion 42 and the straight portion 41 will be positioned at substantially the same height.

[0036] In the preferred example shown in the drawings annexed to the present description, the inclination of the junction portion 43 is equal or similar to the inclination of the lower portion 30I of the cap 30.

[0037] Preferably, the length of said chamber 21, from the inlet portion 21A to the outlet portion 21C, is comprised between 20 mm and 40 mm. In particular, the length of said chamber 21 is comprised between 24 mm and 34 mm; in a preferred embodiment, the length of said chamber 21, from the inlet portion 21A to the outlet portion 21C, is comprised between 26 mm and 28 mm.

[0038] As can be seen in Fig. 2b, the cup 10 is secured to the underside of said coupling portion 42 of the cooking top 40, in particular through known fastening means (typically screws); this allows the cup 10 and the entire burner 1 to be securely fastened to the cooking top 40, without altering the appearance of the cooking appliance.

[0039] In addition, a height H between the outlet portion 21C and said coupling portion 42 of the cooking top 40 is comprised between 15 mm and 30 mm; in particular, the height H between the outlet portion 21C and said coupling portion 42 is comprised between 22 mm and 24 mm; in a preferred embodiment, said height H is approx. 23 mm.

[0040] Preferably, a distance D between said outlet portion 21C and the cap 30 is comprised between 2 mm and 4 mm; in particular, the distance D between said outlet portion 21C and the cap 30 is comprised between 2 mm and 3 mm; in a preferred embodiment, said distance D is approx. 2.5 mm.

[0041] Furthermore, Fig. 2b shows that between the body 20 and the cap 30 a cavity 22 is obtained for letting the gas flow from the outlet portion 21C of the chamber 21 to said plurality of apertures 31.

[0042] Preferably, the cavity 22 has a shape that substantially corresponds to that of the cap 30, in that said cavity 22 is obtained in the space between the body 20 and the cap 30.

[0043] The primary air needed for the operation of the burner 1 is taken from above the cooking top. It flows through the interspace between the body 20 and the cou-

pling portion 42, until it reaches the volume 13 inside the cup 10, where it begins mixing with the gas supplied by the injector 11; said mixing is then completed along the chamber 21.

[0044] The advantages of a gas burner 1 according to the present invention are apparent from the above description.

[0045] In particular, the particular shape and position of the chamber 21, of the cavity 22 and of the cap 30 allow the gas flow to be properly directed towards the plurality of apertures 31 and hence towards a cooking container (not shown in the drawings) placed on the burner 1. In fact, when it reaches the outlet portion 21C of the chamber 21, the gas is directed into the cavity 22 also by the shape of the cap 30, until it ideally and adequately comes out through the plurality of apertures 31, which are preferably located near the lower portion 30I of said cap 30.

[0046] In addition, the particular "dome-like" shape of the cap 30 allows the flames, which originate from the plurality of apertures 31, to have a substantial vertical component prior to lapping a cooking container positioned on the burner 1. Said component depends on the inclination of the apertures 31 relative to the vertical and on the thickness of the cap 30 (which may be approx. 1).

[0047] This allows to obtain an adequate and optimal efficiency of the burner 1 according to the present invention, without having to replace the cap 30 with other suitably profiled components.

[0048] A further advantage of the burner 1 according to the present invention is that the distance D between the outlet portion 21C of the chamber 21 and the cap 30 ensures an optimal circulation of the gas coming from the injector 11 and from said Venturi effect chamber 21.

[0049] Yet another advantage of the present invention is that the solution adopted for the burner 1 according to the present invention allows locating the flame outlet point at an adequate distance from the cooking containers, without having to use particularly tall grates.

[0050] This allows providing a burner 1 which is very efficient in terms of heat output, while at the same time giving a pleasant appearance to the entire cooking appliance.

[0051] The burner described herein by way of example may be subject to many possible variations without departing from the novelty spirit of the inventive idea; it is also clear that in the practical implementation of the invention the illustrated details may have different shapes or be replaced with other technically equivalent elements.

[0052] It can therefore be easily understood that the present invention is not limited to the above-described burner, but may be subject to many modifications, improvements or replacements of equivalent parts and elements without departing from the inventive idea, as clearly specified in the following claims.

Claims

1. A gas burner (1), in particular for a household cooking appliance, said burner (1) comprising:

   - a cup (10) comprising an injector (11) for letting out gas coming from a duct (12) that supplies gas to said burner (1);
   - a body (20) associated with said cup (10) and comprising a Venturi effect chamber (21), in particular said chamber (21) being positioned substantially coaxial to said injector (11);
   - a cap (30) associated with said body (20) in a manner such as to allow gas to come out through a plurality of apertures (31),

   characterized in that
   said Venturi effect chamber (21) comprises an inlet portion (21A), an intermediate portion (21B) and an outlet portion (21C), said outlet portion (21C) being positioned in a first horizontal plane (P1) lying above a second horizontal plane (P2) in which said apertures (31) lie.

2. A burner (1) according to claim 1, **characterized in that** said first (P1) and second (P2) horizontal planes are substantially parallel to at least one straight portion (41) of a cover of a cooking top (40).

3. A burner (1) according to claim 1, **characterized in that** the second horizontal plane (P2) in which said apertures (31) lie is located substantially in correspondence with the intermediate portion (21B) of the chamber (21).

4. A burner (1) according to claim 2, **characterized in that** said Venturi effect chamber (21) mainly extends above the straight portion (41) of the cooking top (40).

5. A burner (1) according to claim 4, **characterized in that** the inlet portion (21A) of said chamber (21) substantially lies in a third horizontal plane (P3) located above said at least one straight portion (41) of the cover of the cooking top (40).

6. A burner (1) according to claim 5, **characterized in that** said third horizontal plane (P3) is located above said at least one straight portion (41) of the cover of the cooking top (40) and under a coupling portion (42) that couples the cooking top (40) to the burner (1).

7. A burner (1) according to one or more of the preceding claims, **characterized in that** the length of said chamber (21) from the inlet portion (21A) to the outlet portion (21C) is comprised between 20 mm and 40 mm, in particular the length of said chamber (21)

being comprised between 24 mm and 34 mm, preferably said length being comprised between 26 mm and 28 mm.

8. A burner (1) according to one or more of the preceding claims, **characterized in that** a height (H) between the outlet portion (21C) and a coupling portion (42) that couples the cooking top (40) to the burner (1) is comprised between 15 mm and 30 mm, in particular said height (H) being comprised between 22 mm and 24 mm, preferably said height (H) being approximately 23 mm.

9. A burner (1) according to one or more of the preceding claims, **characterized in that** a distance (D) between said outlet portion (21C) of the chamber (21) and the cap (30) is comprised between 2 mm and 5 mm, in particular said distance (D) being comprised between 2 mm and 3 mm, preferably said distance (D) being approximately 2.5 mm.

10. A burner (1) according to one or more of the preceding claims, **characterized in that** between the body (20) and the cap (30) there is a cavity (22) for letting the gas flow from the outlet portion (21C) of the chamber (21) to said plurality of apertures (31).

11. A burner (1) according to claim 1, **characterized in that** said cap (30) has a dome-like shape, the inclination of said cap (30) at its lower portion (30I) being preferably equal or similar to the inclination of at least one junction portion (43) of the cooking top (40).

12. A burner (1) according to claims 10 and 11, **characterized in that** the shape of the cavity (22) substantially corresponds to that of the cap (30).

13. A burner (1) according to claim 1, **characterized in that** said plurality of apertures (31) are obtained in the cap (30), in particular near a lower portion (30I) of said cap (30).

14. A burner (1) according to claim 1, **characterized in that** the cup (10) is secured to the underside of a coupling portion (42) of the cooking top (40).

15. A household cooking appliance comprising a burner (1) according to one or more of the preceding claims 1 to 14.

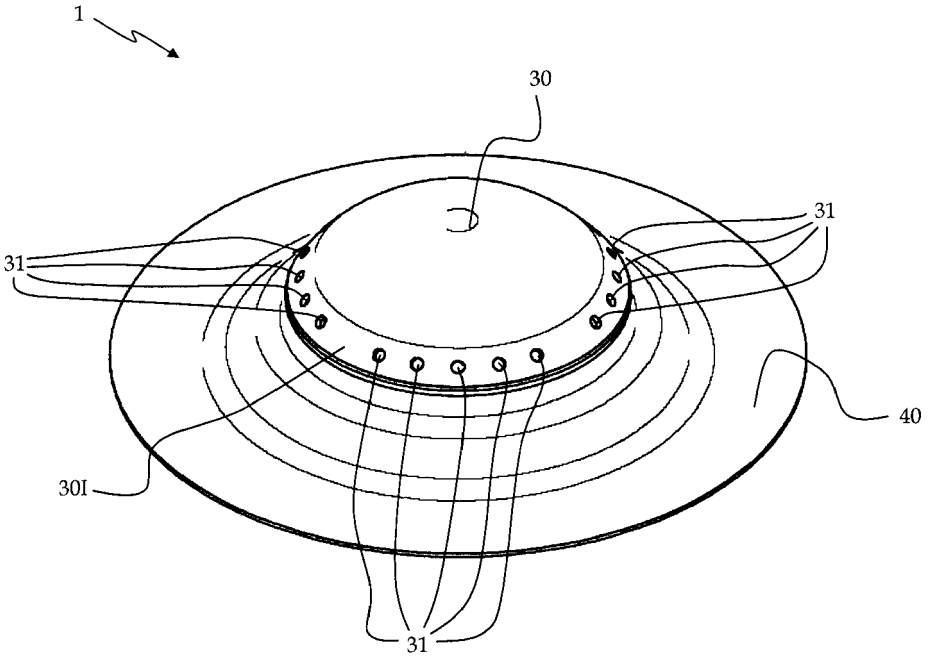

Fig. 1

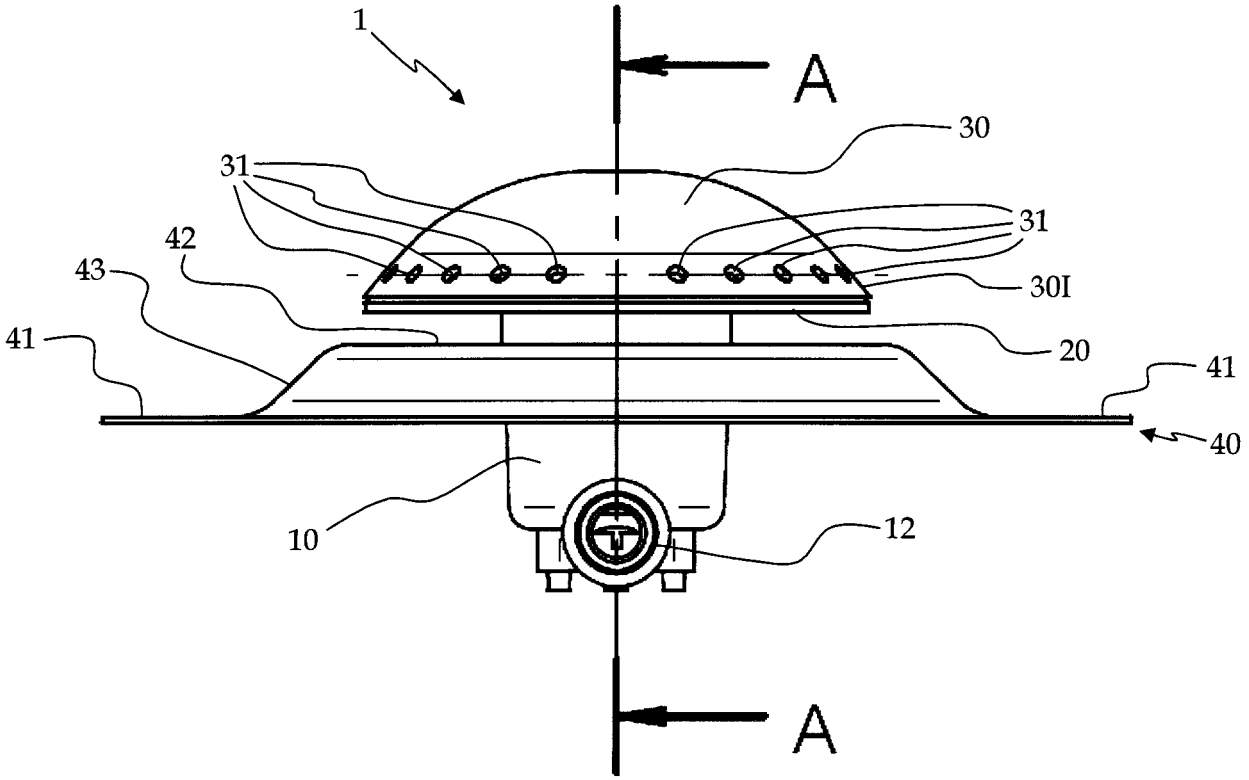
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Fig. 2a

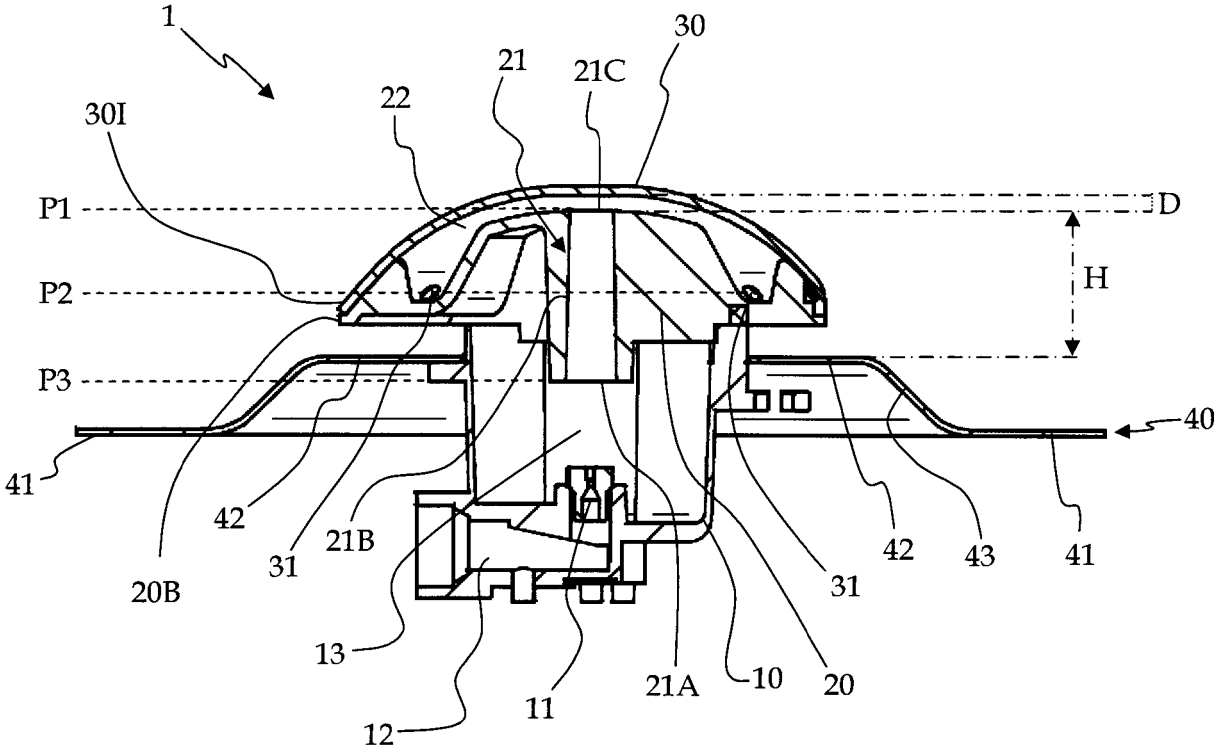
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Fig. 2b

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EUROPEAN SEARCH REPORT

Application Number
EP 12 15 4772

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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A	EP 1 162 404 A2 (WHIRLPOOL CO [US]) 12 December 2001 (2001-12-12) * column 2, paragraph 10 - paragraph 14 * * figure 5 *	1,15	
A	GB 2 100 411 A (SABAF SPA) 22 December 1982 (1982-12-22) * page 2, line 4 - line 89 * * figures 2,3 *	1,15	TECHNICAL FIELDS SEARCHED (IPC) F23D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	9 May 2012	Gavriliu, Costin

CATEGORY OF CITED DOCUMENTS

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