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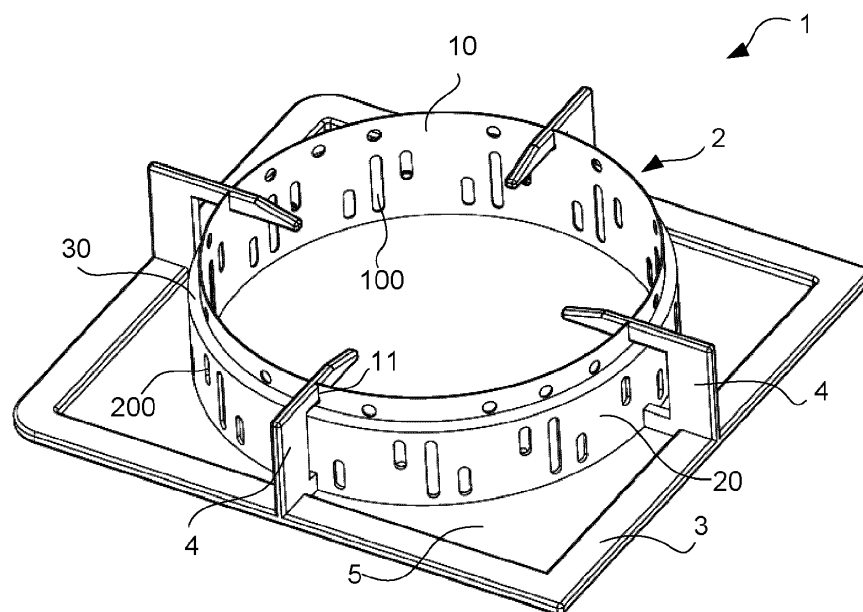
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(54) **ENERGY GATHERING CAP FOR GAS COOKTOP, PAN SUPPORT FOR GAS COOKTOP, AND GAS COOKTOP**

(57) This application relates to an energy gathering cap for a gas cooktop, a pan support for a gas cooktop, and a gas cooktop. The energy gathering cap (2) for a gas cooktop includes an inner ring (10) and an outer ring (20), where the outer ring (20) is disposed around the inner ring (10), the outer ring (20) and the inner ring (10) are separated from each other to form a space (S), the inner ring (10) is provided with a plurality of first holes

(100), the outer ring (20) is provided with a plurality of second holes (200), and a projection of the second hole (200) on the inner ring (10) along a horizontal direction does not overlap with the first hole (100). In this application, the energy gathering cap for a gas cooktop can not only supply sufficient secondary air for burning of gas from a burner, but also prevent lateral wind from affecting a burning flame.

**FIG. 3**

Description

BACKGROUND

Technical Field

[0001] This application relates to the field of gas cooktops, and in particular, to an energy gathering cap for a gas cooktop, a pan support including the energy gathering cap, and a gas cooktop including the pan support, where the energy gathering cap for a gas cooktop includes an inner ring and an outer ring.

Related Art

[0002] An ordinary pan support for a gas cooktop has many disadvantages. For example, quite a lot of burning heat is radiated to the outside and is not utilized. This makes it difficult to improve thermal efficiency. The radiated heat causes the knob temperature to be excessively high, consequently leading to a scald accident. During burning, a flame is easily affected by wind and consequently is easily to be extinguished or lifted.

[0003] In recent years, some solutions using energy gathering caps are put forward, and resolve the foregoing technical problems to some extent. However, existing energy gathering caps still have some problems. For example, sealing performance of an energy gathering cap is excessively high and secondary air is insufficiently supplied. Consequently, gas is incompletely burned and a large amount of carbon monoxide is generated. For another example, an opening for supplying secondary air is directly provided in the energy gathering cap. Wind can pass through the opening and affect burning of a flame. This easily causes the flame to shake or to be accidentally extinguished. In addition, the existing energy gathering caps cannot resolve an overflowing problem of pans. Overflows easily stain a burner and an energy gathering cap, and are not easy to clean.

SUMMARY

[0004] An objective of this application is to provide, for at least one of the foregoing technical problems, an improved energy gathering cap for a gas cooktop, a pan support including the energy gathering cap, and a gas cooktop including the pan support.

[0005] To achieve the foregoing technical objective, this application provides the following technical solution: an energy gathering cap for a gas cooktop, including an inner ring and an outer ring, where the outer ring is disposed around the inner ring, and the outer ring and the inner ring are separated from each other to form a space, the inner ring is provided with a plurality of first holes, the outer ring is provided with a plurality of second holes, and a projection of the second hole on the inner ring along a horizontal direction does not overlap with the first hole.

[0006] Compared with an existing energy gathering

cap using a single ring, the energy gathering cap in this application having the inner ring and the outer ring has a better energy gathering effect. The inner ring and the outer ring are separated from each other to form a space that can accommodate air. Air has a quite small coefficient of thermal conductivity and therefore can better prevent heat of burning from being transferred to the outside. In addition, the inner ring is provided with the plurality of first holes, and the outer ring is provided with the plurality of second holes. Compared with inletting air from below the energy gathering cap, this solution can inlet more air from around the energy gathering cap to a burning area, to supply sufficient secondary air for burning of gas. Moreover, design of the holes on the inner ring and the outer ring, that is, that the projection of the second hole on the inner ring along the horizontal direction does not overlap with the first hole, prevents wind from directly passing through the inner ring and the outer ring and affecting burning of a flame. This design is not only wind-proof, but also enables the energy gathering cap to reflect back heat of the burning flame radiated toward the outside. This reduces an energy loss during burning and improves thermal efficiency of the gas cooktop.

[0007] The energy gathering cap may be made of a metal material. The inner ring and the outer ring may be integrally formed, or may be separately manufactured and subsequently connected to each other. For example, a hole may be first punched in a stainless steel plate, then blanking and beading are performed, and finally the inner ring and the outer ring are formed by welding.

[0008] It should be noted that, the second hole inevitably extends along a longitudinal direction of the outer ring to some extent. The "horizontal direction" in this application should be understood as a direction perpendicular to a direction of the gravity. Therefore, that the projection of the second hole along the horizontal direction should be understood as: light extending perpendicular to the direction of the gravity passes through the second hole and projects the shape of the second hole on a plane. The shape of the first hole and the shape of the second hole are not limited, and circular, square, oblong, or slot-shaped holes are all feasible. The inner ring may be or may not be parallel to the outer ring. The shape of the inner ring may be similar to that of the outer ring. For example, both the inner ring and the outer ring are circular rings. It is also feasible that the shape of the inner ring is different from that of the outer ring. For example, the inner ring is a circular ring and the outer ring is a square ring.

[0009] In a possible implementation, the inner ring and the outer ring are concentric circular rings, and a projection of the second hole on the inner ring along a radial direction of the outer ring does not overlap with the first hole.

[0010] In a possible implementation, the energy gathering cap for a gas cooktop further includes a top sealing portion sealing the space from a top portion of the space. In this way, overflows can be prevented from falling be-

tween the inner ring and the outer ring to be difficult to clean. The inner ring, the outer ring, and the top sealing portion may form an integral member. This not only facilitates manufacturing, but also facilitates gripping and placement by a user.

[0011] To prevent the burning flame from shaking or being extinguished because wind blowing aslant directly passes through the first hole on the inner ring after entering the second hole, in a possible implementation, a protruding edge extending toward the inner ring along the horizontal direction is formed at an edge of the second hole. In this way, guided by the protruding edge, airflow entering from the second hole can only flow from the second hole toward the inner ring along the horizontal direction. The airflow is blocked by the inner ring when flowing along the horizontal direction, and consequently, the airflow cannot directly pass through the inner ring. The airflow whose flowing direction has been changed and on which buffering has been performed does not cause the burning flame to be lifted or be extinguished, and further supplies sufficient secondary air for burning of gas.

[0012] This application further provides a pan support for a gas cooktop. The energy gathering cap for a gas cooktop described above is detachably or fixedly disposed on the pan support for a gas cooktop. The energy gathering cap can be detachably disposed on the pan support by using many solutions, for example, a manner such as magnetic suction, threaded connection, hook hanging, or notch engagement. One of the solutions is that the pan support includes a bottom frame and a plurality of support legs, and at least one support leg is detachably mounted on the bottom frame by using screw threads. A top end of the energy gathering cap is provided with notches respectively matching the support legs. After the energy gathering cap is placed in position, the at least one support leg is mounted. In this way, when cleaning the pan support, a user can detach the energy gathering cap, so that it is convenient for the user to clean and tidy the pan support. In addition, the user may choose to mount or detach the energy gathering cap based on an actual requirement, and this satisfies different choices of the user. If the energy gathering cap is fixedly disposed on the pan support, an integral part is formed by the energy gathering cap and the pan support, thereby improving integrity of exposed parts of the gas cooktop.

[0013] In a possible implementation, the inner ring is higher than the outer ring, or the outer ring is higher than the inner ring. In this way, a higher inner ring or outer ring can prevent overflow liquid. When cookware is placed on the pan support, regardless of a pan or an arc-bottomed pan, the higher inner ring or outer ring is in close contact with the bottom of the pan. Overflow liquid from the pan flows along an outer wall of the bottom of the pan to the higher inner ring or outer ring and flows along the higher inner ring or outer ring to the below. Therefore, the overflow liquid does not contaminate a burner located at an inner part of the pan support.

[0014] In a possible implementation, the pan support for a gas cooktop includes a bottom frame located at an outer side of the energy gathering cap, a plurality of support legs used to support a cooking appliance and fixed on the bottom frame, and a liquid filling portion located between the bottom frame and the energy gathering cap, where the liquid filling portion extends from an inner edge of the bottom frame to a bottom side of the outer ring, and is connected to the inner edge of the bottom frame and the bottom side of the outer ring in a sealing manner. Therefore, the pan support has functions of supporting the cooking appliance, preventing wind, gathering energy, and filling liquid. Overflow liquid flows along the outer ring of the energy gathering cap into the liquid filling portion. Therefore, the overflow liquid can be collected and temporarily stored, and it is also convenient for a user to perform cleaning.

[0015] In a possible implementation, the liquid filling portion is integrally formed on the bottom frame. In this way, it is convenient to manufacture and the bottom frame and the liquid filling portion can be formed by using a casting process.

[0016] In a possible implementation, a top end of the support leg is flush with a top end of the energy gathering cap. In this way, after cookware is placed on the pan support, a top end of the inner ring or the outer ring of the energy gathering cap is in close contact with the bottom of the pan. Therefore, the energy gathering cap can resolve a problem of contamination caused by overflow liquid. Certainly, to match arc-bottomed cookware, a top surface aslant extending downward is formed on a part of the support leg that is located at an inner side of the energy gathering cap.

[0017] In a possible implementation, a top portion of the energy gathering cap is provided with notches corresponding to the support legs, and the support legs are engaged in the notches. In this way, the energy gathering cap is located or fixed at a corresponding position of the pan support.

[0018] Finally, this application provides a gas cooktop. The gas cooktop includes the pan support for a gas cooktop according to any one of the above implementations.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019]

FIG. 1 is a three-dimensional diagram of an energy gathering cap for a gas cooktop according to an embodiment of this application;

FIG. 2 is a local sectional view of an energy gathering cap for a gas cooktop according to an embodiment of this application; and

FIG. 3 is a three-dimensional diagram of a pan support for a gas cooktop according to an embodiment of this application.

List of Reference Numerals:

[0020] 1: Pan support; 2: Energy gathering cap; 3: Bottom frame; 4: Support leg; 5: Liquid filling portion; 10: Inner ring; 11: Notch; 20: Outer ring; 30: Top sealing portion; 100: First hole; 200: Second hole; 201: Protruding edge; and S: Space.

DETAILED DESCRIPTION

[0021] To further understand the objective, constructions, features, and functions of this application, descriptions are provided in detail with reference to embodiments as follows.

[0022] Referring to FIG. 1, FIG. 1 is a three-dimensional diagram of an energy gathering cap for a gas cooktop according to an embodiment of this application. The energy gathering cap 2 for a gas cooktop includes an inner ring 10 and an outer ring 20, and the outer ring 20 is disposed around the inner ring 10. In this embodiment, the inner ring 10 and the outer ring 20 are concentric circular rings.

[0023] The outer ring 20 and the inner ring 10 are separated from each other to form a space S. The energy gathering cap 2 further includes a top sealing portion 30 sealing the space S from a top portion of the space S.

[0024] The inner ring 10 is provided with a plurality of first holes 100, the outer ring 20 is provided with a plurality of second holes 200, and a projection of the second hole 200 on the inner ring 10 along a horizontal direction does not overlap with the first hole 100. In this embodiment, in other words, a projection of the second hole 200 on the inner ring 10 along a radial direction of the outer ring 20 does not overlap with the first hole 100. Therefore, the first hole 100 and the second hole 200 can not only allow airflow to pass through to supply sufficient secondary air for burning of gas from a burner located at an inner side of the energy gathering cap 2, but also prevent lateral wind from directly passing through the outer ring 20 and the inner ring 10 and affecting a burning flame.

[0025] As shown in FIG. 2, FIG. 2 is a local sectional view of an energy gathering cap for a gas cooktop according to an embodiment of this application. In this embodiment, a protruding edge 201 extending toward an inner ring 10 along a horizontal direction is formed at an edge of a second hole 200. In this way, airflow entering from the second hole 200 can only flow inward along the horizontal direction. A projection of the second hole 200 on the inner ring 10 along the horizontal direction does not overlap with a first hole 100, and the airflow passing through the second hole 200 is inevitably blocked by the inner ring 10 when flowing along the horizontal direction, so that the airflow needs to change a flowing direction. After the airflow whose flowing direction has been changed enters an inner side of the energy gathering cap 2, the airflow can supply secondary air for burning of gas from a burner but cannot cause much impact on the burning flame. Therefore, flame lifting and accidental extin-

guishment cannot be caused.

[0026] In this embodiment, an integral member is formed by the energy gathering cap 2, so that the energy gathering cap 2 can be detachably mounted on a pan support, and a user can mount or detach the energy gathering cap based on a requirement of the user. Certainly, the energy gathering cap may alternatively be fixedly disposed on the pan support. Such a pan support is described as follows.

[0027] As shown in FIG. 3, FIG. 3 is a three-dimensional diagram of a pan support for a gas cooktop according to an embodiment of this application. An energy gathering cap 2 is fixedly disposed on the pan support 1 for a gas cooktop. The pan support 1 includes a bottom frame 3 located at an outer side of the energy gathering cap 2, a plurality of support legs 4 used to support a cooking appliance and fixed on the bottom frame 3, and a liquid filling portion 5 located between the bottom frame 3 and the energy gathering cap 2. For a structure of the energy gathering cap 2, refer to the foregoing description. The liquid filling portion 5 extends from an inner edge of the bottom frame 3 to a bottom side of the outer ring 20, and is connected to the inner edge of the bottom frame 3 and the bottom side of the outer ring 20 in a sealing manner. The liquid filling portion 5 is concave relative to the bottom frame 3. During actual manufacturing, the bottom frame 3 and the liquid filling portion 5 may be formed by using a casting process, that is, the liquid filling portion 5 may be integrally formed on the bottom frame 3. The energy gathering cap 2 is then placed at a corresponding position of the pan support 1, and the bottom side of the outer ring 20 is welded with the liquid filling portion 5.

[0028] In this embodiment, the outer ring 20 and an inner ring 10 are separated from each other to form a space S, and a top sealing portion 30 seals the space S from a top portion of the space S. A top portion of the energy gathering cap 2 is provided with notches 11 corresponding to the support legs 4. In this embodiment, the inner ring 10 is higher than the outer ring 20, the notches 11 are formed on the inner ring 10, and four support legs 4 are engaged in the notches 11, so that a top end of the support leg is flush with a top end of the energy gathering cap 2. That is, the top end of the support leg 4 is flush with a top end of the inner ring 10. In this embodiment, the pan support can further resolve a problem of contamination caused by overflow liquid. When cookware is placed on the pan support 1, the top end of the support leg 4 is flush with the top end of the energy gathering cap 2, and the top end of the inner ring 10 is in close contact with the bottom of the pan. Liquid or solid overflowing from the cookware flows along a part of the inner ring higher than the outer ring 20 and the top sealing portion 30 to an outer surface of the outer ring 20, and flows on the outer surface of the outer ring 20 into the liquid filling portion 5. It can be learned that the overflow liquid or solid does not reach an inner part of the energy gathering cap 2 and contaminate a burner.

[0029] Certainly, to enable the top portion of the energy

gathering cap to be in close contact with a bottom surface of the pan all the time, and to be also applicable to arc-bottomed cookware, an inclined top surface (not shown) is formed on a part of the support leg 4 that is located at an inner side of the inner ring 10. An angle of inclination may be selected based on an actual requirement. Certainly, in an embodiment, it is also feasible that the outer ring 20 of the energy gathering cap 2 is higher than the inner ring 10. The top end of the support leg 4 is flush with a top end of the outer ring 20. When cookware is placed on the pan support 1, the top end of the outer ring 20 is in close contact with the bottom of the pan. Liquid or solid overflowing from the cookware flows on the outer surface of the outer ring 20 into the liquid filling portion 5. In this embodiment, for the arc-bottomed cookware, to resolve the problem of contamination caused by overflow liquid, an inclined top surface is formed on a part of the support leg 4 that is located at an inner side of the outer ring 20.

[0030] Finally, this application further provides a gas cooktop. The gas cooktop includes the pan support for a gas cooktop according to any one of the above embodiments.

[0031] The embodiments of single parts described with reference to FIG. 1 to FIG. 3 may be combined with each other in any given manner to achieve advantages of this application.

[0032] This application is already described by using the foregoing related embodiments; however, the foregoing embodiments are merely examples for implementing this application. It should be noted that, the disclosed embodiments do not limit the scope of this application. On the contrary, all variations and modifications made without departing from the spirit and scope of this application fall within the patent protection scope of this application.

Claims

1. An energy gathering cap (2) for a gas cooktop, comprising an inner ring (10) and an outer ring (20), wherein the outer ring (20) is disposed around the inner ring (10), and the outer ring (20) and the inner ring (10) are separated from each other to form a space (S), **characterized in that**, the inner ring (10) is provided with a plurality of first holes (100), the outer ring (20) is provided with a plurality of second holes (200), and a projection of the second hole (200) on the inner ring (10) along a horizontal direction does not overlap with the first hole (100).
2. The energy gathering cap (2) for a gas cooktop according to claim 1, **characterized in that**, the inner ring (10) and the outer ring (20) are concentric circular rings, and a projection of the second hole (200) on the inner ring (10) along a radial direction of the

outer ring (20) does not overlap with the first hole (100).

3. The energy gathering cap (2) for a gas cooktop according to claim 1, **characterized by** further comprising a top sealing portion (30) sealing the space (S) from a top portion of the space (S).
4. The energy gathering cap (2) for a gas cooktop according to claim 1, **characterized in that**, a protruding edge (201) extending toward the inner ring (10) along the horizontal direction is formed at an edge of the second hole (200).
5. A pan support (1) for a gas cooktop, **characterized in that**, an energy gathering cap (2) for a gas cooktop according to any one of claims 1 to 4 is detachably or fixedly disposed on the pan support (1).
6. The pan support (1) for a gas cooktop according to claim 5, **characterized in that**, the inner ring (10) is higher than the outer ring (20), or the outer ring (20) is higher than the inner ring (10).
7. The pan support (1) for a gas cooktop according to claim 5, **characterized by** comprising a bottom frame (3) located at an outer side of the energy gathering cap (2), a plurality of support legs (4) used to support a cooking appliance and fixed on the bottom frame (3), and a liquid filling portion (5) located between the bottom frame (3) and the energy gathering cap (2), wherein the liquid filling portion (5) extends from an inner edge of the bottom frame (3) to a bottom side of the outer ring (20), and is connected to the inner edge of the bottom frame (3) and the bottom side of the outer ring (20) in a sealing manner.
8. The pan support (1) for a gas cooktop according to claim 7, **characterized in that**, the liquid filling portion (5) is integrally formed on the bottom frame (3).
9. The pan support (1) for a gas cooktop according to claim 7, **characterized in that**, a top end of the support leg (4) is flush with a top end of the energy gathering cap (2).
10. The pan support (1) for a gas cooktop according to claim 9, **characterized in that**, a top portion of the energy gathering cap (2) is provided with notches (11) corresponding to the support legs (4), and the support legs (4) are engaged in the notches (11).
11. A gas cooktop, **characterized by** comprising a pan support (1) for a gas cooktop according to any one of claims 5 to 10.

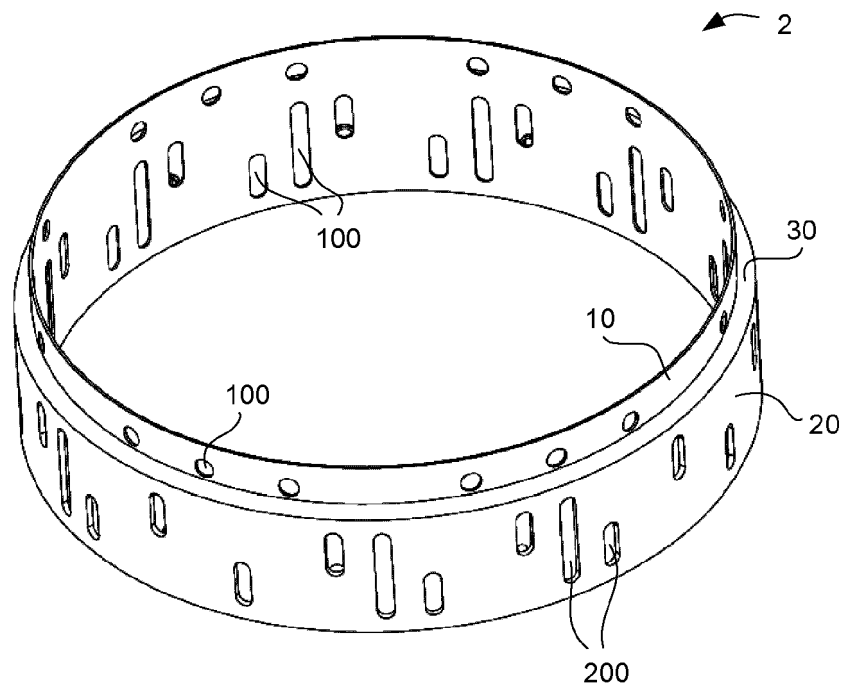


FIG. 1

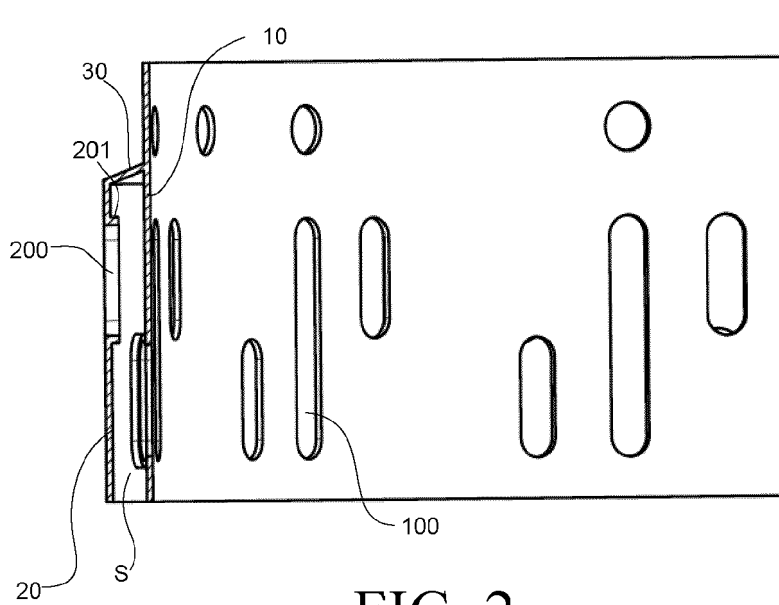


FIG. 2

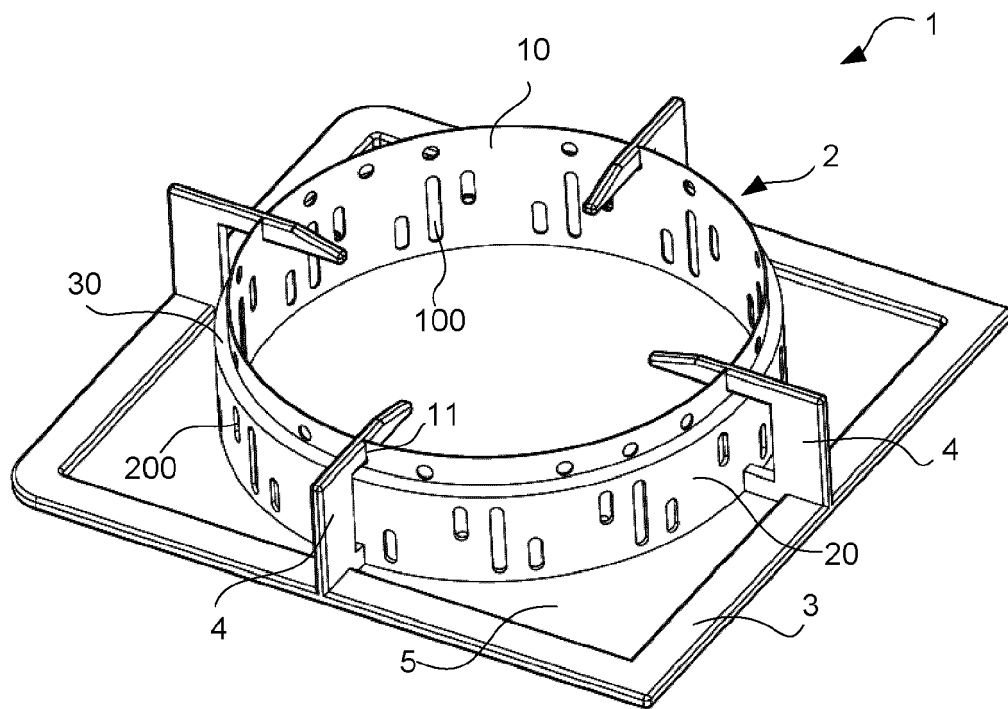


FIG. 3



EUROPEAN SEARCH REPORT

Application Number
EP 18 18 5437

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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	KR 2006 0010022 A (KOVEA CO LTD [KR]) 2 February 2006 (2006-02-02) * figures 2, 3 *	1-3,5,6,11 4,7-10	INV. F24C15/10
Y	* translated description pages 1, 2, 3 *		
Y	----- CN 205 807 549 U (ZHONGSHAN RONGXING ELECTRIC & GAS APPLIANCES CO LTD; FANG YONGPING) 14 December 2016 (2016-12-14) * figures 2, 3 *	4	
	* translation page 2, translation page 3 *		
Y	----- CN 203 478 376 U (ZHONGSHAN AIPU ELECTRICAL APPLIANCE CO LTD) 12 March 2014 (2014-03-12) * translation page 1 par. 3, 5, 6, 7, translation page 2 par. 5 *	7,8	
	* figure 4 *		
Y	----- JP S63 95007 U (YASUO YAMADA NIIGATA) 18 June 1988 (1988-06-18) * pages 7, 9 *	9,10	TECHNICAL FIELDS SEARCHED (IPC)
	* figure 7 *		F24C
A	----- JP S59 212627 A (HAYASHI SEI) 1 December 1984 (1984-12-01) * figure 1 *	1-11	
A	----- US 983 413 A (SWAFFORD LEVI W [US]) 7 February 1911 (1911-02-07) * figures 1, 2 *	1-11	
	* page 1, line 11 - page 1, line 20 *		
	* page 1, line 33 - page 1, line 63 *		
A	----- CN 2 731 314 Y (JIANG MINGJUN [CN]) 5 October 2005 (2005-10-05) * translation page 3 par. 3, par. 4 *	1-11	
	* figure 1 *		
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 28 November 2018	Examiner Jalal, Rashwan
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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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 18 18 5437

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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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28-11-2018

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR 20060010022 A	02-02-2006	NONE	
-----	-----	-----	-----
CN 205807549 U	14-12-2016	NONE	
-----	-----	-----	-----
CN 203478376 U	12-03-2014	NONE	
-----	-----	-----	-----
JP S6395007 U	18-06-1988	NONE	
-----	-----	-----	-----
JP S59212627 A	01-12-1984	NONE	
-----	-----	-----	-----
US 983413 A	07-02-1911	NONE	
-----	-----	-----	-----
CN 2731314 Y	05-10-2005	-----	
-----	-----	-----	-----

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