



(11) **EP 1 531 304 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:  
**03.08.2011 Bulletin 2011/31**

(51) Int Cl.:  
**F23D 14/06<sup>(2006.01)</sup>**

(21) Application number: **04380216.4**

(22) Date of filing: **03.11.2004**

(54) **Triple crown gas burner for cooking hobs**

Gasbrenner mit drei Kronen für Küchenkochfeld

Brûleur à trois couronnes pour plaques de cuisson

(84) Designated Contracting States:  
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LU MC NL PL PT RO SE SI SK TR**

(30) Priority: **11.11.2003 ES 200302586 U**

(43) Date of publication of application:  
**18.05.2005 Bulletin 2005/20**

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## Description

**[0001]** The present invention relates to a gas burner construction for a cooking hob, provided with three flame crowns and the outlets arranged radially in the burner body.

## Prior art

**[0002]** Gas burners for cooking hobs provided with two flame crowns arranged peripherally in the body of the burner, on either side of an annular chamber for the distribution of the gas-air mixture, and with a third central flame crown disposed around a circular central chamber, are already known. The gas-primary air fuel mixture is produced in a bowl-shaped base provided with the gas injector, which is fixed below the cooking hob tray. The burner body is mounted above the hob for the intake of the primary air from the separating space between the hob tray and the burner body.

**[0003]** In this type of known burner the gas-primary air mixture formed in the bowl-shaped base is diffused upstream from a vertical tubular duct of the burner body. Conduction and diffusion of the mixture towards the peripheral annular chamber is carried out by way of various horizontal "venturi" ducts extending in a radial direction from the outlet mouth of the vertical central duct.

**[0004]** The problem to be resolved in a burner of this three flame-crown type, incorporating a central gas-air mixture distribution chamber, is supplying to the central flame crown from a common delivery flow diffused downstream from the central tubular duct and that the portion of branched flow towards the central chamber arrives with a homogeneous gas-air mixture, in order to achieve an efficient combustion at the central crown as well.

**[0005]** The known solutions to the problem posed of supplying the central crown include either branching a portion of the common mixture flow directly from the central tubular duct output, or branching thereof from the radial diffusion ducts.

**[0006]** EP-1025392-A discloses a gas burner of this type, wherein the delivery of gas-air mixture corresponding to the central chamber, is supplied by way of access openings in the bottom of the central chamber, situated directly above the vertical central duct. This solution requires the construction of a concave wall on this chamber bottom separated from the tubular duct, with the drawback that a therefore combustion is deficient because the mixture does not have a long enough diffusion running to become homogeneous.

**[0007]** In WO-03/036168-A the supply of the gas-air mixture to the central distribution chamber is resolved by means of a branching opening on each of said horizontal radial diffusion ducts as they pass below the outline of the central chamber. On this burner, the gas-air mixture flow supplying the central chamber has however run along a horizontal diffusion path, which is not long enough to turn the gas-air flow at the flame holes into an homo-

geneous mixture.

## Disclosure of the invention

**[0008]** The object of the invention is a gas burner for a cooking hob of the type with a circular burner body with three flame crowns of radial outlets, of which two are peripheral crowns around a peripheral annular distribution chamber and the third a central crown around a central chamber, the gas-air mixture being led to both distribution chambers from a vertical mixture intake duct and diffused downstream by way of various horizontal "venturi" ducts, which are extended in a radial direction below the distribution chambers, wherein said radial diffusion ducts are provided with branch channels for supplying the central chamber with a homogenized portion of the mixture flow.

**[0009]** The gas burner according to the present invention is provided with means to divide the mixture flow downstream from said horizontal radial ducts into two portions of flow discharging into the respective peripheral or central annular chamber, the flow portion ducted to the central chamber being composed of a homogenized mixture of gas and air. To achieve this objective for the purpose of maintaining efficient combustion at the central crown, the invention provides a channel for branching a portion of the mixture flow for the particular supply of the central chamber. The branch channel is constructed on each of the common mixture flow radial ducts and has a ducting section sized proportionally to the power of the central crown.

## Description of the drawings

**[0010]**

Figure 1 is a perspective view of a gas burner for a cooking hob, showing its different parts exploded in an assembly arrangement.

Figure 2 is a sectional view of the assembled gas burner of figure 1.

Figure 3 is a sectional plan view of the gas burner of figure 2 according to line III-III.

**Description of a preferred embodiment**

**[0011]** In reference to figures 1-3, a preferred embodiment of gas burner 1 according to the invention comprises the following burner parts:

- a circular burner body 2 provided with an outer peripheral flame crown 3, an inner peripheral flame crown 4, a peripheral annular chamber 6 for distributing the fuel mixture to the two crowns 3,4, a central flame crown 5, and a circular central chamber 7 for distributing the fuel mixture to central crown 5;
- a burner cover 8 with an annular portion of cover 8a covering the peripheral chamber 6, and a central por-

- tion of cover 8b covering the central chamber 7;
- a bowl-shaped mixing base 10 under the cooking hob tray 14, provided with a gas injector 11 and a mixer chamber 12 for the gas G and the primary air A1;
  - a circular outline venturi body 9 fitted under the flame crown body 2 and provided with a central vertical duct 9a on the mixer bowl 10, for the intake of the mixture and with various horizontal ducts 9b extending in a radial direction from the central duct 9a for conduction and diffusion of a flow of fuel mixture M to both distribution chambers 6,7; and
  - a means 13 for branching the mixture flow M, which is placed intermediate between the burner body 2 and the venturi body 9, and provided with various radial branch arms forming a radial channel 13a on each of them for leading a smaller portion of flow Fc to the central chamber 7.

**[0012]** The mixer bowl-base 10 takes in the primary air A1 from an opening above the cooking tray 14. The circular venturi body 9 is connected by its periphery to the burner body, whereby the walls of the latter close above the radial diffusion ducts 9b. The surface of the burner body 2 has various secondary air intake openings between both peripheral crowns 3,4. In the embodiment of burner 1 described, the whole flow of mixture M is led by way of the radial ducts 9b to the outer edge of the periphery of the burner, wherein it is divided into a larger flow portion Fp supplying the peripheral chamber 6 and a smaller flow portion Fc ducted to the central chamber 7.

**[0013]** The means for the branching 13 of the flow M is constructed using an intermediate plate 13, which is made of a single circular contoured piece provided with a convex central portion 13b with no openings and a number of radial arms 13a. The intermediate plate 13 covers the outlet of the vertical tubular duct 9a preventing direct flowing of the mixture M to the central chamber 7. The arms 13a of the intermediate plate 13 are interposed on the radial ducts 9b, dividing them in the direction of height "H", except at its peripheral end, wherein it forms an opening 16 below the peripheral chamber 6. These peripheral openings 16 supply the larger flow portion Fp, around 90% of the overall flow M. The arms of the intermediate plate 13 form said branch channels 13a above the radial ducts 9b, and up against the surface of the burner body ducting the smaller flow portion Fc, around 10%, in a return direction towards the centre of the burner. The smaller branched flow Fc reaches the central chamber via an opening 17 in its bottom. In this way, the smaller flow Fc travels a long circulation path of length "L" (FIG. 2) before supplying the central chamber 7, so as to achieve the complete homogenization of the gas-air mixture M, said circulation path being longer than the radius R of the area of the central chamber 7.

**[0014]** In the burner 1 embodiment described here the problem of resistance to the circulation of the flow Fc by way of the circulation path (FIG. 2) is resolved by means

of the formation of a quadrangular section channel 13a over the width "W" of the radial duct 9b, which is also divergent upstream and whose height "H" (FIG.2) and width "W" (FIG.3) are sized in proportion to the heating power of the central crown 5 compared with the total power of the burner.

**[0015]** The present invention also covers a different construction (not shown in the drawings) of the above described central chamber 7 supply channel 13a, wherein the intermediate plate between the burner body 2 and the venturi body 9 is replaced by a flow Fc branch channel formed along the duct 9b of length "L", but of smaller width than "W", by means of two parallel or divergent vertical walls projecting from the bottom of the radial duct 9b, which divide it into two ducts adjacent to one another in a horizontal direction and equal in height to that of the radial duct 9b.

## 20 Claims

1. Gas burner for a cooking hob of the type that includes a circular burner body (2) provided with at least one peripheral flame crown (3,4) and one central flame crown 5, a peripheral annular chamber (6) for distributing the gas-air mixture (M) to the at least one peripheral crown (3,4), and a circular central chamber (7) for distribution to the central crown (5), a circular outline venturi body (9) connected to the body (2) of the flame crowns (3-5) below their periphery, and provided with a central vertical mixture (M) flow receiver duct (9a) and a number of horizontal venturi ducts (9b) extending in a radial direction for the diffusion of a common mixture flow (M) to both distribution chambers (6,7), and means (13, 13a,16, 17) for the branching and ducting a smaller mixture flow portion (Fc) for the individual supply of the central chamber (7), **characterised in that** said partial flow (Fc) branching and ducting means (13, 13a,16, 17) comprise a radial channel (13a) formed below the surface of the body (2) of the crowns (3,4,5) that starts downstream from said central venturi duct (9a), its length (L) being greater than the radius (R) of the area of the central chamber (7), whereby the circulation path of the partial flow (Fc) is prolonged for the sake of its complete homogenization in a return direction towards the center of the burner.
2. Gas burner for a cooking hob according to claim 1, wherein said radial branch channel (13a) starts from the peripheral end (16) of each said radial venturi duct (9b) and extends in a radial direction downstream as far as an opening (17) in the bottom of the central chamber (7).
3. Gas burner for a cooking hob according to claim 1, wherein said radial branch channel (13a) for the particular supply of the central chamber (7) is formed

by means of an intermediate circular outline plate (13) provided with a convex central portion (13b) that covers the central vertical duct (9a), and with a number of radial branch arms interposed on the radial ducts (9b) of the venturi body (9) and of the same width (W) as these, which lead the partial flow (Fc) to the central chamber (7) by way of an opening (17) in the bottom of the latter.

### Patentansprüche

1. Gasbrenner für einen Kochherd, von einem Typ umfassend einen runden Brennerkörper (2) mit mindestens einer peripherischen Flammenkrone (3,4) und einer mittleren Flammenkrone (5), einer peripheren Ringkammer (6) zum Verteilen der Gas-Luft-Mischung (M) an der mindestens einer peripheren Krone (3,4), und einer kreisförmigen mittleren Kammer (7) zum Verteilen an der mittleren Krone (5), ein Venturikörper (9) mit kreisförmigem Umriss, verbunden mit dem Körper (2) der Flammenkronen (3-5) unter ihrem Umriss, und versehen mit einer mittigen vertikalen Empfängerleitung (9a) für den Fluss der Mischung (M) und einer Reihe horizontalen Venturileitungen (9b), die sich radial erstrecken, um einen gemeinsamen Mischungsfluss (M) zur beiden Verteilerkammern (6,7) zu verbreiten, und Mittel (13,13a, 16,17) zur Verzweigung und Leitung eines kleineren Anteils (Fc) des Mischungsflusses zur individuellen Versorgung der mittigen Kammer (7), **dadurch gekennzeichnet, dass** die Mittel (13, 13a,16, 17) zum Verzweigen und Leiten des Teilflusses (Fc) einen radialen Kanal (13a) umfasst, der unter den Flächen des Körpers (2) der Kronen (3,4,5) gebildet ist und stromabwärts von dieser mittleren Venturileitung (9a) beginnt, wobei seine Länge (L) größer ist als der Radius (R) der Fläche der mittigen Kammer (7), wobei der Zirkulationsweg des Teilflusses (Fc) verlängert wird, um seine vollständige Homogenisierung in der Rückflussrichtung in die Mitte des Brenners zu erreichen.
2. Gasbrenner für einen Kochherd gemäß Anspruch 1, wobei dieser radiale Verzweigungskanal (13a) am peripheren Ende (16) der einzelnen radialen Venturileitungen (9b) beginnt sich in radialer Richtung stromabwärts bis zu einer Öffnung (17) unten in der mittigen Kammer (7) hin erstreckt.
3. Gasbrenner für einen Kochherd gemäß Anspruch 1, wobei dieser radiale Verzweigungskanal (13a) für die konkrete Versorgung der mittigen Kammer (7) aus einer kreisförmig Zwischenplatte (13) gebildet ist, die einen konvexen zentralen Abschnitt (13b) umfasst, welcher die zentrale vertikale Leitung (9a) abdeckt, sowie eine Reihe radiale Verzweigungen zwischen den zentralen radialen Leitungen (9b) des

Venturikörpers (9) und mit der gleichen Breite (W) wie diese, so dass der Teilfluss (Fc) über eine Öffnung (17) unten in die mittige Kammer (7) geleitet wird.

### Revendications

1. Brûleur à gaz pour table de cuisson du type qui comprend un corps de brûleur circulaire (2) fourni avec au moins une couronne à flamme périphérique (3, 4) et une couronne à flamme centrale (5), une chambre annulaire périphérique (6) pour une distribution de la mélange gaz - air (M) à au moins une couronne périphérique (3, 4), et une chambre centrale circulaire (7) pour alimenter la couronne centrale (5), un corps venturi à contour circulaire (9) connecté au corps (2) des couronnes à flamme (3, 5) en dessous de leur périphérie et doté d'un conduit récepteur du flux de mélange (M) (9a) vertical et central et d'un certain nombre de conduits venturi (9b) horizontaux qui s'étendent dans un sens radial pour assurer l'acheminement du flux de mélange commun (M) vers les deux chambres de distribution (6, 7) et des moyens (13, 13a, 16, 17) de ramification et d'acheminement d'une portion réduite du mélange (Fc) pour l'alimentation individuelle de la chambre centrale (7), **caractérisé en ce que** lesdits moyens de ramification et d'acheminement (13, 13a, 16, 17) dudit débit partiel (Fc) comprennent un canal radial (13a) qui est formé en dessous de la surface du corps (2) des couronnes (3, 4, 5) qui débute en aval depuis ledit conduit venturi central (9a), sa longueur (L) étant supérieure au rayon (R) de la zone de la chambre centrale (7), où le circuit de fluide du débit partiel (Fc) est prolongé afin d'assurer son homogénéisation complète dans une direction de retour vers le centre du brûleur.
2. Brûleur à gaz pour table de cuisson selon la revendication 1 où ledit canal radial de ramification (13a) débute à l'extrémité périphérique (16) de chacun desdits conduits venturi radiales (9b) et s'étend dans un sens radial en aval, atteignant l'ouverture (17) au fond de la chambre centrale (7).
3. Brûleur à gaz pour table de cuisson selon la revendication 1 où ledit canal radial de ramification (13a) pour l'alimentation spécifique de la chambre centrale (7) est formé au moyen d'une plaque intermédiaire (13) de contour circulaire doté d'une portion centrale convexe (13b) qui recouvre le conduit vertical central (9a) et doté d'un certain nombre de branches radiales disposées sur les conduits radiaux (9b) du corps venturi (9) et de même largeur (W) que celles-ci, ce qui acheminent le débit partiel (Fc) vers la chambre centrale (7) grâce à une ouverture (17) pratiquée au fond de cette dernière.



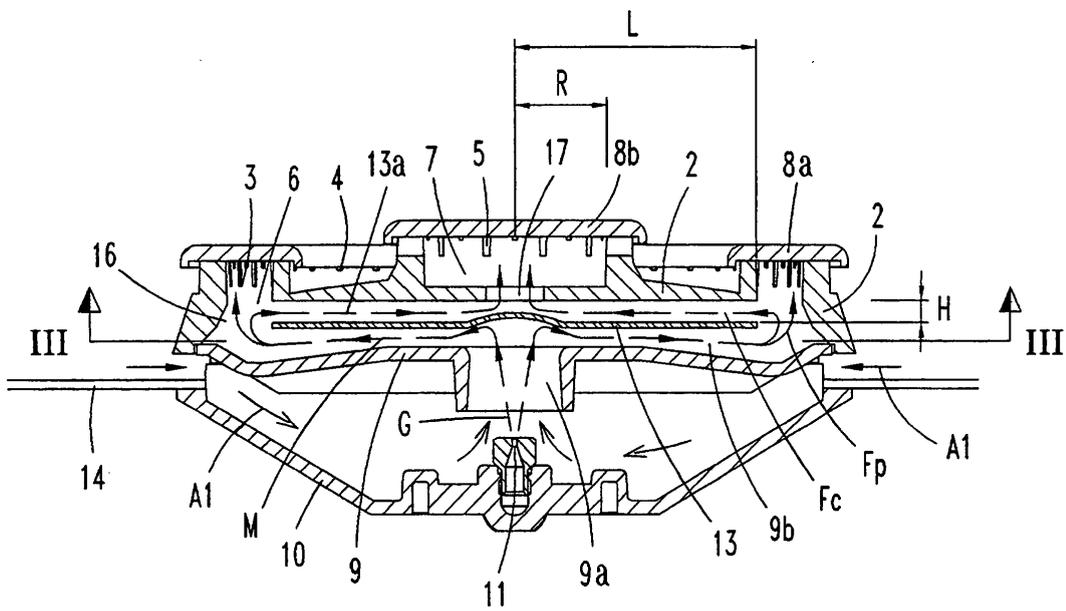


FIG. 2

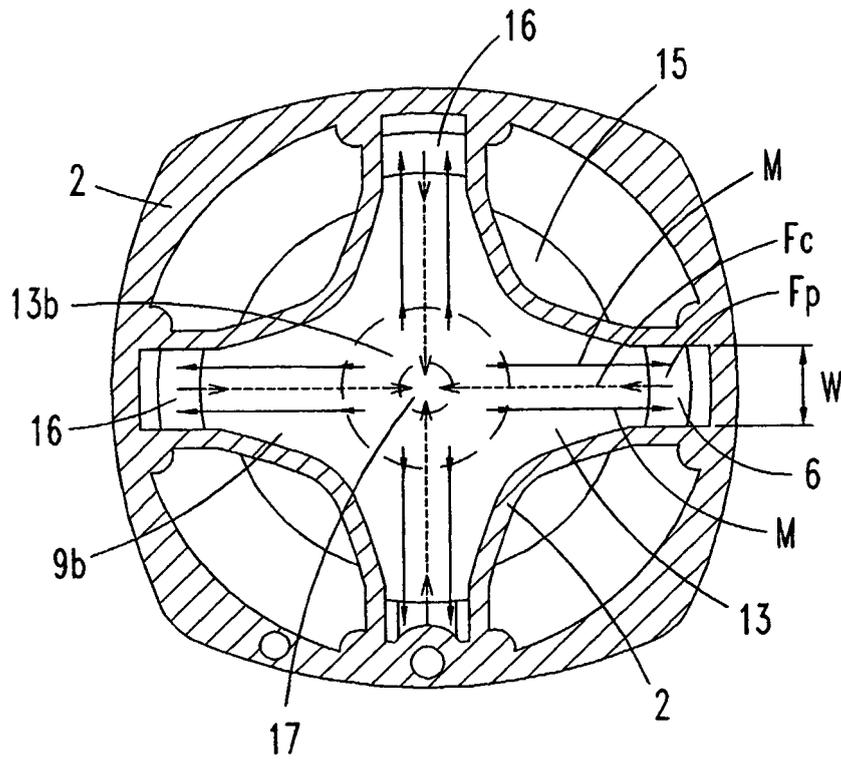


FIG. 3

**REFERENCES CITED IN THE DESCRIPTION**

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