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(54) **Burner for domestic cooking appliances**

(57) A burner (1) which is used in domestic cooking appliances, e.g. cookers, ovens, etc., and which consists of a pool (1.1), a base (1.2) and a cap (1.3). The cap (1.3) comprises a convex upper surface and a concave lower surface provided with ports on a port ring for forming a flame. The bottom of the ports in the lower surface of the cap (1.3) is inclined downwards at a bottom angle between 2° and 8°. At least two C-shaped cavities are radially distributed around the cap's (1.3) center in order

for it to be easily mounted on the base (1.2). The cap (1.3) can be made of aluminium via injection moulding method, brass via hot forging method, or of any one of the materials including glass, porcelain, ceramics, which are resistant to heat and thermal shock, as a single piece, alternatively it can be made of brass or aluminium material, and then applied Teflon or ceramic coating thereon for providing thermal resistance and for obtaining different colours.

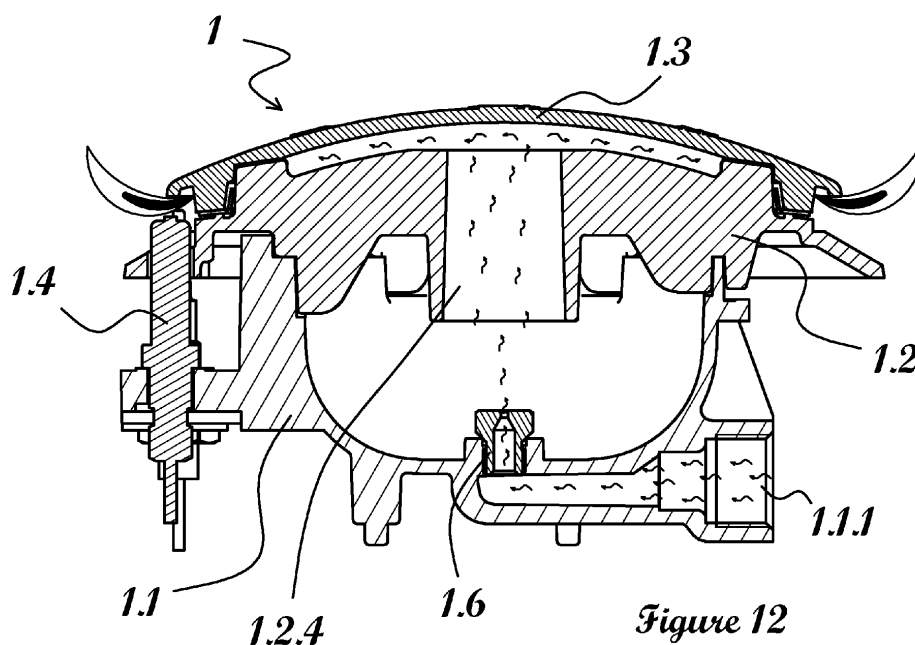


Figure 12

Description

TECHNICAL FIELD

[0001] The invention relates to burners used in domestic cooking appliances, e.g. cookers, ovens, etc. As known, the burners used in domestic cooking appliances basically consist of at least three individual parts, which are a pool, at least one flame crown and at least a cap (i.e. lid or cover). In some burners, on the other hand, the adapter consists of two parts, one of which is a base mounted on said pool, and the other is a flame crown made of brass material and provided with ports thereon. In all of these burners, a cap is placed on the adapter or flame crown. Cap is the enamelled part which has a specific surface form fitting onto the flame crown. Today, these burner lids which are located on the ports, where the flame exits, can have different designs. Besides canalizing the primary air-gas mixture, by hitting lower surface of the cap which is in a suitable surface form, to the ports with the horizontal venturi effect, the lids in the burners also increase the heat transfer to the object placed on it by keeping the heat within the burner. In other words, the better the cap keeps the heat within the burner and transfers it to the object placed on it, the higher the burner efficiency is. Moreover, the better the cap fits onto the flame crown, the smoother the flame exits through the ports; and the union of the flames exiting from successive ports is prevented. Again, burning is adversely affected by any distortion (run-out) or deformity occurring on the cap, adapter or flame crown, and therefore it causes big flames to go out from some ports. Such union of flames results in the fact that big flames exit some ports, or certain ports, and that a homogeneous heat transfer for any place of pans, saucepans, etc. put on the burner may be prevented. This, in turn, is an undesired situation affecting the quality of cooking negatively. The invention relates to a burner with a new cap design which can be used in domestic cooking appliances and which aims to eliminate all of the above mentioned problems, said cap being made of aluminum, brass, ceramic, porcelain, or glass material, or being applied teflon or ceramic coating thereon.

PRIOR ART

[0002] Within the state of the art, there exist many burners with different cap designs. Now, reference will be made to several applications in literature regarding the subject matter.

[0003] The application owned by the firm Sabaf S.p.a and numbered WO 2004/102072 discloses a burner (1). Here, said cap (5) and body (3) are produced separately. As seen in Figs. 1 and 2 of this application, the cap (5) having a convex form is mounted on a body (3) by means of bolts (21). This method is quite demanding; moreover, in addition to causing time losses during production, it is difficult for housewives to dismount/mount it when they

want to clean it. In our invention, however, the cap is produced as a single-piece together with the ports and it can be easily located on the base by means of the cavities provided on the lower surface of the cap. Thus, there is no need for housewives to remove bolts for cleaning the burner or for any other reason.

[0004] The patent application owned by the firm Electrolux Home Products Corporation and numbered EP 1 703 203 also discloses a burner. As seen in Fig. 1 of the application, the cap (14) and the flame crown (12) are produced separately. A cap (14) with a flat surface is placed on the toothed crown. Due to any distortion or deformity likely to be experienced during the production of the cap (14), the cap may not be properly placed on the flame crown (12). Therefore, flames will not properly exit the ports and flame unions in some consecutive ports will be experienced. This is an undesired situation in burners. In the burner developed by the present invention, ports are located in the lower surface of the cap and the cap can be produced of aluminum, brass, ceramic or glass material, as a single piece together with these ports. Thus, cap and ports are produced in a way fully compatible with each other, thereby preventing possible distortion between the cap and ports.

[0005] Again, in all of the burners within the state of the art, the flame crown, where ports are provided, and the caps are commonly produced separately, and then the caps are placed on the flame crown by being mounted thereon. The flame crown is made of aluminum or brass material, while the cap is the enamelled burner component. Since these components are produced by different production methods, distortions and deformities occurring during production adversely affect the burning, causing serious potential problems regarding proper burning, providing the pot placed thereon with homogeneous heat transfer, etc. In our invention, however, the flame crown ring, where ports are provided, and the cap are produced as a single piece.

[0006] Therefore, no distortion occurs between the flame crown and cap, thereby avoiding the above mentioned problems. Moreover, as seen in common applications, the bottom parts of the ports, through which the flame exists, have either flat surface, or inclined surface at a certain angle facing upwards, where cooking pot is provided. However, unlike the existing applications, the port bases in our invention are designed such that they will be inclined downwards at a certain angle. Hence, the route of the flame is increased downwards and a more uniform burning is obtained.

[0007] As explained above, the present invention, totally different from the state of the art, introduces novelties and advantages to the related technical field.

OBJECT OF THE INVENTION

[0008] The object of the invention is to provide a burner with a new cap design to be used as burners in domestic cooking appliances, e.g. cookers, ovens, etc.

[0009] Another object of the invention is to provide a burner having a cap design which can be made of aluminum, brass, glass, porcelain, or ceramic material as a single piece, wherein teflon or ceramic coating method can be applied on brass or aluminum materials.

[0010] Another object of the invention is to provide a burner with high thermal efficiency, thanks to the new cap design thereof.

[0011] In a preferred embodiment of the invention, the cap in said burner can be made of aluminum via injection moulding method, aluminum or brass via hot forging method, or of any one of the materials including glass, porcelain, ceramics, which are resistant to heat and thermal shock, as a single piece, alternatively it can be made of brass or aluminum material, and then applied teflon or ceramic coating thereon for providing thermal resistance, said cap comprising a convex upper surface, a port ring provided with ports through which the flame exits, and a convex lower surface provided with at least two C-shaped cavities radially scattered around its center in order for it to be easily mounted on the base.

[0012] In another preferred embodiment of the invention, at least two ridges provided on the base of the burner and radially scattered around the center thereof are formed such that a certain ridge outer length narrows down to a certain ridge inner length so as to allow it to be engaged in at least two C-shaped cavities in the lower surface of the cap.

[0013] In another preferred embodiment of the invention; a C-shaped cavity with a flat surface is provided in the periphery of the igniter bearing where the igniter is mounted, said cavity being provided in the skirt portion of the base provided in the burner.

[0014] In another preferred embodiment of the invention, the bottom of the ports on the port ring in the lower surface of the cap in said burner is inclined downwards such that the bottom angle (X) will be between 2° and 8° .

[0015] The structural and characteristic features and all advantages of the invention will be understood more clearly with the detailed description written by referring to the following figures; therefore, the evaluation needs to be done by taking these figures and the detailed description into consideration.

DESCRIPTION OF THE FIGURES

[0016]

Fig. 1 is a perspective view of the burner according to the invention,

Fig. 2 is another perspective view of the burner according to the invention,

Fig. 3 is the detailed view showing the igniter and flame holder parts of the burner according to the invention,

Fig. 4 is the front detailed view showing the igniter and flame holder parts of the burner according to the invention,

Fig. 5 is the exploded view of burner with cap according to the invention,

Fig. 6 is the perspective view showing the upper part of the cap according to the invention,

Fig. 7 is the perspective view showing the lower part of the cap according to the invention,

Fig. 8 the top view of the cap according to the invention,

Fig. 9 the top view of the base provided in the burner according to the invention,

Fig. 10 is the perspective view of the base provided in the burner according to the invention,

Fig. 11 is the detailed view of the base provided in the burner according to the invention,

Fig. 12 is the cross-sectional view of the burner according to the invention,

Fig. 13 is another top view of the cap of the burner according to the invention,

Fig. 14 is the cross-sectional view of the cap of the burner according to the invention,

Fig. 15 is the detailed view of the cap of the burner according to the invention.

REFERENCE NUMERALS

[0017]

1. Burner

1.1. Pool

1.1.1. Gas inlet

1.2. Base

1.2.1. Igniter bearing

1.2.2. Flame holder bearing

1.2.3. Ridge

1.2.3.1. Ridge (1.2.3) outer length

1.2.3.2. Ridge (1.2.3) inner length

1.2.4. Circular channel

1.2.5. Skirt portion

1.2.5.1. C-shaped cavity with flat surface

1.3. Cap

1.3.1. Lower surface

1.3.2. Upper surface

1.3.3. Port ring

1.3.3.1. Ports

1.3.3.1.1. Ports' (1.3.3.1) bottom

X. bottom angle

1.3.4. C-shaped cavity

1.3.4.1. Cavity outer length

1.3.4.2. Cavity inner length

1.4. Igniter

1.4.1. Spark

1.5. Flame holder

1.6. Injector

[0018] The details that are not given in figures may have been neglected. Furthermore, the components which are at least substantially identical or have at least substantially identical functions are indicated with the same number.

DETAILED DESCRIPTION OF THE INVENTION

[0019] Now, the invention will be explained in more detail with reference to the attached figures.

[0020] Figs. 1 and 2 are perspective views of the burner according to the invention; Fig. 3 is the detailed view of the burner (1) according to the invention showing igniter (1.4) and flame holder (1.5) sections thereof; Fig. 4 is the front detailed view of the burner (1) according to the invention showing igniter (1.4) and flame holder (1.5) sections thereof; Fig. 5 is the exploded view of the burner (1) according to the invention; Fig. 6 is the perspective view showing the upper part of the cap (1.3) in the burner (1) according to the invention; Fig. 7 is the perspective view showing the lower part of the cap (1.3) in the burner (1) according to the invention; Figs. 8 and 13 are the top views of the cap (1.3) in the burner (1) according to the invention; Fig. 9 is the top view of the base (1.2) provided in the burner (1) according to the invention; Fig. 10 is the perspective view of the base (1.2) provided in the burner (1) according to the invention; Fig. 11 is the detailed view of the base (1.2) provided in the burner (1) according to the invention; Fig. 12 is the cross-sectional view of the burner (1) according to the invention; Fig. 14 is the cross-sectional view of the cap (1.3) provided in the burner (1) according to the invention; and Fig. 15 is the detailed view of the cap (1.3) provided in the burner (1) according to the invention.

[0021] As seen in Figs. 1, 2, 3, 4, and 5, the burner (1) consists of a pool (1.1), a base (1.2) and a cap (1.3). In the burner (1) according to the invention, said cap (1.3) can be made of aluminum via injection moulding method, brass via hot forging method, or of any one of the materials including glass, porcelain, ceramics, which are resistant to heat and thermal shock, as a single piece, alternatively it can be made of brass or aluminum material, and then applied teflon or ceramic coating thereon for providing thermal resistance and for obtaining different

colors, said cap comprising a convex upper surface (1.3.2), at least two C-shaped cavities (1.3.4) radially scattered around its center in order for it to be easily mounted on said base (1.2), and a convex lower surface (1.3.1) provided with a port ring (1.3.3) having the ports (1.3.3.1) through which the flame exists. The pool (1.1) is mounted on the griddle and is provided thereon with an injector (1.6), a flame holder (1.5) and an igniter (1.4). The base (1.2) is positioned on said pool (1.1). This positioning is provided due to the fact that the vertical ridges are mounted on the walls of the pool (1.1), in the lower part of said base (1.2). Finally, the cap (1.3) is positioned on said base (1.2). As seen in detailed views of the burner (1) given in Figs. 4 and 5, the igniter (1.4) is positioned close to the port ring (1.3.3). Thus, first burning is achieved by emitting sparks (1.4.1) to the ports (1.3.3.1) provided on the port ring (1.3.3) at certain intervals, and then burning takes place in all ports of the burner (1) due to flame switch to the consecutive ports. Here, the igniter (1.4) emits spark (1.4.1) towards the ports at certain intervals in a horizontal manner, and thus burning is achieved easily.

[0022] As seen in Fig. 6, the upper surface (1.3.2) of the cap (1.3) according to the invention is designed in convex form. Thus, thermal efficiency of the burner (1) has been increased by making the burner (1) closer to the cooking pot, e.g. pan, sauce pan, etc., put thereon. Provided on the lower surface (1.3.1) of the cap (1.3) according to the invention seen in Fig. 7 is a port ring (1.3.3) on which the ports (1.3.3.1), through which the flame exits, are provided, as well as at least two C-shaped cavities (1.3.4) radially scattered around its center in order for it to be easily mounted on the base (1.2). Said at least two C-shaped cavities (1.3.4) are located in at least two ridges (1.2.3) provided on the base (1.2) seen in Fig. 10. At least two ridges (1.2.3) provided on said base (1.2) and radially scattered around the center thereof are formed such that a certain ridge outer length (1.2.3.1) is widened to a certain ridge inner length (1.2.3.2) towards the burner (1) center, so as to allow it to be engaged in at least two C-shaped cavities (1.3.4) provided on the cap (1.3). Therefore, in order for at least two C-shaped cavities (1.3.4) on the cap (1.3) to fit in at least two ridges (1.2.3) radially scattered around the center of the base (1.2), it is designed such that it will be widened to a certain cavity inner length (1.3.4.2) from a certain cavity outer length (1.3.4.1) towards the cap (1.3) center. Thus, the cap (1.3) can be readily positioned on the base (1.2). As seen in the detailed view of the base (1.2) in the burner (1) given in Fig. 11, the skirt portion (1.2.5) is provided with an igniter bearing (1.2.1) and a flame holder bearing (1.2.2). Through one of these bearings passes the igniter (1.4) emitting spark (1.4.1) at certain intervals within the burner (1), while the flame holder (1.5) enabling flame hold by sensing the heat after burning process passes through the other. C-shaped cavity (1.2.5.1) with flat surface is designed in the periphery of said igniter bearing (1.2.1).

[0023] Fig. 12 shows the cross-sectional view of the burner (1) when the base (1.2) is mounted on the pool (1.1) and the cap (1.3) according to the invention is mounted on the base (1.2). The route of the gas in said burner (1) is tried to be described with vectors. The gas coming from gas inlet (1.1.1) passes through the injector (1.6), thereby passing through the circular channel (1.2.4) of the base (1.2) with venturi effect. Having passed through the circular channel (1.2.4), the gas reaches to ports (1.3.3.1) by hitting the lower surface (1.3.1) of the cap (1.3) in the burner (1) according to the invention. Here, the lower surface (1.3.1) of the cap (1.3) is also designed in convex form in order to facilitate distribution of the gas to the ports (1.3.3.1) by hitting the lower surface (1.3.1) of the cap (1.3). Fig. 13 is the top view of the cap (1.3) in the burner (1) according to the invention. Fig. 14 is A-A cross-sectional view of the cap (1.3) according to the invention. As seen in cross-sectional view, both of the lower surface (1.3.1) and the upper surface (1.3.2) of the cap (1.3) are designed in convex form. Fig. 15, on the other hand, gives B detail view obtained from the cross-sectional view of the cap (1.3) in Fig. 14. As seen here, ports' (1.3.3.1) bottom (1.3.3.1.1) provided in the lower surface (1.3.1) of the cap (1.3) according to the invention is designed such that the bottom angle (X) will be inclined downwards at a certain angle. This bottom angle (X) may preferably have a value between 2° and 8° . Here, due to the fact that the upper surface of the cap has a convex form, and thanks to the new port design, 65-70% thermal efficiency is achieved, which is quite good when it comes to burners.

[0024] The invention is suitable for use in small burners, middle burners, big burners, and turbo burners, all of which have different power (kW) values, provided in any domestic cooker or oven. Moreover, different production methods performed without drifting away the design provided by the present invention and the use of coating techniques and materials with different colors and characteristics do not mean exceeding the scope of the invention.

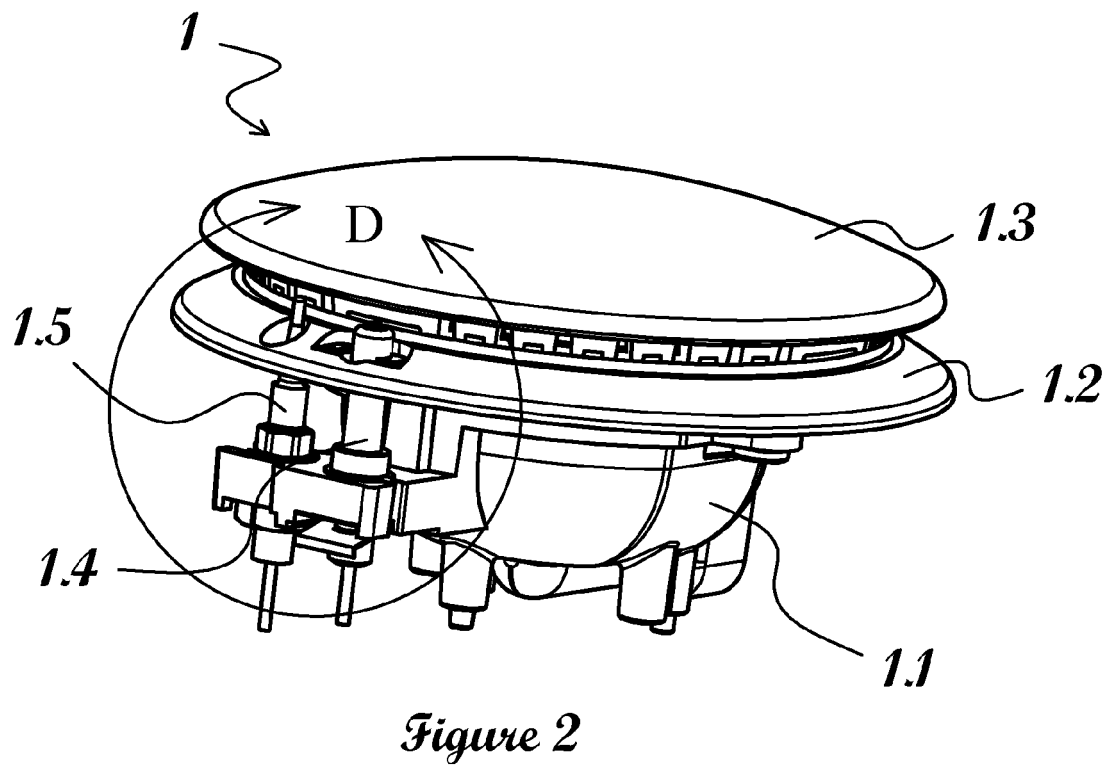
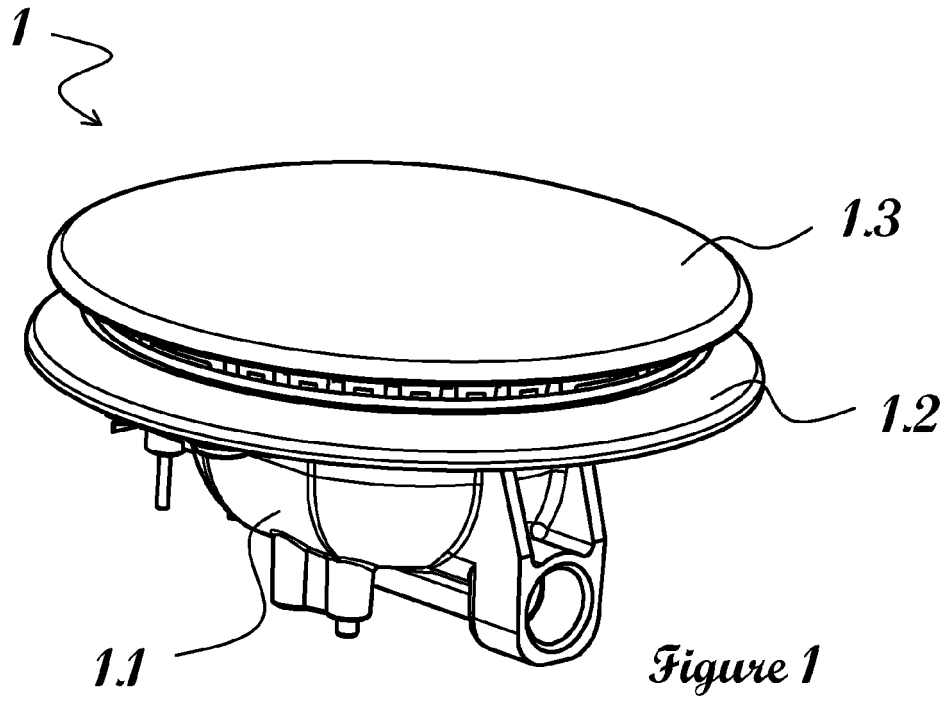
Claims

1. A burner (1) which is used in domestic cooking appliances, e.g. cookers, ovens, etc., and which consists of a pool (1.1), a base (1.2) and a cap (1.3); **characterized in that** said cap (1.3) can be made of aluminum via injection moulding method, brass via hot forging method, or of any one of the materials including glass, porcelain, ceramics, which are resistant to heat and thermal shock, as a single piece, alternatively it can be made of brass or aluminum material, and then applied teflon or ceramic coating thereon for providing thermal resistance and for obtaining different colors, wherein it comprises:

> convex upper surface (1.3.2),

> at least two C-shaped cavities (1.3.4) radially scattered around its center in order for it to be easily mounted on said base (1.2) and a convex lower surface (1.3.1) provided with a port ring (1.3.3) having the ports (1.3.3.1), through which the flame exists.

2. A burner (1) according to Claim 1; **characterized in that** at least two ridges (1.2.3) provided on said base (1.2) and radially scattered around the center thereof are formed such that a certain ridge outer length (1.2.3.1) is widened to a certain ridge inner length (1.2.3.2) towards the burner (1) center, so as to allow it to be engaged in at least two C-shaped cavities (1.3.4) provided in the lower surface (1.3.1) of the cap (1.3).
3. A burner (1) according to Claim 1; **characterized in that** C-shaped cavity (1.2.5.1) with flat surface is provided in the periphery of the igniter bearing (1.2.1), where the igniter (1.4) is mounted, said cavity being positioned in the skirt portion (1.2.5) of said base (1.2).
4. A burner (1) according to Claim 1; **characterized in that** the bottom (1.3.3.1.1) of the ports (1.3.3.1) on the port ring (1.3.3) in the lower surface of said cap (1.3) is inclined downwards such that the bottom angle (X) will be between 2° and 8° .



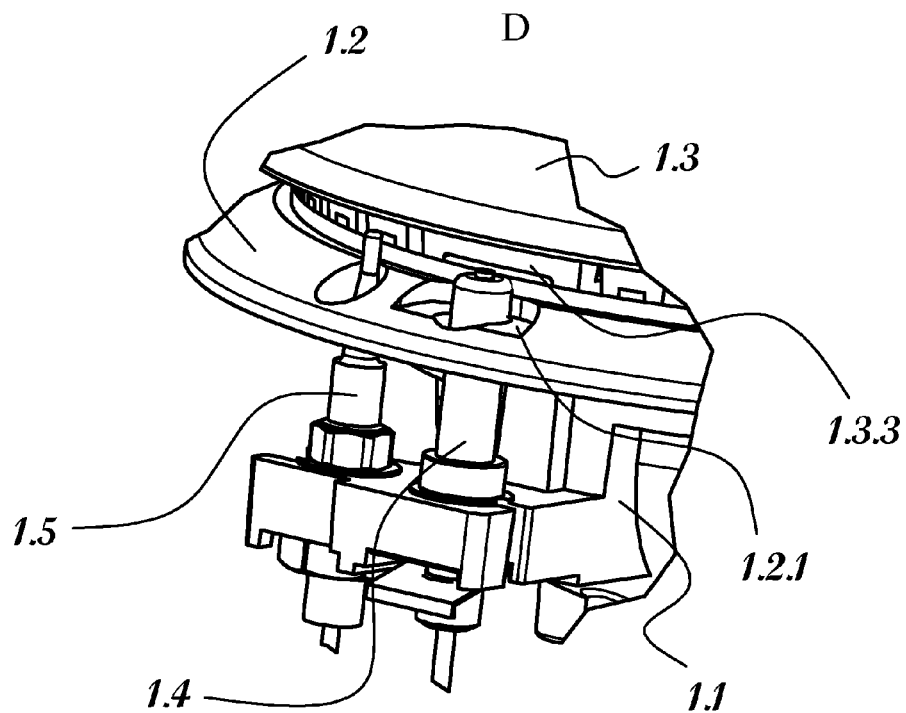


Figure 3

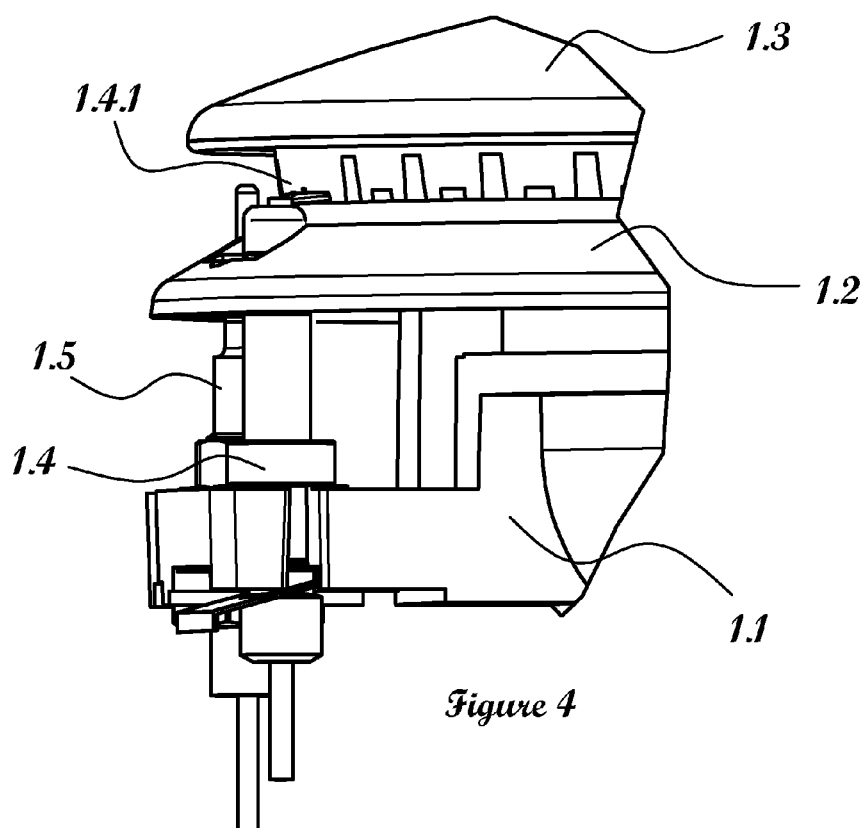


Figure 4

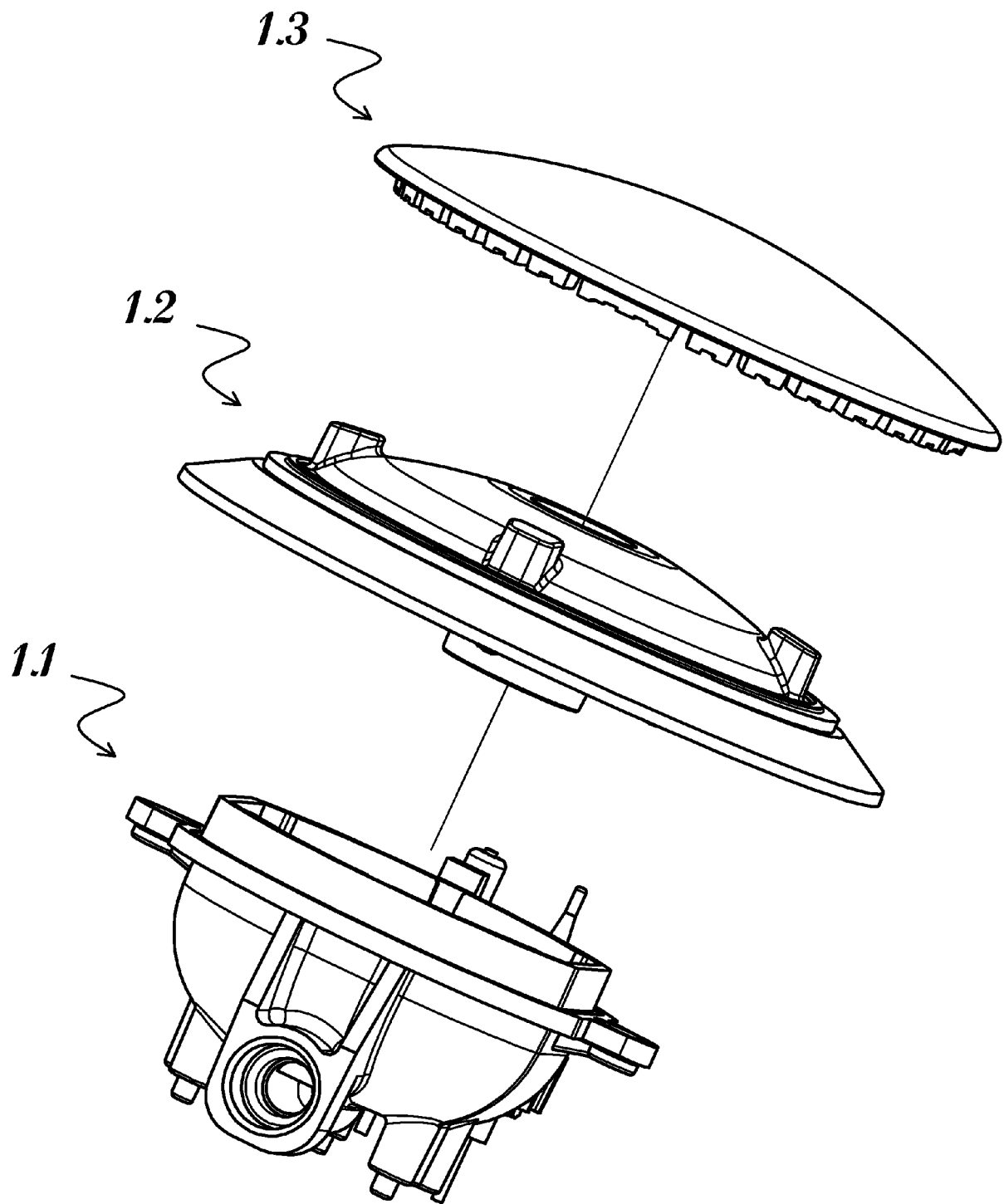
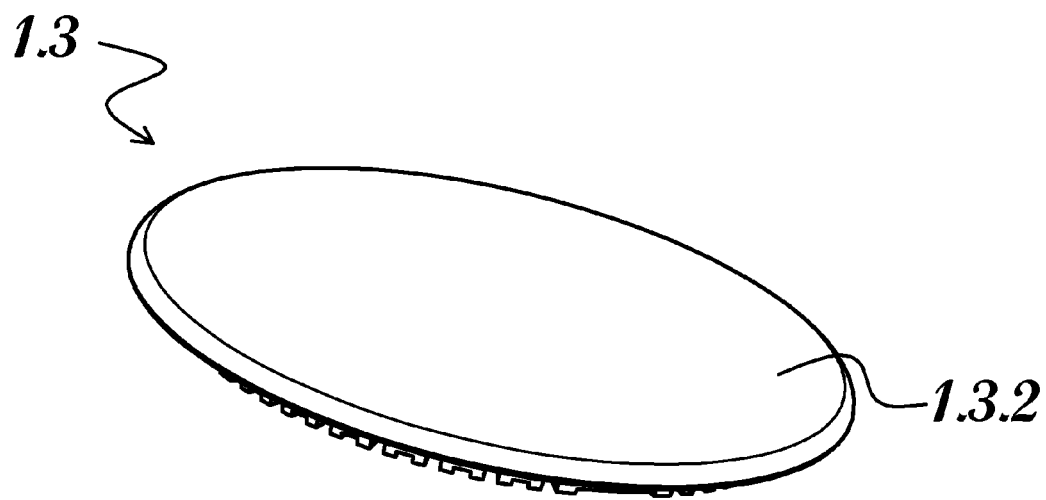


Figure 5



Sekil 6

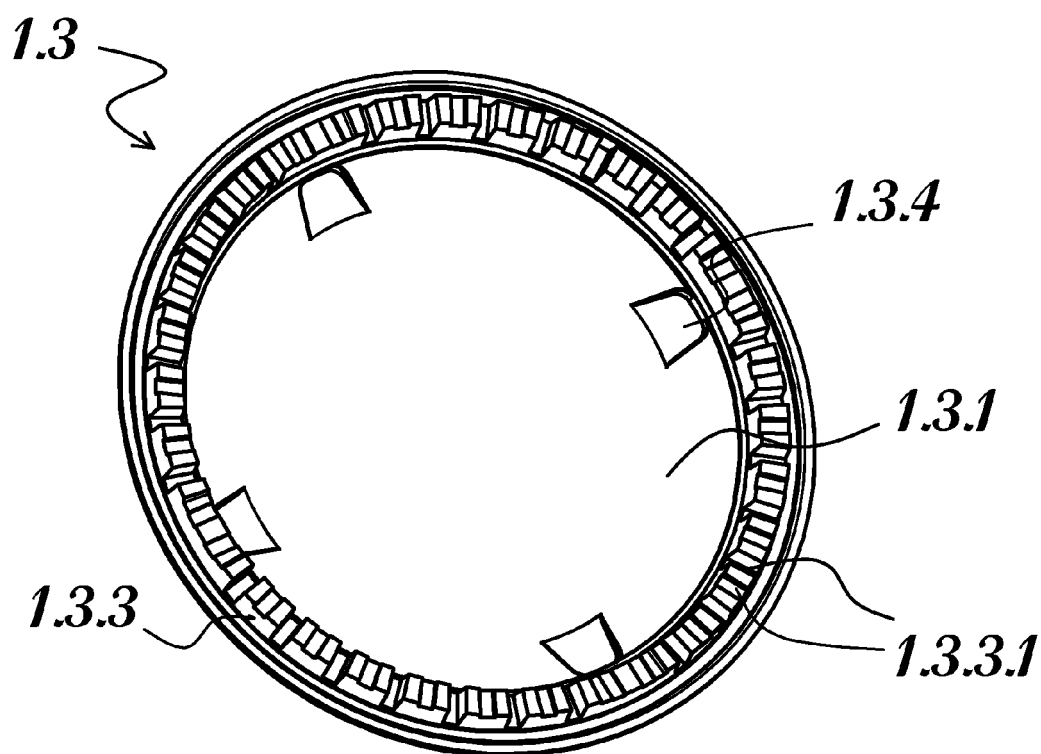


Figure 7

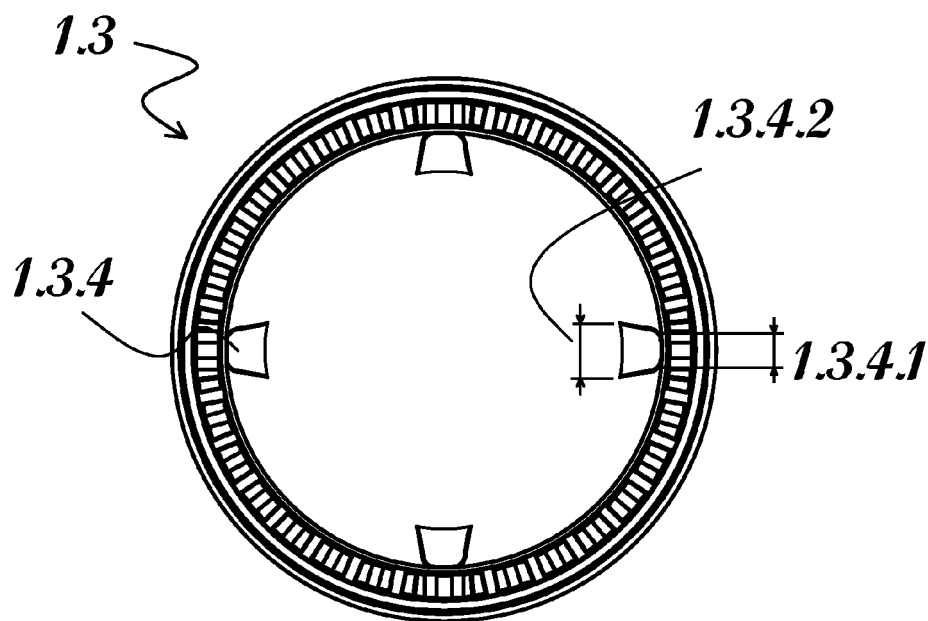


Figure 8

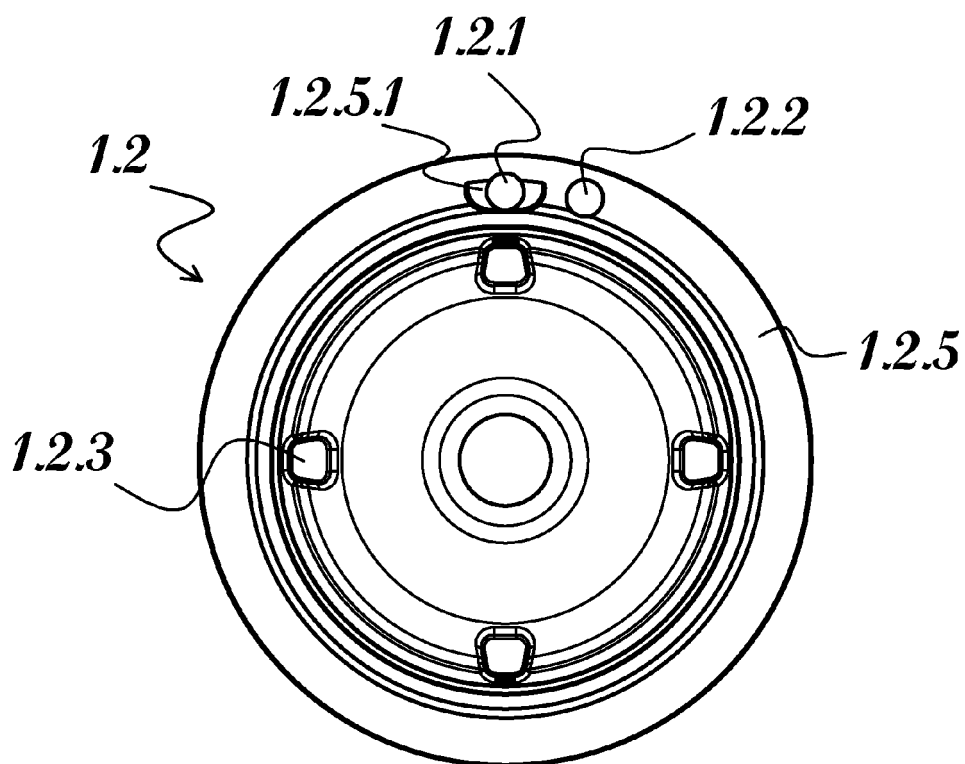


Figure 9

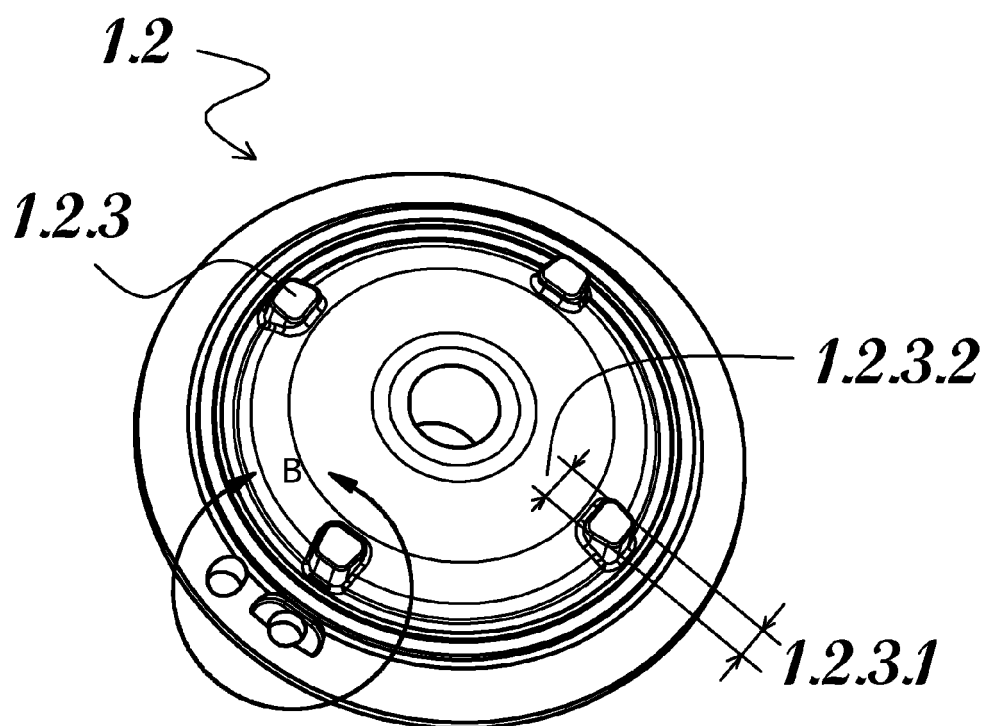


Figure 10

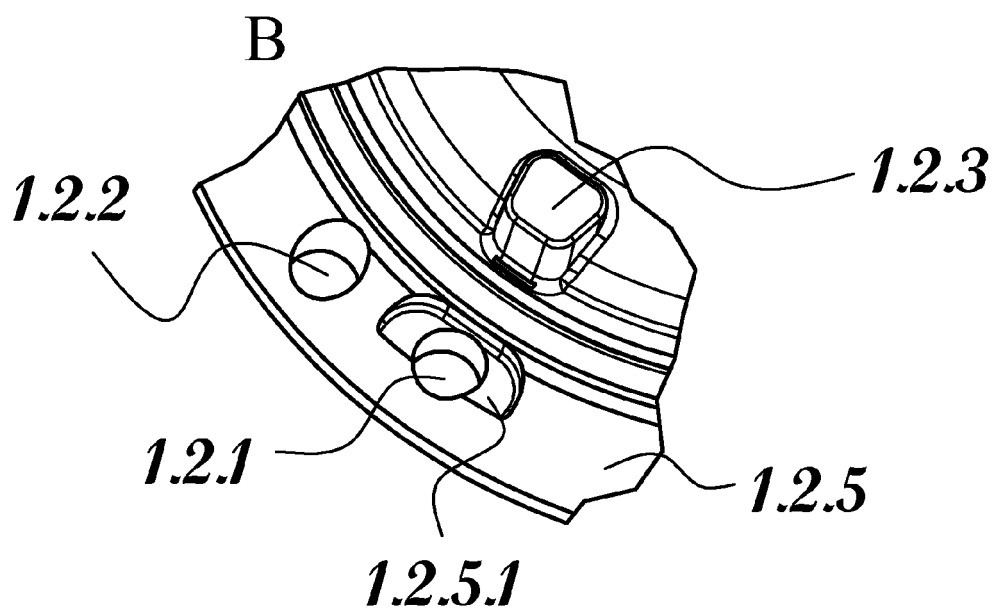


Figure 11

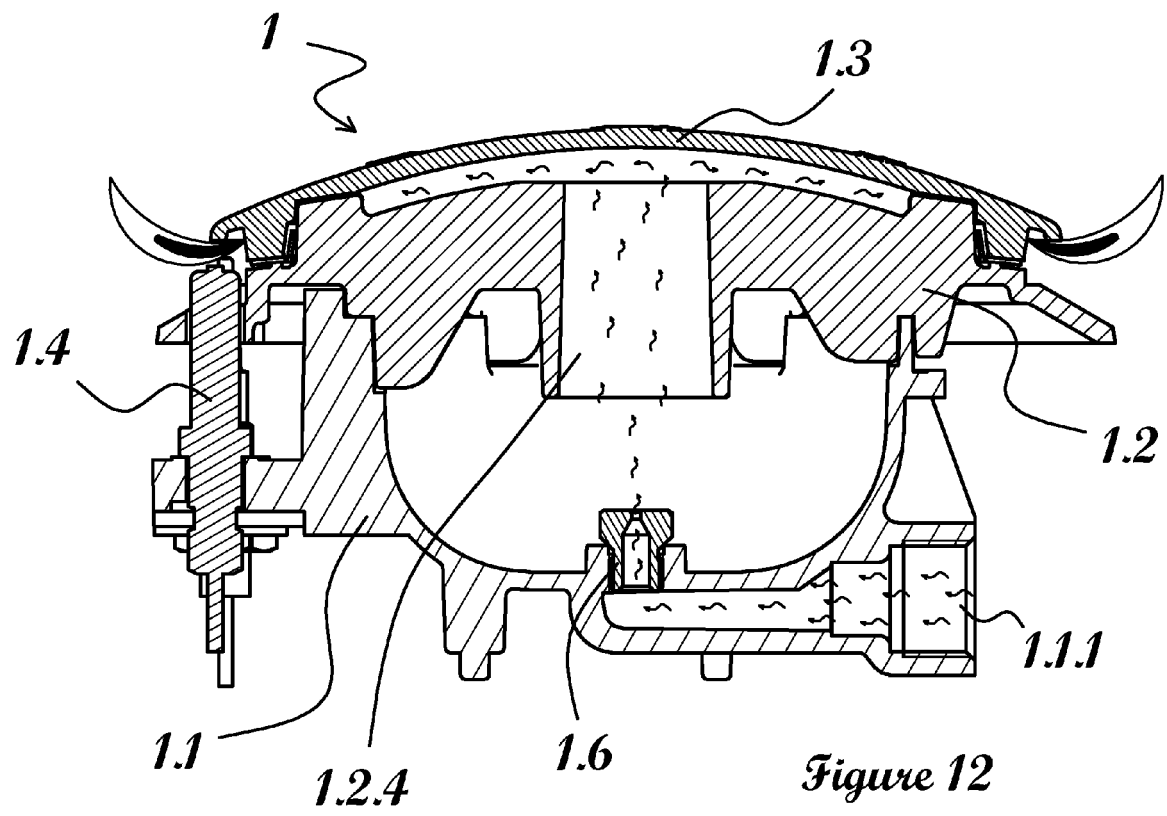


Figure 12

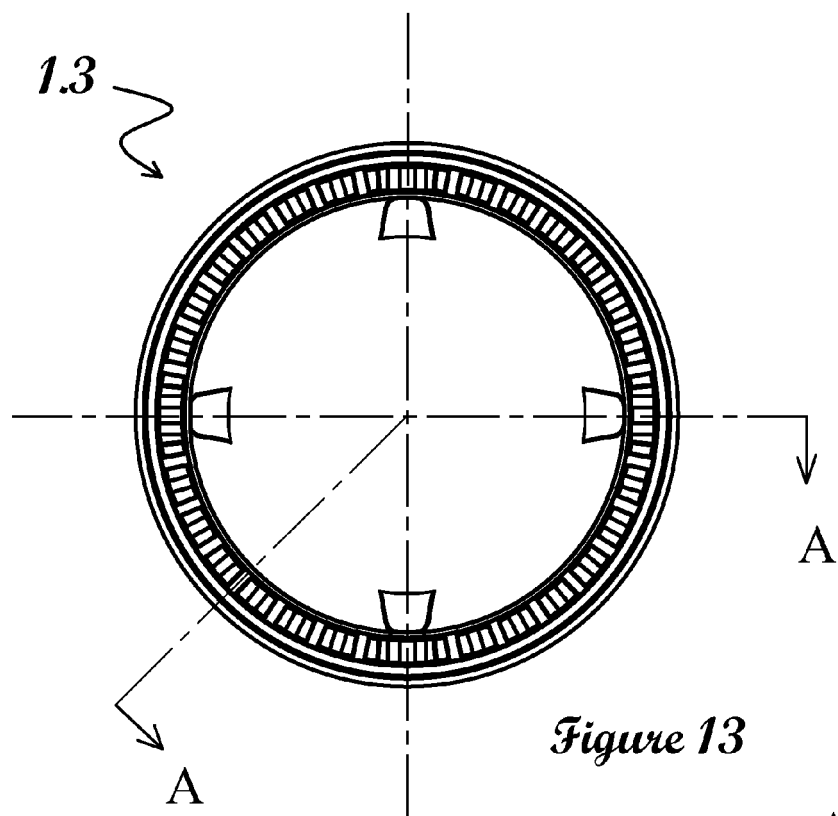


Figure 13

A-A

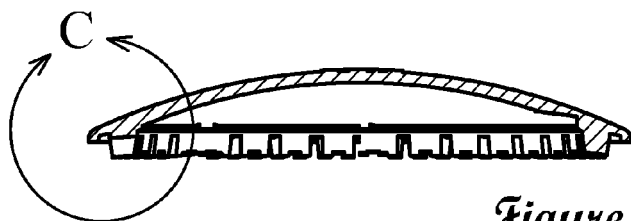


Figure 14

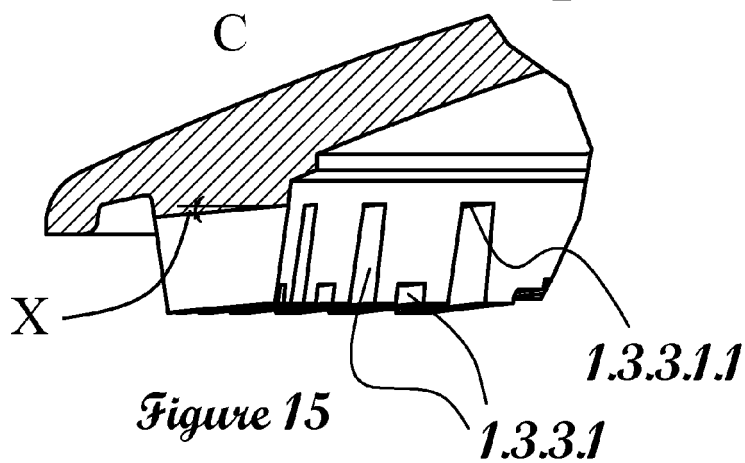


Figure 15



EUROPEAN SEARCH REPORT

Application Number
EP 13 16 4653

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	US 5 924 860 A (MASSEY DALE [US] ET AL) 20 July 1999 (1999-07-20)	1	INV. F23D14/06
Y	* the whole document *	2-4	
X	US 6 146 132 A (HARNEIT UWE [US]) 14 November 2000 (2000-11-14)	1,3,4	
Y	TR 2011 10814 A2 (TURAS GAZ ARMATUERLERI SAN VE TIC A S [TR]) 22 August 2012 (2012-08-22)	2	
A	-& EP 2 587 144 A2 (TURAS GAZ ARMATUERLERI SANAYI VE TICARET A S [TR]) 1 May 2013 (2013-05-01) * paragraphs [0001], [0025], [0026] * * figures 2, 3, 5c, 6a, 13 *	3	
Y	US 5 468 145 A (FERLIN WILLIAM J [US]) 21 November 1995 (1995-11-21)	3	
Y	JP S60 11012 A (MATSUSHITA ELECTRIC WORKS LTD) 21 January 1985 (1985-01-21)	4	TECHNICAL FIELDS SEARCHED (IPC)
A	* the whole document *	1	F23D
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 29 November 2013	Examiner Vogl, Paul
CATEGORY OF CITED DOCUMENTS		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	
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			

1
EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 13 16 4653

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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29-11-2013

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5924860	A	20-07-1999	NONE	
US 6146132	A	14-11-2000	NONE	
TR 201110814	A2	22-08-2012	EP 2587144 A2 TR 201110814 A2	01-05-2013 22-08-2012
EP 2587144	A2	01-05-2013	EP 2587144 A2 TR 201110814 A2	01-05-2013 22-08-2012
US 5468145	A	21-11-1995	NONE	
JP S6011012	A	21-01-1985	JP S6011012 A JP S6338605 B2	21-01-1985 01-08-1988

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- WO 2004102072 A [0003]
- EP 1703203 A [0004]