

"Cooking hob from tempered glass or other thermodegradable materials"

FIELD OF THE INVENTION

The present invention relates to the use of a domestic gas burner, of
5 the type comprising a burner base and a burner head provided with
at least one flame crown, in a cooking hob having a supporting
surface made of a material that is physically and/or only structurally
degradable in the presence of heat sources, such as, for example,
tempered glass.

10 By the term "cooking hob" is meant, in what follows, any installation for
the cooking of foodstuff provided with a support for housing at least
one burner designed for supplying heat to the foodstuff itself,
comprising in this term installations such as, for example, surfaces
equipped for cooking or cooking ranges.

15 BACKGROUND ART

Amongst cooking hobs for domestic use, it forms part of the known art
to use, for reasons that are prevalently aesthetic and/or regard
practicality of maintenance, surfaces for housing (or supporting) one
or more atmospheric gas burners, which are made of materials whose
20 use is not suitable in the presence of high heat emissions, such as, for
example, tempered glass, enamelled steel or stainless steel. Such
materials, in fact, undergo a considerable degradation of their
physical characteristics, and, in particular, their structural
characteristics, when they are in the proximity of heat sources with
25 high temperatures.

In particular, the use of supporting surfaces made of tempered glass, a
material which, in its most typical compositions, poorly withstands
temperatures higher than 280°C, is in any case more desirable in so far
as tempered glass is able, from the aesthetic standpoint as well as the

maintenance standpoint, to replace pyroceram, the use of which in cooking hobs entails extremely high costs.

The use of cooking hobs having a supporting surface made of pyroceram is, in fact, particularly widespread on account of its
5 aesthetic qualities and the simple cleaning operations that such cooking hobs require. In spite of the brittleness of pyroceram, which implies the implementation of a number of constructional solutions aimed at preventing fractures, for example, due to the different rates of thermal expansion of the materials employed (steel or other metals
10 for the burner and pyroceram for the supporting surface), the cooking hobs made of said material do not present any structural or mechanical degradation to thermal stresses coming from the burners, even though they prove particularly expensive and difficult to model.

In order to overcome the aforesaid drawbacks, and at the same time
15 maintain the aesthetic characteristics and the characteristics of practicality of maintenance of the cooking hobs with supporting surfaces made of pyroceram, there have been produced supporting surfaces made of tempered glass, which, however, have proven extremely sensitive to the heat developed by the burners, thus
20 presenting unfavourable phenomena of structural yielding during use.

The high temperatures and the constant irradiation localized in the proximity of the burner, to which the surface made of tempered glass is subject during combustion, as well as the consequent presence of a steep temperature gradient between adjacent areas on the glass
25 surface, frequently lead to the formation of fractures and/or phenomena of structural yielding of the cooking hob.

In order to solve the above problem, it has been proposed to increase the diameter of the holes provided for housing the burners obtained in the surface made of tempered glass and to affix, for each hole, a

metal plate on the supporting surface, in a position corresponding to the burner, in order to screen the irradiation coming from the burner and from the bottom part of the cooking recipient, and directed towards the surface made of tempered glass.

- 5 Said solution, which entails the use of metal plates having a plan extension that is other than negligible, is able to prevent fractures in the cooking hob, but is aesthetically far from pleasant and constitutes an obstacle to cleaning of the cooking hob.

- 10 In addition, in embodiments of cooking hobs known to the prior art, for example, from the British patent application GB-A-2.068.104, such metal plates may be shaped like concave containers or trays, at the centre of which is housed the burner. This implies the drawback of accumulation of grease and ashes in the plate, with consequent inconvenience for cleaning of the cooking hob, as well as the need to
- 15 achieve a considerable precision of fabrication and of assembly of the plates, which need to have low dimensional tolerances, as compared to the specific techniques envisaged in the design phase.

- Finally, the gas burners used with said protective plates are generally of the type in which the intake of primary air takes place underneath
- 20 the cooking hob, given the overall dimensions of the protective plate itself and the laborious problems involved in making air-inflow inlets set above said plate. Gas burners in which the flow of primary air for combustion comes from underneath the cooking hob are less efficient and usually of larger dimensions as compared to burners in which the
- 25 primary air is taken in above the cooking hob and likewise involve the presence of appropriately designed air intakes in the supporting surface, which, above all in brittle materials, such as tempered glass, can prove difficult to produce.

There is consequently felt the need to find a solution, alternative to the

ones so far identified, which will enable the use of supporting surfaces for atmospheric gas burners made of tempered glass whilst still retaining the same aesthetic qualities and the practicality of production and maintenance of the surfaces made of pyroceram
5 and without the need to use burners in which the intake of primary air takes place underneath the cooking hob.

As regards, instead, cooking hobs with a supporting surface made of stainless steel or other materials that are structurally resistant to heat but aesthetically degradable, such as enamelled steel, said cooking
10 hobs tend, in the proximity of the burners, to undergo deformation and to change colour permanently, thus rendering the cooking hob itself somewhat unpleasant from the aesthetic point of view.

Also for the above materials, there is felt the need to find solutions that will enable their use in cooking hobs provided with atmospheric gas
15 burners, without there occurring any degradation in the appearance of the said cooking hob.

The above-mentioned needs are met by the present invention, which provides a surprising solution to the drawbacks that arise with the use, for the supporting surface in cooking hobs comprising one or more
20 atmospheric gas burners, of materials that are physically and/or only structurally degradable when set in the presence of heat sources.

Consequently, a purpose of the present invention is to provide a cooking hob having a supporting surface for housing the burners which is made of a material that is degradable in the presence of
25 thermal emissions, which does not present the drawbacks referred to above, and at the same time is of pleasant appearance and simple to produce and maintain.

Another purpose of the present invention is to provide a cooking hob having a support made of a material that is degradable in the

presence of thermal emissions and is provided with at least one gas burner, in which the latter is of the type that envisages the inflow of primary air from above the support that houses the burner itself.

SUMMARY OF THE INVENTION

5 The above and other purposes are achieved by the present invention, according to what is claimed in the first independent claim of use and in the subsequent dependent claims and according to what is claimed in the independent Claim 12 and in the subsequent product claims dependent thereon.

10 According to the present invention, the solution to the drawbacks referred to above can be achieved by using, in a way that is unknown to the prior art and is in itself surprising, a gas burner of an atmospheric type provided with a burner base, a burner head having at least one flame crown, and a circumferential ring, the gas burner being set in a
15 hole made in the supporting surface of a cooking hob which is made of a material, the physical characteristics or the structure of which are degradable in the proximity of heat sources. The circumferential ring is set between the flame crown and the supporting surface.

The action of the circumferential ring, which is preferably shaped like a
20 truncated cone with the major base facing the supporting surface, is that of shielding the latter from the irradiation coming from the burner and from the heated recipient, in order to prevent, in the proximity of the said burner, there being formed temperature gradients such as might cause fracturing of the said supporting surface. The
25 circumferential ring also has the function of dissipating the heat transmitted by irradiation and by conduction along the burner.

According to a preferred feature of the present invention, the circumferential ring is separate from the support of the cooking hob in such a way that the space existing between the support and the

circumferential ring will enable passage of the primary air directed to the burner, this implying the use of a burner of the type in which the primary air is taken in above the cooking hob.

In this way, the primary air inflow, which is drawn, for example, by a
5 horizontal Venturi tube (also known as radial Venturi), with which the burner can be equipped, contributes to cooling down both the circumferential ring and the supporting surface in the proximity of the burner.

According to a further feature of the present invention, the
10 circumferential ring has a plan diameter greater than or equal to the diameter of the hole within which the burner is housed and preferably greater than or equal to the diameter of the flame crown.

In a preferred embodiment of the present invention, the burner is of the type comprising two or more flame crowns, and the supporting
15 surface is made of tempered glass.

The present invention also intends to protect a cooking hob which has a support made of a material, the physical characteristics of which or the structure of which are degradable in the proximity of heat sources, and provided with at least one hole, within which is housed, at least
20 partially, a gas burner of the type comprising a burner base and a burner head with at least one flame crown. Said burner is provided with a circumferential ring set between the flame crown and the supporting surface. Preferably, the circumferential ring is set at a distance from the supporting surface, and the primary air is taken in
25 above the supporting surface and underneath said circumferential ring.

BRIEF DESCRIPTION OF THE DRAWINGS

There now follows a description, purely by way of non-limiting example, of a preferred embodiment of the present invention, with

the aid of the attached figures, in which:

- Figure 1 is a perspective view from above of a cooking hob made of thermally degradable material, comprising a plurality of atmospheric gas burners, according to a particular feature of the present invention;

- Figure 2 is a profile view, partially in cross section, of a gas burner provided with three flame crowns used on a cooking hob made of thermally degradable material, according to another feature of the present invention;

- Figure 3 is a view in lateral cross section of the burner of Figure 2; and

- Figure 4 is a partially cut-away perspective view, of a burner provided with a single flame crown, according to a further feature of the present invention.

DETAILED DESCRIPTION OF SOME PREFERRED EMBODIMENTS OF THE INVENTION

The present invention relates, with reference to Figure 1, to the use of at least one gas burner 2, 3a, 3b or 3c with one or more flame crowns in a cooking hob, for example, a domestic cooking hob, provided with a supporting surface 1 made of a material the physical characteristics of which or the structure of which are degradable in the presence of heat sources, such as, for example, tempered glass, stainless steel, or enamelled steel. The present invention likewise relates to a cooking hob having a supporting surface made of a degradable material.

Figure 1 illustrates, then, purely by way of non-limiting example, a cooking hob provided with a supporting surface 1, for example, made of tempered glass, on which are arranged, in purposely provided seats, a burner 2 with three flame crowns and three burners 3a, 3b, 3c having just one flame crown.

As is illustrated in Figure 2, the burner 2 comprises, according to the present invention, a burner base 4 and a burner head 5 bearing the above-mentioned three flame crowns, as well as a circumferential ring 9 set between the flame crowns and the supporting surface 1. The
5 outermost flame crown, defined in the burner head 5 by peripheral holes 26, can be seen in Figure 2.

The base 4 of the burner 2 is housed in a circular hole made in the said supporting surface 1 (and set in a position corresponding to the portion designated by 22 in Figure 2), supported by a plurality of flat springs 8
10 set opposite to a circular flange 7, between which is set the portion of the supporting surface 1 adjacent to the housing hole. The burner 2 is likewise provided with a supporting grill 6 for a cooking container.

More in particular, with reference to Figure 3, the burner 2 comprises a base 4 set underneath the supporting surface 1, which is made of
15 tempered glass, in which there is set an injector 23 for the combustible gas. The base 4 presents peripheral ramifications or projections 24, which engage in the seat of the supporting surface 1 and carry both the flange 7 and the flat springs 8. The coupling of the springs 8 to the circular flange 7 and the mutual clamping thereof, after prior
20 interposition of the edges of the housing hole of the burner 2, enables stable fixing of the burner base 4 to the supporting surface 1.

In alternative embodiments (not illustrated), the base 4 of the burner 2 can be housed in a circular hole of the supporting surface 1, without coming into contact with the latter and being supported, for example,
25 by elastic means, on a structural element of the cooking hob set underneath the supporting surface 1 and not visible to the user.

According to the known art, above the base 4, and constrained thereto in a removable way, there is a burner head that has a central body 12, closed by a top lid 10 and equipped, once more according

to the prior art, with a horizontal Venturi tube (or radial Venturi) 11 for mixing of the gas with the primary air, and with a distribution chamber having holes facing outwards and designed to define a first central flame crown. The burner head further comprises a toroidal body 13, which is surmounted by a an annular lid 14 and connected to the horizontal Venturi 11 and/or to the distribution chamber of the body 12 by appropriate radial channels (not illustrated), and which presents an inner series of holes and an outer series of holes designed for defining, respectively, a second flame crown and a third flame crown. The second flame crown is, in particular, set in opposition to the first central flame crown, and the burner 2 is moreover provided with a grill 6 designed for supporting a cooking container.

The burner 2, moreover, is of the type in which the primary air I is taken in, thanks to the suction exerted by the Venturi 11, from above the supporting surface 1, penetrates, via channels (not illustrated), into the chamber defined by the burner base 4, and then is mixed with the gas coming out of the nozzle 23 in said horizontal Venturi (or radial Venturi) 11. A burner of the type referred to above is known from the patent application EP-A-0.903.538 or from the publication EP-A-0.797.048, both of which are in the name of the present applicant.

According to the present invention, the burner 2 likewise presents a circumferential ring 9, which is made of the same material as or of a material different from that of the burner, set coaxial to the vertical axis of the said burner and set between the flame crowns and the supporting surface 1 made of tempered glass. Advantageously, as will emerge clearly from what follows, the ring 9 is separate from the supporting surface 1, and the primary air I is induced to enter the burner above the supporting surface 1 and underneath the ring 9.

The presence of the circumferential ring 9, which is conveniently set

between the heat source, represented by the flame crown or flame crowns, and the supporting surface made of tempered glass, enables adequate shielding of the supporting surface made of tempered glass 1 from the irradiation coming from the flame crowns and, albeit to a lesser extent, also from the irradiation coming from the heated cooking container.

The above-mentioned shielding action, which brings about lowering of the temperature of those areas of the supporting surface 1 in the proximity of the burner 2, has surprisingly proved sufficient for preventing the substantial degradation of the material of which the supporting surface 1 is made. In the case of tempered glass, for example, the interposition of the ring 9 prevents the generation of fractures and makes possible the use of said economic material in the production of cooking hobs. Also when used with surfaces made of stainless steel or enamelled steel, the ring 9 has enabled reduction or elimination of the formation of halos or deformations of the supporting surface 1.

In addition, the inflow of primary air 1, drawn by the Venturi 11, in the space made between the ring 9 and the supporting surface 1, which is substantially at room temperature, contributes to a cooling down by convection of both the supporting surface 1 and the circumferential ring 9. The contribution of the flow of primary air 1 in the action of local cooling is deemed particularly important, albeit not essential, in the case of brittle materials, such as tempered glass.

Finally, the ring 9 acts also partially as a heat sink, by conduction, of the heat produced by the burner 2 itself, thus lowering the temperature of the latter in the proximity of the said ring 9 and, hence, the temperature in proximity of the hole housing the burner in the supporting surface 1.

According to a preferential feature of the present invention, the plan diameter of the circumferential ring 9 is greater than the diameter of the hole present in supporting surface 1 made of tempered glass and is also greater than the plan diameter of the outermost flame crown defined by the toroidal body 13. In this way, the ring 9 extends, in plan view, from the burner base 4, or from the burner head 5, up to beyond the flame crown made along the outer perimeter of the toroidal body 13.

The above dimensions of the ring 9, which are much greater than the dimensions of similar rings made in burners provided in traditional cooking hobs, enable an effective shielding of the supporting surface underneath.

The ring 9, as may be seen in Figure 3, is moreover preferably shaped substantially like a truncated cone with the major base facing the supporting surface 1 so as to prevent any possible residue of food that may come out of the cooking container from getting stuck on the ring 9, with the risk of combustion thereof. Alternative embodiments of the ring 9 made with a convex shape have proven equally effective.

Furthermore, the circumferential ring 9 may be made separately from the burner 2 and coupled, by juxtaposing the various parts, to the latter, but may also be made integrally with an element of the burner 2 itself. For example, should the ring 9 be coupled to a burner of the type described in EP-A-0.797.048, i.e., a burner, which comprises an inner metal plate shaped for separation of the fluid flows, said ring 9 may be made of a single piece with said inner metal plate, thus considerably simplifying its production.

Materials that may be suitable for the production of the ring 9 are steel, aluminium alloys (Al-Si or Al-Ni), or other alloys or metal materials, such as brass, or else ceramics or plastic technopolymers with ceramic

fillers or with fibre fillers that are resistant to high temperatures.

Figure 4 illustrates another embodiment of the present invention, in which, on a cooking hob provided with a supporting surface 1 made of a thermally degradable material, there is fit an atmospheric gas burner 3 of the type comprising just one flame crown.

The burner 3 comprises: a burner base 15 fit in a housing hole made on the supporting surface 1; elastic means for coupling to the supporting surface 1, which consist of one or more flat springs 21 and a circular flange 20 for being set opposite to said springs; a burner head 16; and a top lid 17. The base 15 is withheld in position thanks to the interposition of the edges of the hole for housing the supporting surface 1 between the spring 21 and the circular flange 20 and comprises a chamber, within which there is present an injector 23, fluid-connected to a pipe 25 for supplying the combustible gas.

The burner head 16 of the burner comprises a horizontal Venturi 18, constituted, according to the known art, of a reduced section portion and of a radial expansion chamber, and is enclosed by the lid 17. At the radial ends of the expansion chamber there is a portion for distribution of the gas-primary air I mix, which presents a series of holes that form the flame crown of the burner 3. The burner 3 likewise presents, connected by interposition of parts, a circumferential ring 19, which extends from the burner head 16 of the burner up to beyond the flame crown. The said circumferential ring 19 is separate from the supporting surface 1 in order to enable inflow of the primary air I between the said supporting surface 1 and the ring 19.

Also by using the burner 3, illustrated in Figure 4, the effect of shielding from irradiation and of cooling of the supporting surface 1 by the flow of the incoming primary air I, obtained thanks to the ring 19, enables the use of cooking hobs provided with supporting surfaces made of

thermally degradable materials, such as, for example, tempered glass, stainless steel, or enamelled steel.

Claims

1. Use of a gas burner, of the type comprising a burner base and a burner head provided with at least one flame crown, in a cooking hob having a supporting surface made of a material the physical characteristics or the structure of which are degradable in the proximity of heat sources, said burner being at least partially housed in a hole made in said cooking hob and comprising a circumferential ring set between said at least one flame crown and said supporting surface.
2. Use of a gas burner according to Claim 1, in which said circumferential ring is set at a distance from said supporting surface and the primary air is taken in above the supporting surface and underneath said circumferential ring .
3. Use of a gas burner according to Claim 1 or Claim 2, in which said circumferential ring has a plan diameter equal to or greater than the diameter of said flame crown.
4. Use of a gas burner according to any one of the preceding claims, characterized in that said circumferential ring has a plan diameter greater than or equal to the diameter of said hole within which the burner is housed.
5. Use of a gas burner according to any one of the preceding claims, in which said circumferential ring substantially has the shape of a truncated cone and/or a convex shape, the major base of which faces said supporting surface.
6. Use of a gas burner according to any one of the preceding claims, in which said burner comprises at least one horizontal Venturi tube for mixing of primary air and combustible gas.
7. Use of a gas burner according to any one of the preceding claims, in which said burner comprises two or more flame crowns.

8. Use of a gas burner according to any one of the preceding claims, in which said supporting surface of the cooking hob is made of tempered glass, or of stainless steel, or of enamelled steel.
9. Use of a gas burner according to any one of the preceding
5 claims, in which said circumferential ring is fixed to the base or to the head of the burner.
10. Use of a gas burner according to any one of the preceding claims, in which said burner comprises an intermediate plate for the separation of the fluid flows towards and in the burner, and in which
10 said circumferential ring is fixed in an integral way to said intermediate plate.
11. Use of a gas burner according to any one of the preceding claims, in which said circumferential ring is made of steel, or aluminium, or aluminium alloys, or brass, or ceramic, or plastic
15 technopolymers with ceramic fillers or with fibre fillers that are resistant to high temperatures.
12. A cooking hob having a supporting surface which is made of a material the physical characteristics or structure of which are degradable in the proximity of heat sources and is provided with at
20 least one hole within which is housed at least partially a gas burner of the type comprising a burner base and a burner head having at least one flame crown, as well as a circumferential ring set between said at least one flame crown and said supporting surface.
13. The cooking hob according to Claim 12, in which said
25 circumferential ring is set at a distance from said supporting surface, and the primary air is taken in above the supporting surface and underneath said circumferential ring.
14. The cooking hob according to Claim 12 or Claim 13, in which said burner is of the type comprising a burner head having two or

more flame crowns.

15. The cooking hob according to any one of Claims 12, 13 or 14, in which said circumferential ring has a plan diameter equal to or greater than the diameter of said flame crown.

5 16. The cooking hob according to any one of Claims 12 to 15, in which said circumferential ring has a plan diameter greater than or equal to the diameter of said hole within which the burner is housed.

17. The cooking hob according to any one of the preceding Claims 12 to 16, in which said circumferential ring has a shape that is
10 substantially a truncated cone and/or a convex shape.

18. The cooking hob according to Claim 17, in which the major base of said circumferential ring faces the supporting surface.

19. The cooking hob according to any one of Claims 12 to 18, in which said circumferential ring is made of steel, or aluminium, or
15 aluminium alloys, or brass, or ceramic, or plastic technopolymers with ceramic fillers or with fibre fillers that are resistant to high temperatures.

20. The cooking hob according to any one of Claims 12 to 19, in which said supporting surface of the cooking hob is made of tempered glass or of stainless steel or of enamelled steel.