



(12) **EUROPEAN PATENT APPLICATION**

(21) Application number : **93830005.0**

(51) Int. Cl.⁵ : **F23D 14/06, F23D 14/72**

(22) Date of filing : **12.01.93**

(30) Priority : **13.01.92 IT MI920031**

(43) Date of publication of application :
21.07.93 Bulletin 93/29

(84) Designated Contracting States :
CH DE ES FR GB LI SE

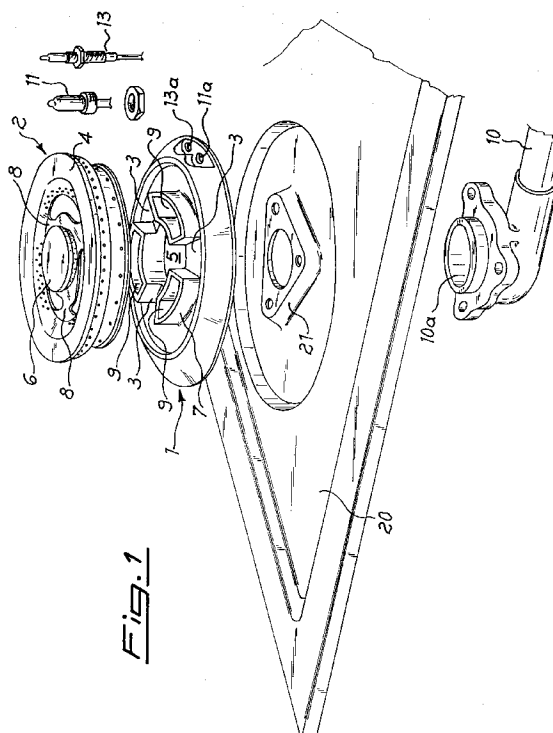
(71) Applicant : **SMEG S.p.A.**
Via Circonvallazione Nord, 36
Guastalla (Reggio Emilia) (IT)

(72) Inventor : **Bertazzoni, Roberto**
Via Maldotti 2
Guastalla (Reggio Emilia) (IT)

(74) Representative : **Adorno, Silvano et al**
c/o SOCIETA' ITALIANA BREVETTI S.p.A. Via
Carducci, 8
I-20123 Milano (IT)

(54) **Improved gas cooker burner with three concentric flames.**

(57) An improved gas cooker burner is described, of the type with three concentric flames, comprising a flame dividing member in a single piece fed by a single gas delivery whose adjustment is therefore carried out through a single conventional gastap, wherein the ignition of the three flames is simultaneous by means of a single spark-plug, and a single thermocouple is provided for safety purposes. Said flame dividing member includes a central and a peripheral ring connected by radial gas passages alternated to areas of adduction of the secondary air to the central crown, which is preferably provided with a projecting ledge to reduce the pressure of the gas coming out in said areas. Special arrangements of the holes are provided as well, with two rows one on top of the other which, in the two central crowns are staggered, while the secondary air flow to said crowns is made easier by the position of the burner raised from the worktop.



This invention concerns an improved gas cooker burner with three concentric flames, and precisely of the type with flame dividing member in a single piece.

It is known that in hobs or gas cookers at least one of the burners, intended to be used with the cooking containers of greater diameter, is preferably provided with multiple concentric flames, typically three, to improve the distribution of heat on the bottom of the container itself and thereby have a greater cooking efficiency. This can be achieved with burners and relative flame dividers dismountable into several pieces, but presenting in such a case drawbacks caused by the poor maintenance practicality and the difficulty in obtaining a satisfying level of cleanliness of the pieces themselves.

Owing to these reasons burners have been used with three concentric flames or crowns obtained by two rings in a single piece, but with two separate gas deliveries on the inner ring and the outer ring, separately controlled by two different gastaps or even a single gastap which controls the gas feeding to the outer ring only from a certain level of opening of the delivery onwards, while for reduced supplies the gas flows only from one of the rings or crowns, usually from the innermost one. Actually it proves to be particularly difficult to achieve an even distribution of the gas in the different members which give rise to the concentric flames, so as to have both an exact balancing of the pressures and an adequate flow of secondary air by the different flame areas, while assuring the propagation and preservation of the flame itself, without the presence of frequent flame separation phenomena.

In any case accomplishing a burner of the type indicated, manufactured according to the prior art, would have required the adoption of at least two spark-plugs and two safety thermocouples, even in case of single delivery, supposing that such a burner would have been able to work.

Consequently the object of this invention is to provide a burner of the above-mentioned type which is free from the aforesaid faults and drawbacks, since it may be fed by a single gas delivery with a single control tap and therefore has a single spark-plug and a single safety thermocouple. In this way the flames spread immediately from the ignition point on the outer crown all the way to the innermost one and there remain, with no flame separation, even for reduced gas delivery, controlled by a single gastap quite similar to the conventional ones for single flame burners.

This is achieved through a burner comprising a basic distributing body, connected to a gas delivery tube of known type and having three radial gas passage areas and three intermediate secondary air inlet areas, with a flame dividing member, fit to be placed on said distributing body, comprising two concentric rings connected by three radial members fit to form the cover of the above-mentioned gas passages, with

intermediate apertures for the secondary air, the inner ring having on its periphery two staggered rows of holes one on top of the other as well as are present on the surface confronting the latter on the inner periphery of the outer ring, whose outer periphery has other two series of holes one on top of the other and level with the latter a single spark-plug and a thermocouple connected to a known-type gas safety valve are provided.

These and other objects, advantages and characteristics of the improved burner according to this invention will appear mixture clearly from the following detailed description of its preferred embodiment, reported as non-limiting example, referring to the annexed drawings wherein :

Fig. 1 shows an exploded view of the burner according to the invention; and

Fig. 2 shows a partial radial sectional view of the burner of fig.1 assembled for its operation.

With reference to the drawings the burner according to this invention, fed by the outlet 10a of a gas delivery tube 10 of conventional type, is formed by a body 1 of the real burner upon which a flame dividing member 2 is placed, as it generally occurs in the known single flame burners. The body of the burner 1 serves the purpose, particularly important in this case, of properly distributing the gas, or rather the mixture of gas and primary air fed by the tube 10, to the different flames of the member 2. In order to do this the body 1 has radial passages 3 communicating with a central hole 5 coaxial with 10a, and separated one from the other by the raised walls 7 defining the vertical passages 9, therefore perpendicular to the plane of the body 1, for the entry of the secondary air by the central flames. The passages 3, as shown in fig.1, are preferably three, as well as the secondary air inlet areas 9.

The flame dividing member 2, in a single piece according to the invention, substantially includes an outer ring 4 and an inner disc 6. The three flames rise from proper holes on the outer and inner periphery of the ring 4, as well as on the outer periphery of the disc 6. The outer ring 4 and the inner disc 6 are connected by radial connecting members 8, coinciding in number and position with said passages 3 of which they define the upper wall or closing cover. On the outer edge of the circular plate forming the burner body 1 there are also two holes 11a and 13a for the positioning of a spark-plug 11 and a safety thermocouple 13 respectively, as well as for the passage of the relative connections to the respective controls, in such a position that the active parts of both elements 11 and 13 are near the outer periphery of said ring 4 of the flame divider 2.

With particular reference to fig.2, the holes on the flame divider 2, through which the gas comes out and by which the flame is formed, are shown in greater detail. The holes on the inner crown 6 are indicated

by 12 and those on the outer ring 4 by 14 and 16, on the inner and outer side respectively. All the holes are preferably oriented upwards and particularly those indicated by 12 and 14, on confronting surfaces, are directed one against the other so as to produce converging gas flows, thus meeting in an intermediate position, substantially along a circumference having its diameter included between that of the central crown 6 and the inner diameter of the ring 4.

According to a preferred embodiment of this invention all the holes 12, 14 and 16 are arranged as two series of holes one on top of the other, which are staggered by the two inner flames in order to make the reciprocal preservation of the flame easier, in that the lower row of holes, alternating with the upper ones, gives rise to the so called "pilot light" which ignites and supports the flame on the upper row of holes, or vice versa.

It should be noted that the gas flow is directed radially outwards, as already said before, while the flame spreads inwards starting from the external spark-plug 11. It should also be noted that by the inner holes 12 the gas has a higher pressure, consequently their diameter will be smaller than that of the holes 14 and even smaller compared to the outer holes 16. Moreover to avoid the separation of the flame, which could take place anyway due to this higher pressure, above said holes 12, along the periphery of the inner disc 6, a projecting ledge 18 is provided, capable of reducing this pressure and the occurrence of this phenomenon.

Always with reference to the figures, it clearly appears that the holes 14 are provided on limited areas only of the inner periphery of the ring 4, and precisely they are missing by the radial connections 8, that is by the gas passages 3. Therefore in the case shown and above illustrated there are three hole areas 14 by the secondary air inlets 9.

As far as the outer flame is concerned the relative holes 16, of greater diameter, are only slightly inclined upwards, while there is a second series of holes 16a below, of smaller diameter, wherein each hole 16a is preferably vertically aligned with an upper hole 16 for which it acts as pilot light, as besides is known in prior art. The secondary air for the outer flame reaches the holes 16 and 16a with no particular problems, but this is made easier by a preferred shape of the worktop 20, which forms a raised area 21 on which the burner body 1 is mounted, so that between the latter and the surrounding top remains a space of some millimeters, suitable to make the passage of the secondary air easier, especially in the inner part through the ducts 9.

From what comes before it clearly appears that with a single delivery 10, adjustable through a single control tap (not shown), the gas flow is adjusted from a minimum to a maximum always preserving the three concentric flames. The ignition is single as well

by means of a single spark-plug 11 which first of all causes the ignition of the gas that comes out of the holes 16 of the outer ring 4 and then the gas which is pushed outwards from the inner holes 12, which in turn spreads the flame to the as flow, converging with it, coming from the central holes 14. Obviously the thermocouple 13 is single too and controlled by the existence of the outer flame, which presupposes the presence of the two innermost flame crowns too.

Claims

1. An improved gas cooker burner with three concentric flames, comprising a basic distributing body (1) connected to the outlet (10a) of a gas delivery tube (10), with a flame dividing member (2) fit to be placed on said distributing body, characterized in that said body (1) has three radial gas passage areas (3) and three intermediate secondary air inlet areas (9), said flame divider (2) being formed by two concentric rings (4,6) connected by three radial members (8) fit to form the cover of the above-mentioned gas passages (3), with intermediate through apertures (9) for the secondary air, the inner ring (6) having on its periphery two staggered rows of holes one on top of the other, as well as staggered are the rows of holes (14) on the confronting surface formed by the inner periphery of the outer ring (4), whose outer periphery has other two series of holes (16) one on top of the other, and level with the latter there is a single spark-plug (11) and a safety thermocouple (13).
2. A burner according to claim 1, characterized in that the diameter of the holes (12,14,16) is increasing from the inner crown to the outer one, all said holes having an upwards inclination in the direction of the gas flow, so that the two confronting series of holes 12 and 14 give rise to converging gas flows which intersect in an intermediate position, substantially along a circumference having its diameter included between that of the central crown (6) and the inner diameter of the ring (4).
3. A burner according to claim 1 or 2, characterized in that it has, all around the central crown (6), a projecting ledge (18) to reduce the pressure of the outcoming gas.
4. A burner according to any of the preceding claims, characterized in that said intermediate holes (14) on the inner periphery of said ring (4) are present by said secondary air passages (9) only, missing in the connection areas of said members (8) which cover the gas passages (3).

5. A burner according to any of the preceding claims, characterized in that the gas delivery tube (10) ends up in the burner body (1) through a central hole (5) of the latter coaxial with its outlet (10a), communicating with said passages (3) and the flow it feeds is controlled by a single control tap, whereby the presence of the flame is assured on all three series of holes (12,14,16) even in case of reduced delivery.
6. A burner according to claim 5, characterized in that said coaxial connection between the outlet (10a) of the delivery tube (10) and the central hole (5) of the distributing body (1) is carried out in a raised area (21) of the worktop (20) surrounding said burner, so that the latter remains raised some millimeters from said worktop (20) making easier the adduction of the secondary air both to said outer holes (16) and, through said internal passages (9), to the inner ones (12,14).

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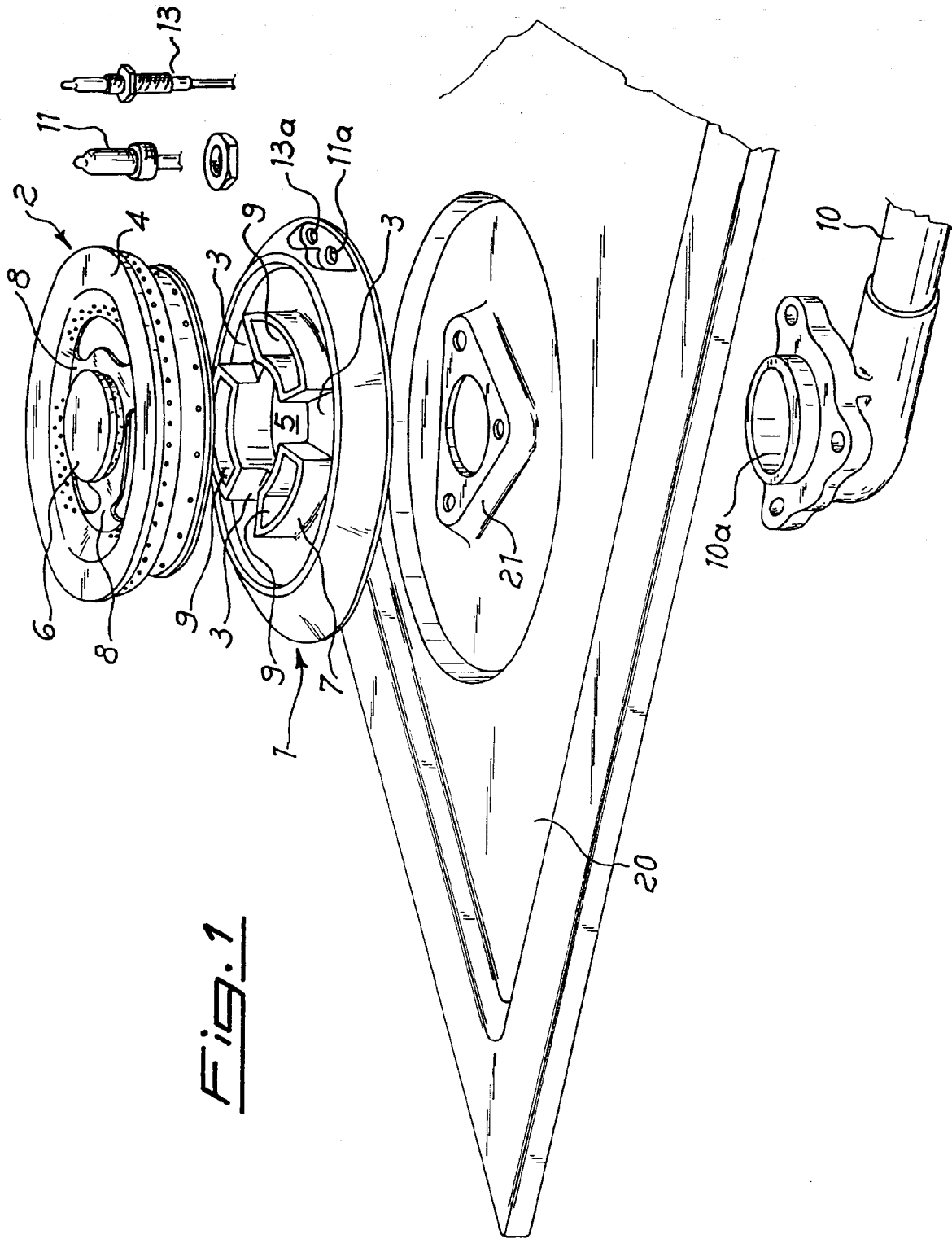


Fig. 1

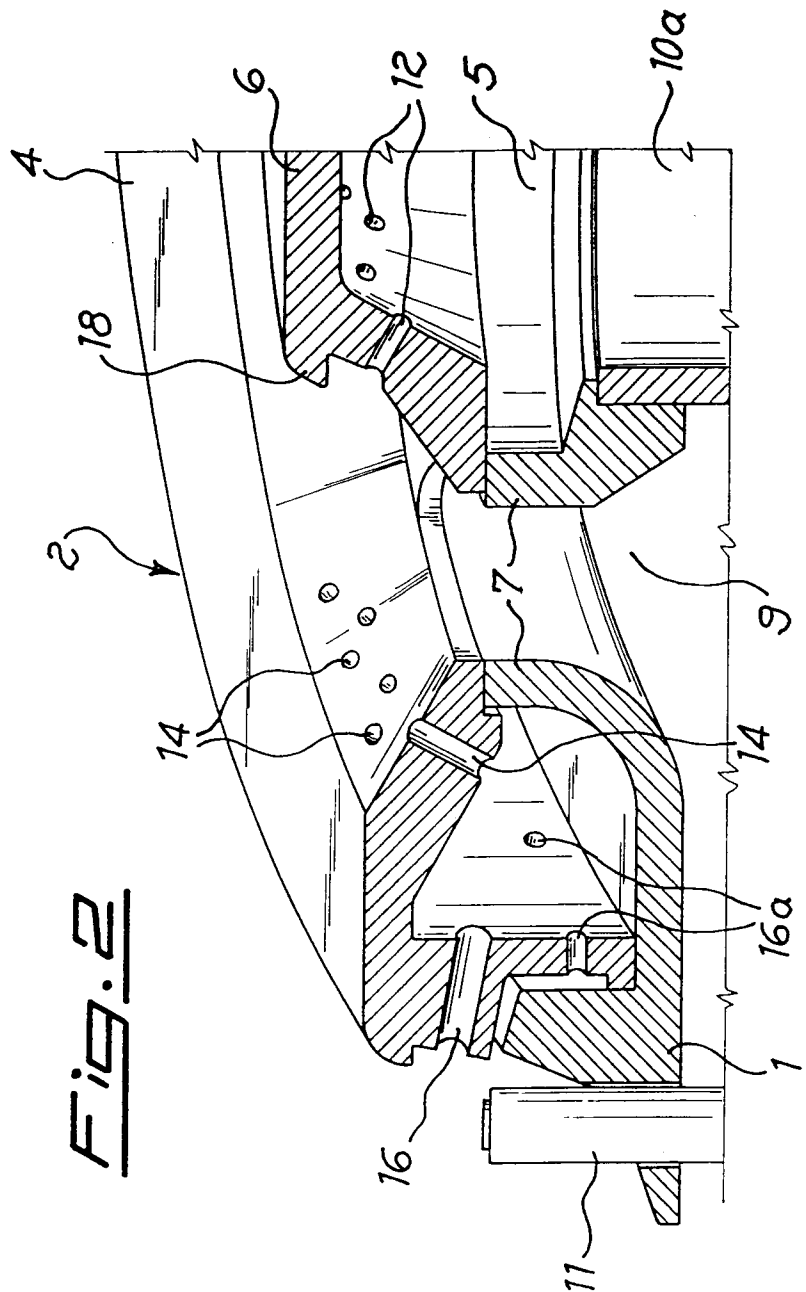


Fig. 2