United States Patent

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[73] Assignee **Institute of Gas Technology**

[54] **GAS BURNER DEVICE**
7 Claims, 5 Drawing Figs.

[52] U.S. Cl. 126/39, 126/214
[51] Int. Cl. F24c 3/00, F24c 15/10
[50] Field of Search ..... 126/39, 39 H, 39 D, 39 K, 214, 214 C

[56] **References Cited**

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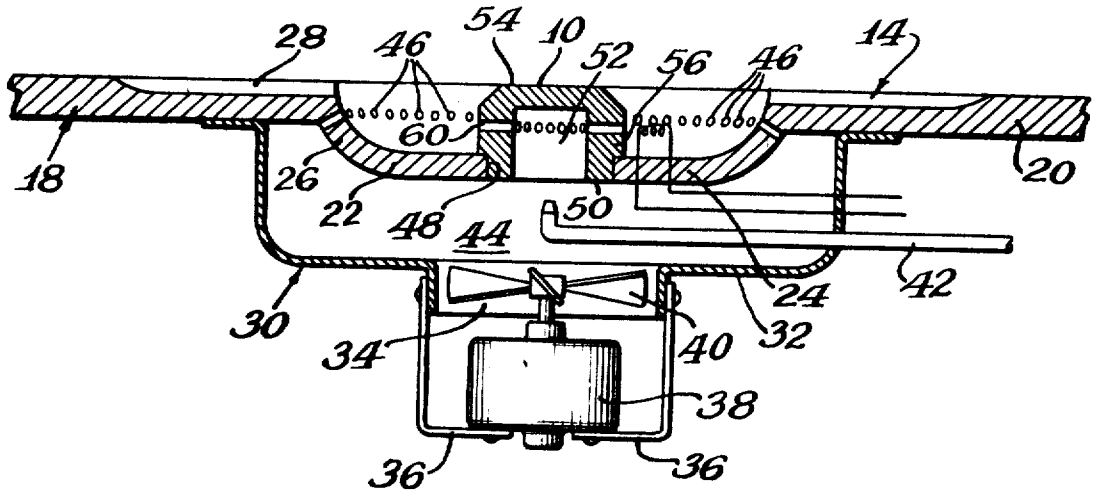
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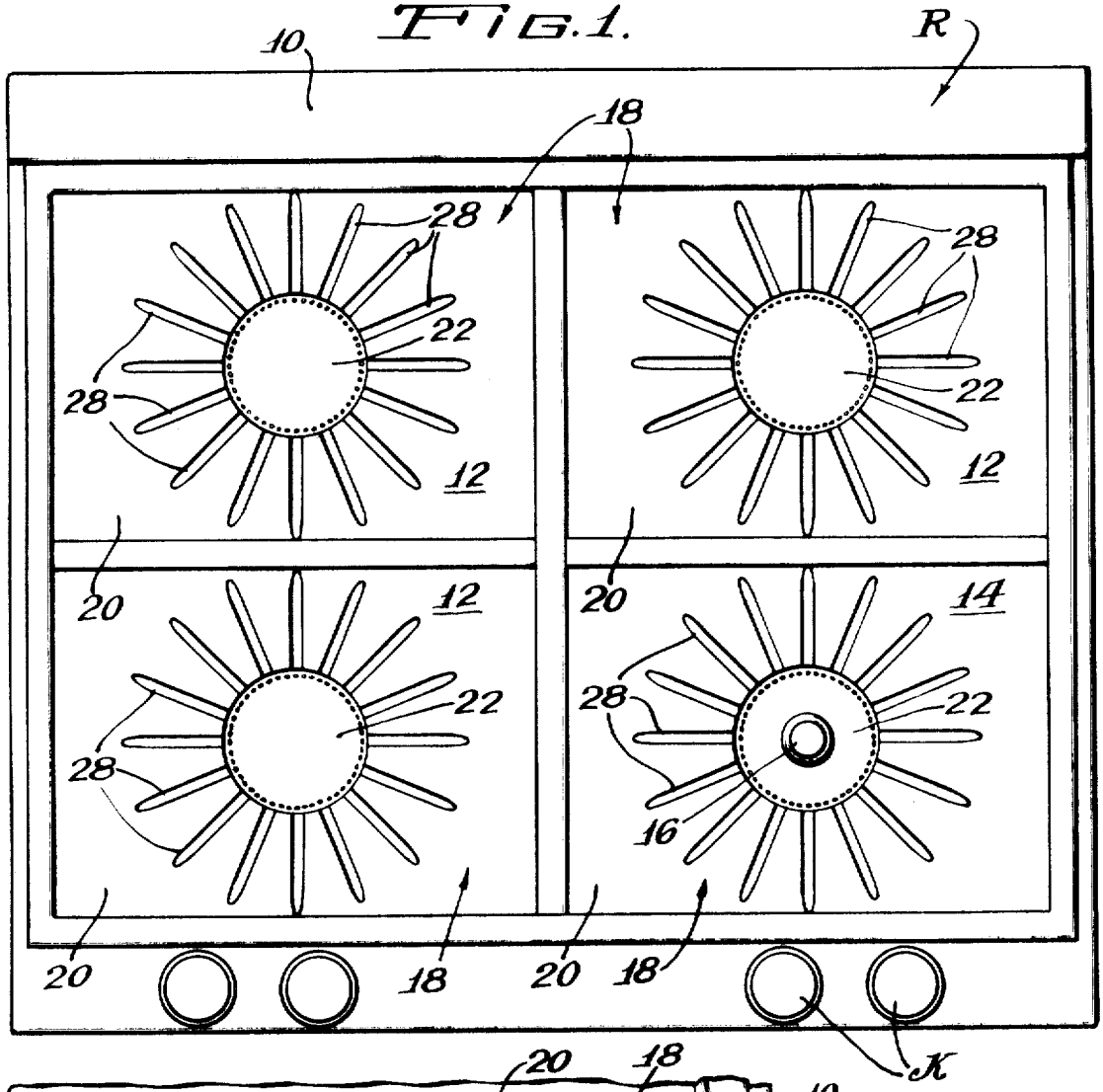
ABSTRACT: A gas burner for heating a pot or pan for use on a gas range top. The burner includes a planar portion and a recessed portion which is unitary with the planar portion. A chamber is provided below the recessed portion and passage means extend from the chamber and pass outwardly through the recessed portion. Means are provided for introducing a gaseous combustible medium, such as a mixture of air and gas, to the chamber and for directing the combustible mixture through the passage means. Means are also provided for igniting the gaseous combustible mixture as it passes outwardly through the passage means in the recessed portion.



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SHEET 1 OF 2

FIG. 1.



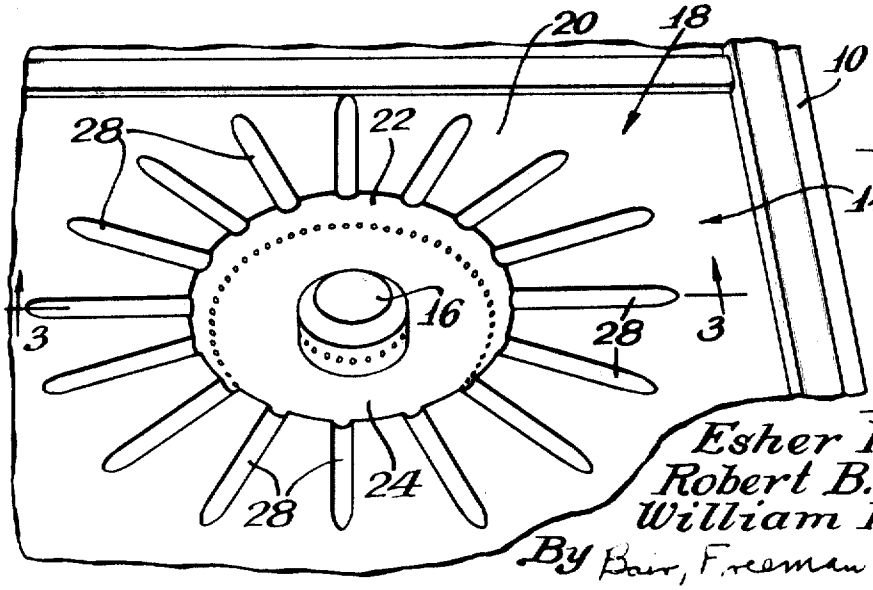


FIG. 2.

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FIG. 3.

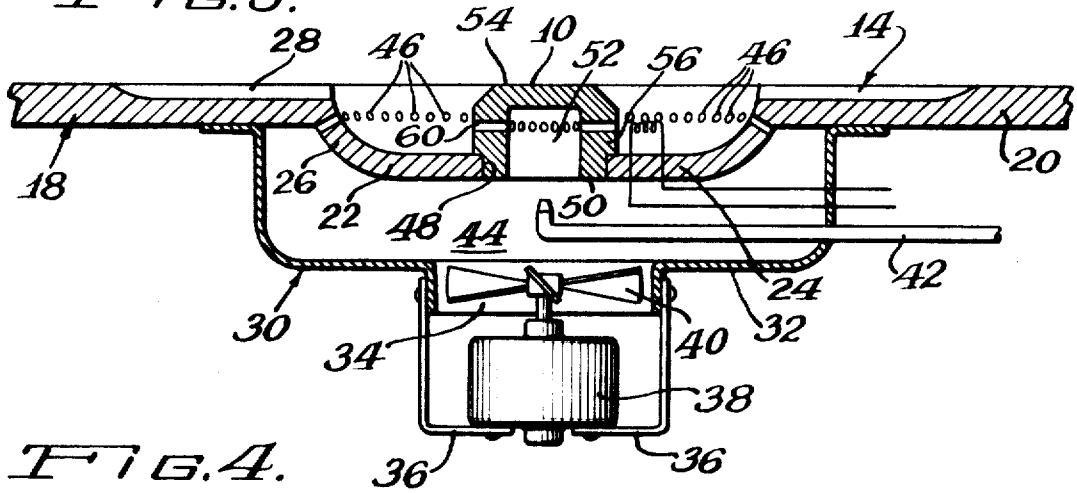


FIG. 4.

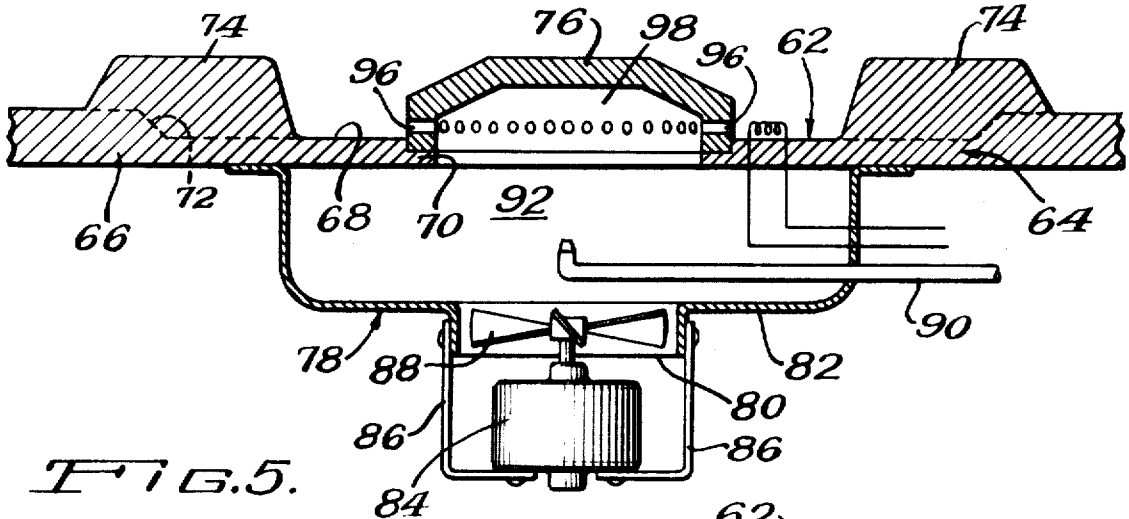
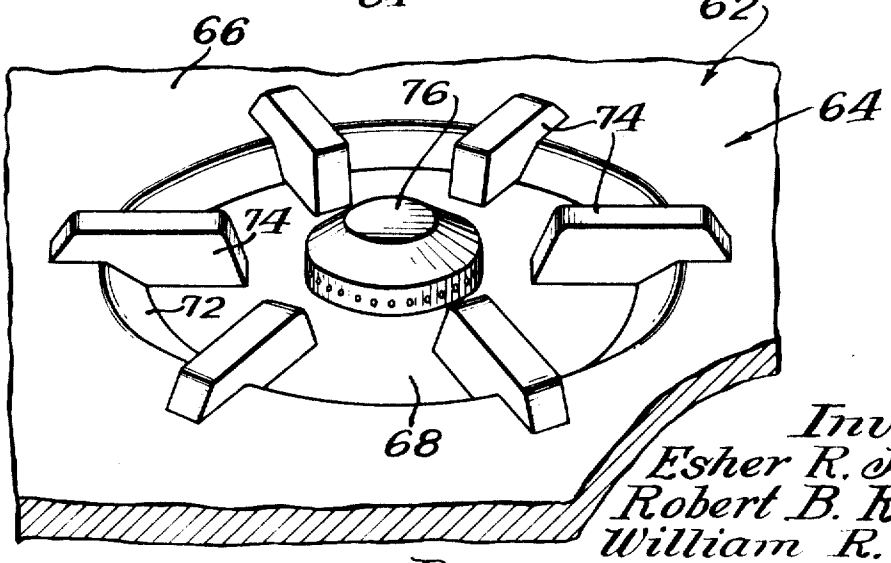


FIG. 5.



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GAS BURNER DEVICE

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION AND DESCRIPTION OF THE PRIOR ART

This invention relates to a gas burner structure for use on a gas range top.

For years, gas ranges have been conventionally constructed by having openings in the range top and a burner is located in each of the openings in the top. Each burner is normally connected to a gas manifold which passes natural gas into the burner. Grates are normally mounted on the gas range top around each of the openings so that the bottom of a pan rests on the grate at a position spaced above the burner.

The conventional prior art burners have certain inherent disadvantages. One of the primary disadvantages of conventional burner designs are the difficulties encountered in cleaning the gas range top and the individual burners. Ordinarily, the burner tops must all be removed and then separately cleaned. Furthermore, because of the annular opening that is normally located around the burner and the gas range top, food, crumbs, spilled liquids, boiled over materials, and the like often pass downwardly through the annular opening. This not only necessitates cleaning the burner top but also the top of the burner box which is normally directly below the burner openings. The cleaning of the bulkhead is often a difficult and time consuming job because it usually requires complete dismantling of the entire burner structure and dismantling of the gas manifold. The grates must be separately removed and cleaned.

SUMMARY OF THE INVENTION

It is therefore an important object of this invention to provide an improved gas burner structure for use on a gas range top wherein many of the inherent disadvantages of conventional prior art gas burners are avoided.

It is also an object of this invention to provide a gas burner which is particularly easy to clean and substantially prevents the passage of spilled food downwardly to the bulkhead which defines the upper wall of the oven.

It is yet another object of this invention to provide a monolithic gas burner structure which not only supports pots and pans but also acts as a flame retainer, wherein the structure is particularly characterized by its ease of cleaning.

It is yet another object of this invention to provide an improved gas burner for gas ranges wherein the burners are characterized by self-cleaning by combustion of material which comes into contact with the flame zone.

Further purposes and objects of this invention will appear as the specification proceeds.

The foregoing objects are accomplished by providing a gas burner for use on a gas range top wherein the structure includes a planar portion, a recessed portion which is unitary with the planar portion, a chamber located below the recessed portion, passage means which pass from the chamber and through the recessed portion, means for introducing a gaseous combustible medium into the chamber and for directing the gaseous medium through the passage means, and means for igniting the gaseous mixture as it passes outwardly through the passage means.

BRIEF DESCRIPTION OF THE DRAWINGS

Particular embodiments of the present invention are illustrated in the accompanying drawings wherein:

FIG. 1 is a top plan view of a gas range top utilizing particular embodiments of our invention:

FIG. 2 is a perspective view of one of our improved gas burners;

FIG. 3 is a cross-sectional view taken along the line 3–3 of FIG. 2 showing the internal structure of our improved gas burner structure;

FIG. 4 is a cross-sectional view of an alternate embodiment of our improved gas burner structure; and

FIG. 5 is a perspective view of the exterior of the gas burner device shown in FIG. 4. DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIG. 1, a range top 10 of a gas range R is shown having three gas burners 12 made in accordance with one embodiment of the invention and a gas burner 14 embodying an alternate embodiment of our invention. As shown in the perspective view of the embodiment 14 in FIG. 2, the burner 14 differs from the burner 12 in the addition of a central upright post burner 16.

The burners 12 and 14 are provided with a substantial monolithic plate, generally 18, which includes a planar portion 20 and a central depressed or dished portion 22. The dished portion 22 is substantially circular in plan view and has a bottom portion 24, which is devoid of openings, and a curved, upwardly extending sidewall 26 which intersects the planar portion 20. A plurality of radially extending grooves 28 extend outwardly in the planar portion 20 form the intersection between the dished portion 22 and the planar portion 20. The grooves act as exhaust ports for combustion products when a pot or pan rests on the planar portion and over the dished portion 22, the flame retainer. Since many pots and pans have a planar bottom with a diameter greater than the diameter of the dished portion 22, it is important that the described exhaust ports be provided for proper exhaustion of combustion products.

Preferably, the burner plate 18, including the planar portion 20 and the dished portion 22, are formed in a single piece of the same material, such as a ceramic material resistant to flame and high heat. The material is also to be capable of being cooled in a really short period of time after the burner has been inoperative.

Referring to FIG. 3, and enclosure 30 is secured to the underside of the plate 18 by suitable means (not shown) directly below the dished portion 22 of each of the burners 12 and 14. The bottom wall 32 of the plenum 30 has an air inlet 34 provided thereon. A pair of brackets 36 rigidly support a motor 38 which drives a fan 40. The fan 40 draws air from the atmosphere upwardly through the inlet 34 and forces it under pressure into the chamber 44 defined by the enclosure 30.

A gas manifold 42 passes through the wall of plenum 30 and is directed into the chamber 44. The gas manifold 40 directs natural gas therein where the gas is intermixed, if desired, with the air being drawn inwardly through the inlet 34.

A plurality of peripheral passageways or apertures 46 are located in the sidewall 26 of the dished portion 22. The passageways 46 are spaced above the bottom portion 24 so that ordinarily no material spilled in the dished portion 22 will pass through the passageways 46.

The burner 14, in contrast to the burners 12, includes a central burner post 16 which is received by an aperture 48 in the central part of the bottom 24 of the dished portion 22. The aperture 48 receives, by press fit, a recessed cylindrical lower end 50 on the post burner 16. The burner post 16 is removable from the aperture 48. However, the parts fit together so that there can be substantially no passage of material between the post burner 16 and the aperture 48. An upright aperture 52 is provided in the burner 16. The burner 16 has an upper wall 54 which has an upper surface coextensive with the upper surface of the planar portion 20 of the plate structure 18. A plurality of laterally extending passages 60 are provided in the sidewall 56 of the burner post 16.

An ignition or glow coil 58 is located in close proximity to one of the passageways 46 provided in the dished portion 22 and exterior of the chamber 44. The coil 58 is to be rapidly heated to at least the ignition temperature of the combustible material, such as a mixture of gas and air, contained within the plenum or chamber 44 so that as the mixture passes outwardly through the passageways 46, there will be rapid combustion thereof. The flame apertures on passageways 46 are in close proximity so that a flame is rapidly passed from each

peripheral passageway 46 to the next and is also passed to the lateral burner openings 60 provided in the burner post 16. A glow coil may alternatively be placed exterior and adjacent one of the burner openings 60 in the burner post 16.

Referring to FIGS. 4 and 5, an alternate embodiment of our invention is shown. In the embodiment of FIGS. 4 and 5, the gas burner 62 includes a substantially monolithic plate 64. The plate 64 includes a planar portion 66 and a dished portion 68. The dished portion 68 is devoid of apertures as is the planar portion 66. The dished portion 68 includes a bottom 70 and curved sidewalls 72 which extend from the bottom 70 and intersect, at a substantially circular intersection, with the planar portion 66.

A plurality of radially extending ribs 74 formed in one piece with the plate 64 are provided in the area of the dished portion 68 and extend partially to the planar portion 66. The ribs 74 are each of substantially the same construction having an upper surface which is spaced above the upper surface of the planar portion 66. The ribs 74, of equal height, provide support for pots or pans. The lateral space between the lower surface of a pot or pan, the side surfaces of the ribs 74 and the upper surface of the planar portion 66 provide an exhaust port for combustion gases. The ribs 74 are spaced from the central burner portion 76, which is at the central portion of the dished portion 68 and the plate 64.

As in the embodiment of FIGS. 1—3, an enclosure 78 is integrally connected by suitable means (not shown) to the undersurface of the burner plate 64. The enclosure 78 is located directly below the dished portion 68. An air inlet 80 is located in the bottom 82 of the plenum 78. A motor 84 is mounted to the enclosure 78 by brackets 86 and the motor drives a fan 88 which draws outside air from the outside through the air inlet 80 and passes into the enclosure 78. A gas manifold 90 passes through the enclosure 78 and directs gas into the chamber 92 defined by the enclosure 78.

An ignition or glow coil 94 is provided for igniting the combustible mixture, such as a gas-air mixture, as the mixture passes outwardly through the burner apertures 96 in the cylindrical sidewall of the central burner portion 76. The coil 94, exterior of and adjacent a burner opening 96, is rapidly heated to the combustion temperature of the gaseous combustible mixture contained within the chamber 78. The glow coil may be located any place exterior of an adjacent a burner opening. The apertures 96 communicate with the upright aperture 98 of the burner portion 76. The closed upper surface of the burner portion 76 is coextensive with the upper surface of the rib 74 so that a pot or pan rests steadily thereon.

Various systems other than those shown in the drawings may be used for supplying the combustible gas-air mixture to the burner head. For example, an inspirator tube may be used for supplying primary air-gas mixture while a fan supplies the secondary air. Further, two separate chambers may be provided—one chamber for the outer ring of burner openings and one for the inner ring; a fan supplies air to both chambers, which gas is supplied separately to the inner and outer chambers. Also, a rheostat control could be used for the air supply to the amount of gas supplied.

The operation of both embodiments is substantially the same. When a person desires to operate the range, the knob K on the range R is turned to the "on" position. This causes introduction of gas into the plenum 30 or 78 through the gas manifold 42 or 90 by opening a solenoid operated valve (not shown) on the respective manifold. Simultaneously, a switch (not shown) operates the motor 38 or 84 to draw air through the inlet 34 or 80. By closing another switch (not shown), the ignition coil 58 or 94 is rapidly heated to combustion temperature so as to ignite the gas-air mixture. As a result, the flame passes laterally outwardly through the flame apertures 48 or 96 for the purpose of heating a pot or pan.

When the bottom of a pot or pan extends beyond the dished portion 22 or 68, the combustion gases escape through the grooves 28 or through the space formed between the ribs 74. In both cases, if there is any spillage of material, the entire burner is easily cleaned because there are no apertures, except for the burner openings themselves, where food or material may collect or pass. Furthermore, the heat imparted by the flame will cause combustion of material collected in the area of the burner so that it is only necessary for a person to wipe away the ash. It is thus seen that all of the objects of the foregoing invention have been accomplished.

While in the foregoing there has been provided a detailed description of particular embodiments of the present invention, it is to be understood that all equivalents obvious to those having skill in the art are to be included with the scope of the invention as claimed.

What we claim and desire to secure by Letters Patent is:

1. A gas burner for heating a pot or the like for use on a gas range top, said burner comprising a planar portion, a recessed portion unitary with said planar portion, a chamber below said recessed portion, passage means between said recessed portion and said chamber, a substantially upright post at the central portion of said recessed portion, said post including passageways from said chamber passing laterally outwardly through said upright post, means for introducing a combustible gaseous medium into said chamber and for directing said combustible medium through said passageways and said passage means, and means for igniting said combustible gaseous medium as it passes outwardly through said passageways and said passage means.

2. The device of claim 1 wherein means are provided for supporting a pot or the like above said recessed portion while providing exhaust passageways for combustion products between the pot and the said planar portion.

3. The device of claim 1 wherein said recessed portion has a bottom and a side portion, said passage means comprises a plurality of apertures in the said side portion, said apertures being spaced upwardly from said bottom portion.

4. The apparatus of claim 1 wherein pan support means, unitary with said planar portion, projecting upwardly therefrom, are provided adjacent said recessed portion.

5. The device of claim 1 wherein said introducing means comprises a manifold for introducing gas into said chamber, and fan means for introducing and mixing air with the said gas for passage through said passage means, and said igniting means comprises electrical heating means capable of being rapidly raised to the ignition temperature of the combustible gaseous medium.

6. A gas burner for heating a pot or the like for use on a gas ranger top, said burner comprising a planar portion, a recessed portion unitary with said planar portion, said planar portion providing a surface for supporting said pot, and radial groove means at the intersection between said recessed portion and said planar portion for permitting the escape of combustion products, a chamber below said recessed portion, passage means between said recessed portion and said chamber, means for introducing a combustible gaseous medium into said chamber and for directing said combustible gaseous medium into said chamber and for directing said combustible medium through said passage means, and means for igniting said combustible gaseous medium as it passes outwardly through said passage means.

7. A gas burner for heating a pot or the like for use on a gas range top, said burner comprising a planar portion, a recessed portion unitary with said planar portion, a chamber below said recessed portion, passage means between said recessed portion and said chamber, a central raised portion in said recessed portion, said passage means including apertures projecting laterally from the side portions of said central raised portion, means for introducing a combustible gaseous medium into said chamber and for directing said combustible medium through said passage means, and means for igniting said combustible gaseous medium as it passes outwardly through said passage means.