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(54) **Gas burner generating an annular flame**

(57) A gas burner (1) is associated with a support member such as a cooking hob (2) and comprises a conduit (5) from which there emerges a gas/air mixture, said conduit (5) being operationally associated with a burner body (8). This latter comprises a base portion (9) and a burner head (10) disposed on said portion, said conduit

opening (at 6) into the base portion (9), between said portion (9) and said burner head (10) there being present to the side of the burner body (8) an annular gap (16) at which an annular flame is generated when the burner (1) is activated. A cooking hob with at least one such burner is also claimed.

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Description

[0001] The present invention relates to a gas burner in accordance with the introduction to the main claim.

[0002] Known gas burners comprise a burner body associated with a conduit from which a previously obtained gas/air mixture emerges. With particular reference to a cooking hob (built-in or present on a self-supporting cooker), the said conduit (terminal part of a vertically or horizontally extending venturi tube) opens at said hob where the burner is present. This latter comprises a piece which connects to the tube and on which there is positioned a diffuser presenting a plurality of slits disposed along a lateral surface. On activating the burner, a plurality of mutually separate flames emerge from these slits.

[0003] The burners of the state of the art comprise a plurality of parts presenting considerable complexity, this negatively affecting their cost. In addition, the known burners have a relatively large height above the cooking hob, which necessitates the use in their vicinity of supports, likewise of relatively large dimensions, for the cooking utensils (pans); all this detracts from the appearance of the cooking hob.

[0004] In addition, the flames produced by known burners are unstable, with obvious consequences for flame stability and possible extinguishing of the burner. Known burners can also easily give rise to carbon monoxide and nitrogen oxide emissions above the levels defined by the most stringent regulations.

[0005] An object of the present invention is to provide a burner which is improved relative to known burners.

[0006] A further object is to provide a burner which has a low height above its support member, for example above the surface of a cooking hob; this can also result in the provision of cooking hobs formed in such a manner as not to require grids for supporting pans above the burner.

[0007] A further object is to provide a burner which can be easily cleaned, and results in low carbon monoxide and nitrogen oxide emission.

[0008] These and further objects which will be apparent to the expert of the art are attained by a burner in accordance with the accompanying claims.

[0009] The present invention will be more apparent from the accompanying drawing, which is provided by way of non-limiting example and in which:

Figure 1 is an exploded perspective view of a burner according to the invention;

Figure 2 is a side view of the burner of Figure 1;

Figure 3 is a perspective view of the burner of Figure 1 during use;

Figures 4 and 5 are sections through a burner of the invention connected to different types of conduit for feeding the gas/air mixture; and

Figure 6 is a cross-section through a variant of the invention.

[0010] With reference to said figures, a burner according to the invention is indicated overall by 1 and is associated with a cooking hob 2 having an upper surface 3 and a lower surface 4. Below the surface 4 there is present for the gas a conduit G carrying an injector J (Figures 4, 5) and with which there is associated a usual venturi tube 5 which can lie horizontally (Figure 4) or vertically (Figure 5) or otherwise. The tube 5 (and the gas conduit in general) opens at its end 5A at 6 on the surface 3 of the hob 2. The burner 1 is present in a position corresponding with the opening 6.

[0011] This burner comprises a burner body 8 having a base portion (or simply base) 9 and a one-piece head 10. The burner head 10 is positioned on the base 9 and lies vertically at a short distance from it by virtue of support feet 12 associated with said head. The support feet 12 can be associated with the base 9. Between the burner head 10 and base 9 there is thus present an expansion chamber 15 into which there flows the gas/air mixture originating from the venturi tube 5 and created by entrainment of atmospheric air into this tube by the gas originating from the main.

[0012] When in their relative position, the burner base 9 and head 10 define within the burner body 8 an annular gap 16 provided laterally to this latter and presenting an inclination which can vary between horizontal and vertical. The gap 16 communicates with the expansion chamber 15. A substantially uninterrupted annular flame 17 forms at said gap when the burner is activated, said flame thus appearing along the peripheral edge of the burner body 8. In the case of a burner with multiple rings of flame, the flame can also appear along an inner peripheral edge of the burner body 8 along another gap communicating with the chamber 15.

[0013] More specifically, in the embodiment described here, the burner head 10 is substantially of flanged inverted cup shape, comprising a central portion 21 and a peripheral flange 22 positioned below the portion 21. This portion is hollow and is superposed on the opening 6 of the venturi tube 5. Preferably, the lower face 22A of the flange 22 is inclined to the surface 3 of the hob 2 and faces, at a distance therefrom, a corresponding face 25A of an edge 25 of the burner base 9. This latter comprises a frusto-conical central part 26 surrounding that terminal part 5A of the venturi tube 5 projecting from the hob 2.

[0014] By virtue of the particular shape of the aforesaid surfaces 25A and 22A, correct relative positioning between the burner head 10 and base 9 after these parts of the burner body 8 have been separated, for example for cleaning, is substantially automatic.

[0015] In addition, because of its particular shape and the fact that it is in one piece, the burner head 10 has a very small height above the surface 3 of the cooking hob 2, enabling this latter to comprise integrated supports of various shapes (defining the usual "grid") for a food preparation utensil or pan. These supports are shown in Figure 3 where they are indicated by 27.

[0016] Usual flame generation and control members can be associated with the burner of the invention. For example (see Figure 1), a spark generator 30 can be associated with the base 9 together with a usual thermocouple 31 to maintain gas feed to the burner in known manner after the flame 17 has been activated.

[0017] In addition, the gas/combustion air mixture can be adjusted by modifying the dimension (aperture) of the gap 16 by changing the distance between the burner head 10 and base 9. This can be achieved by moving the head relative to the base; for example (see Figure 1), with the base 9 there can be associated supports 33 movable parallel to the terminal part 5A of the venturi tube 5 and arranged to cooperate with the feet 12 of the head 10. The supports 33 are associated with rods 34 movable parallel to the axis K and cooperating with cams 35 provided on a rotary member 36 parallel to the surface 4 of the hob 2 and positioned below it. This member 36 is mounted on a rotary shaft 37 driven by a motor 38 the operation of which is controlled by a push-button 39 mounted in a suitable position on the hob 2. Rotation of the shaft 37 about its axis results in rotation of the member 36 and hence possible cooperation between the cams 35 and the rods 34 which raise the supports 33 from the burner base 9, to hence cause the head 10 to rise from the base 9. This results in modification of the width of the gap 16.

[0018] The cams 35 can also be provided directly on the burner base 9 in a predetermined position to hence allow pre-adjustment of the width of the gap 16 prior to the use of the burner 1.

[0019] Other solutions can however be provided for adjusting the width of the gap 16, such as solutions involving telescopic feet 12 or the use of spacers for modifying the position of the head 10 relative to the base 9.

[0020] According to a variant of the invention (Figure 6) the head 10 presents a lower annular part 43 resting on the burner base 9 and provided with a plurality of longitudinally or transversely (with respect to the head 10) extending slots. The slots are equidistant and the gas/air mixture emerges from them. As these slots are spaced from the peripheral edge of the burner body 8, igniting the mixture results in the generation of a continuous annular flame about the burner 1.

[0021] By virtue of the invention, several burners can be positioned on a cooking hob of standard dimensions because of the elimination of those pan supports (grids) which are currently present on cooking hobs in those positions corresponding with the gas burners. In view of the low burner height above the surface 3 of the hob 2, these supports can be integrated into said hob, with supports associated with the different burners being able to be positioned closer to them than known grids.

[0022] Again by virtue of the invention, a large air flow into the burner can be achieved, so limiting emissions of toxic gases such as carbon monoxide and nitrogen oxides.

[0023] The burner of the invention, having a continu-

ous single flame, and being provided with a diffuser with slots or cavities for flame stabilization, produces a flame front of laminar type which in its turn generates a noise which is lower than that generated by known burners.

[0024] The said burner has a very pleasing appearance and can be easily cleaned; because of its small height any pans placed on it are extremely stable.

[0025] Various embodiments of burners according to the invention have been described using a burner base 9 associated with a cooking hob (or other support surface or member). However, said base can be integrated into the cooking hob (which therefore comprises a region in which the occupying end 5A of the tube 5 is shaped as said base) or can be "virtual" in the sense of being that region (even completely flat, coplanar with the surface 6) of the cooking hob into which the tube opens and on which the burner head 10 is rested. Again in this case, about said head (or along the side of the burner defined by said head and by the aforesaid cooking hob region) a flame of continuous annular shape is generated.

Claims

1. A gas burner associated with a support member such as a cooking hob (2) and comprising a burner body (8) positioned to correspond with and lying above a conduit (5) opening (at 6) onto a surface (3) of said support member (2), from said conduit there emerging a gas/air mixture, **characterised in that** said burner body (8) comprises at least one annular gap (16) at which a flame (17) is generated when the burner is activated.
2. A gas burner as claimed in claim 1, **characterised in that** the annular gap (16) is provided on a lateral surface of the burner body (8).
3. A gas burner as claimed in claim 1, **characterised in that** the flame (17) generated by the burner is continuous.
4. A gas burner as claimed in claim 1, **characterised in that** the burner body (8) comprises a base portion (9) containing the opening (6) of said conduit (5) and on which there is positioned, spaced therefrom, a burner head (10), between said burner head (10) and said base portion (9) there being defined the gap (16) through which an annular flame emerges when the burner is activated.
5. A gas burner as claimed in claim 1, **characterised in that** the burner head (10) is in one piece.
6. A gas burner as claimed in claim 2, **characterised in that** the burner head is cup shaped and presents

a flange (22) at its free end, the hollow portion (21) of the head (20) being superposed on the opening (6) of the conduit (5) for the gas/air mixture.

7. A gas burner as claimed in claim 3, **characterised in that** the burner head (10) carries spacer elements (12) arranged to maintain it spaced from the base portion (9).
8. A gas burner as claimed in claim 3, **characterised in that** the flange (22) of the burner head (10) is inclined to the support member (2) with which the burner body (8) is associated.
9. A gas burner as claimed in claim 1, **characterised in that** the base portion (9) of the burner (1) is flared.
10. A gas burner as claimed in claims 5 and 6, **characterised in that** the base portion (9) of the burner (1) presents a peripheral part (25) having a portion (25A) inclined to the surface (3) of the support member (2), said portion (25A) being arranged to face the inclined flange of the burner head (10), and a frusto-conical part (26) surrounding the opening (6) of the conduit (5) for the gas/air mixture.
11. A gas burner as claimed in claim 1, **characterised by** comprising means (33, 34, 35, 36, 37, 38, 39) for modifying the distance between the head (10) and the base portion (9) of the burner (1), said modification varying the width of the lateral gap (16) in the burner body (8), through which the annular flame is generated.
12. A gas burner as claimed in claim 11, **characterised in that** the means for modifying the distance between the head (10) and the base portion (9) of the burner (1) are elements (33) associated with and movable relative to the base portion (9), and arranged to cooperate with spacer elements (12) of the head (10), said elements cooperating, via linkages (34), with cams (35) carried by a rotary member (36) positioned below the support member (2) and connected to a selectively operable actuator (38).
13. A gas burner as claimed in claim 1, **characterised in that** the base portion (9) is an independent member separate from the support member (2) with which the burner (1) is associated.
14. A gas burner as claimed in claim 1, **characterised in that** the base portion (9) is a region of the support member (2) with which the burner (1) is associated, and in which the conduit for the gas/air mixture opens.
15. A gas burner as claimed in claim 1, **characterised**

in that the base portion (9) carries an igniter (30) and a flame sensor (31).

16. A gas burner as claimed in claim 1, **characterised in that** the burner head (10) presents a skirt (43) which surrounds the opening (6) of the conduit (5) for the gas/air mixture and is provided with through apertures (44).
17. A gas burner as claimed in claim 1, **characterised in that** the burner body (8) comprises two concentric annular gaps.
18. A cooking hob comprising at least one gas burner (1) having a burner body (8), said hob (2) having an upper surface (3) and a lower surface (4), into the upper surface there opening a conduit (5) for the gas/air mixture, the burner body (8) being positioned at the opening (6) of the conduit (5) on the hob (2), **characterised in that** the burner body (8) comprises at least one annular gap (16) through which the annular flame emerges.
19. A cooking hob as claimed in claim 1, **characterised in that** the annular gap (16) is present on a lateral surface of the burner body (8).
20. A cooking hob as claimed in claim 18, **characterised in that** the annular gap (16) is provided between a burner head (10) and a base portion (9) which are relatively removable, said portion containing the opening (6) of the conduit (5) for the gas/air mixture.
21. A cooking hob as claimed in claim 20, **characterised in that** the burner base portion (9) is independent of the cooking hob.
22. A cooking hob as claimed in claim 20, **characterised in that** the burner base portion (9) is a part of the cooking hob.

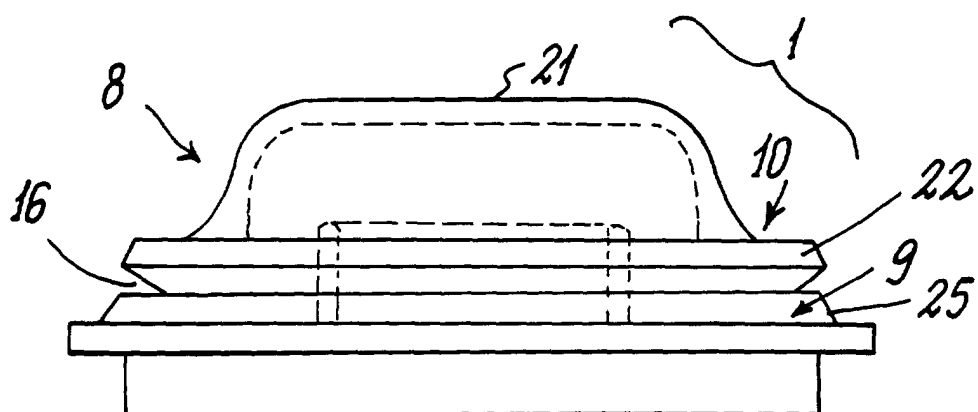
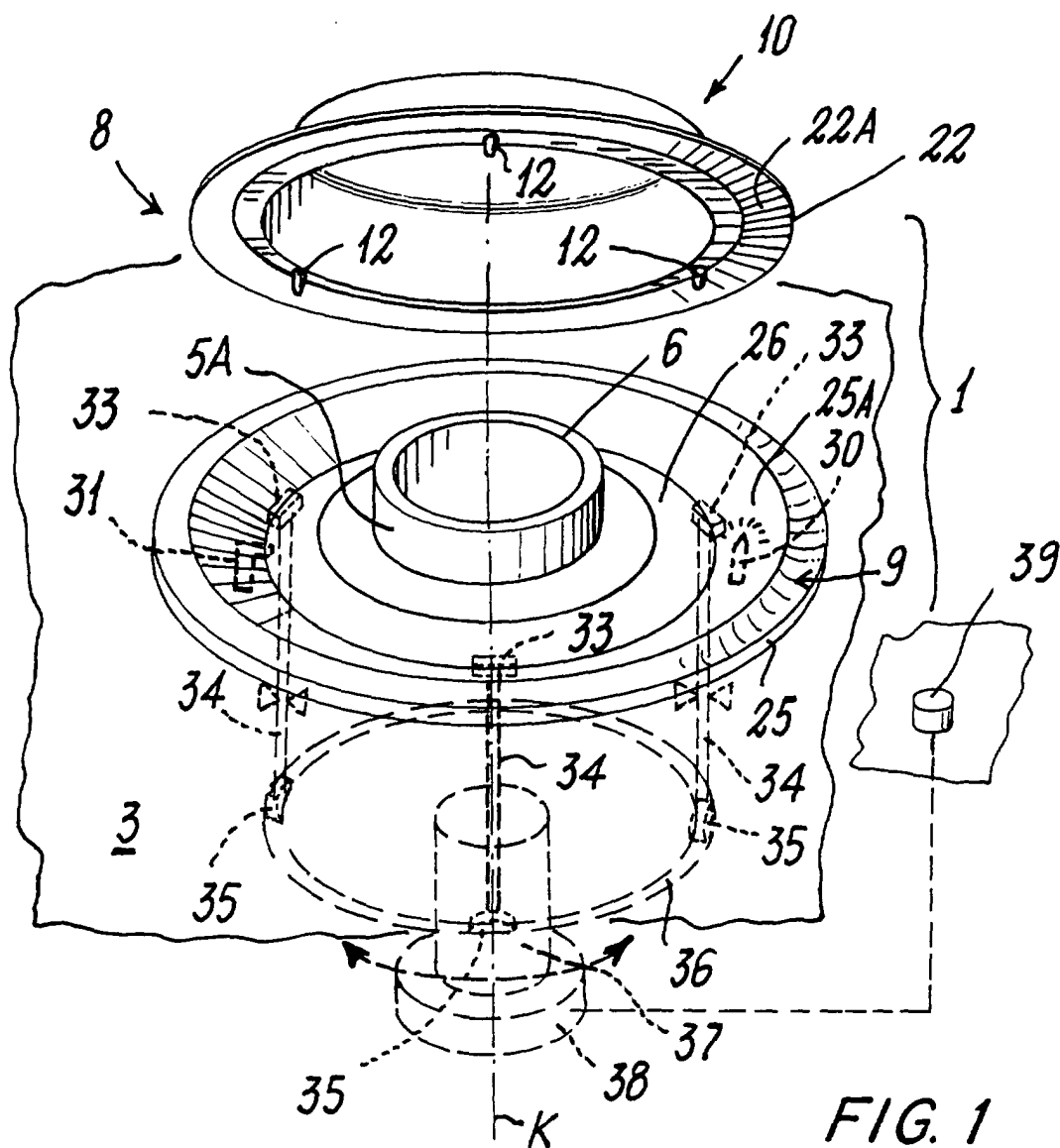


FIG. 2

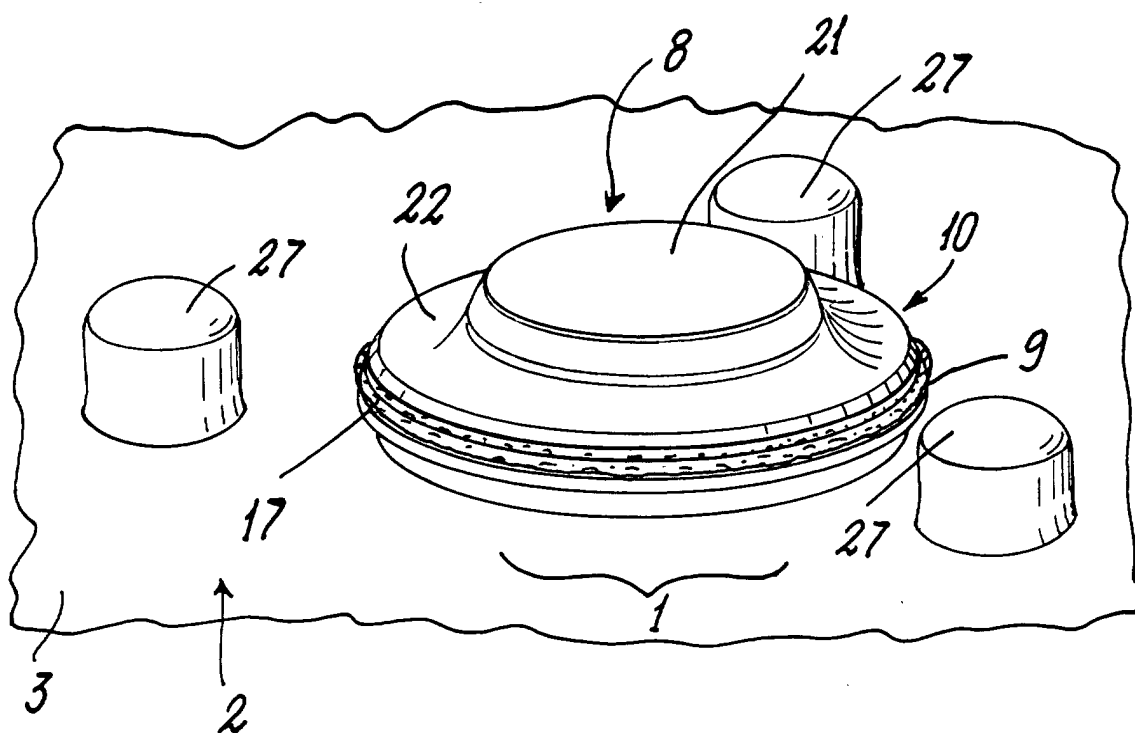


FIG. 3

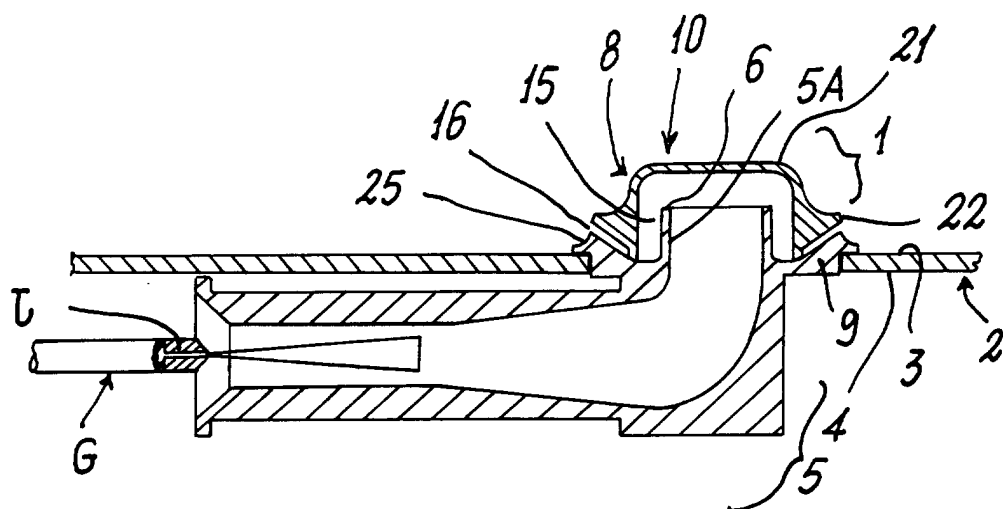


FIG. 4

