

Nov. 6, 1951

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2,574,153

COMBINATION BAKING AND BROILING GAS BURNER

Filed April 5, 1945

2 SHEETS—SHEET 1

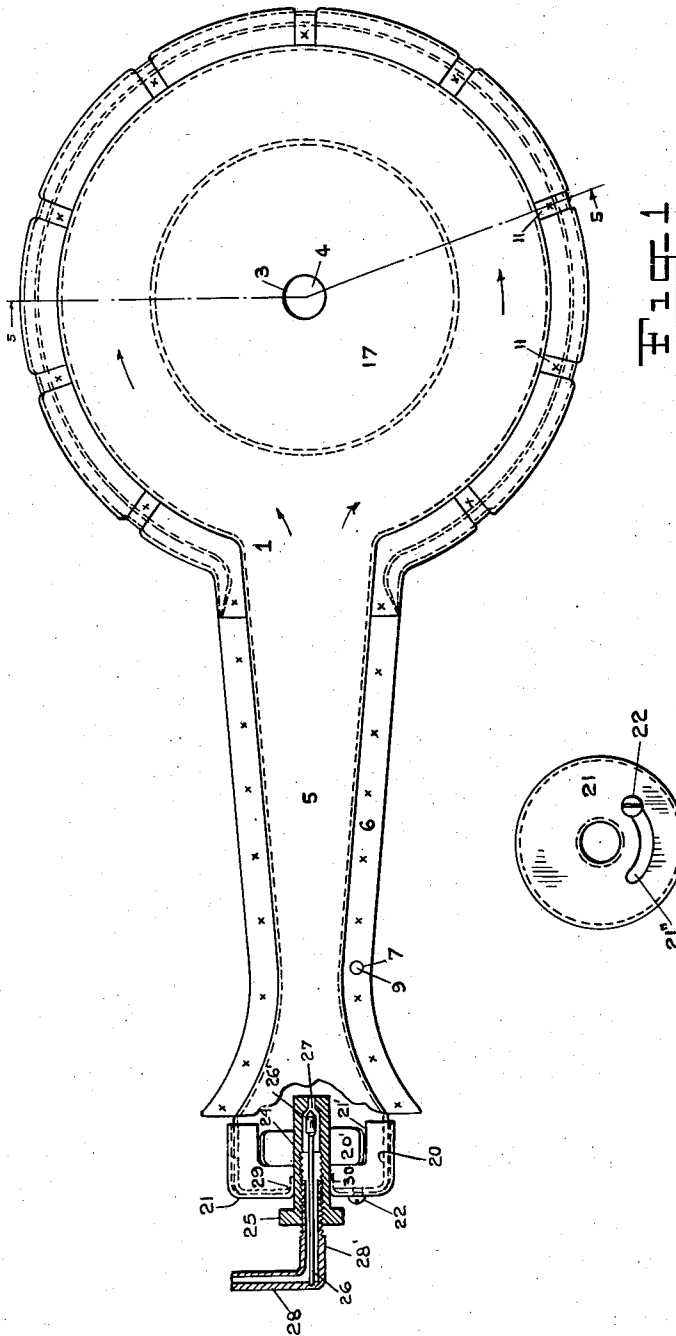


Fig. 1

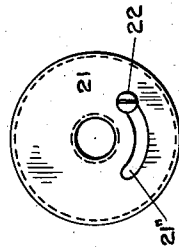


Fig. 3

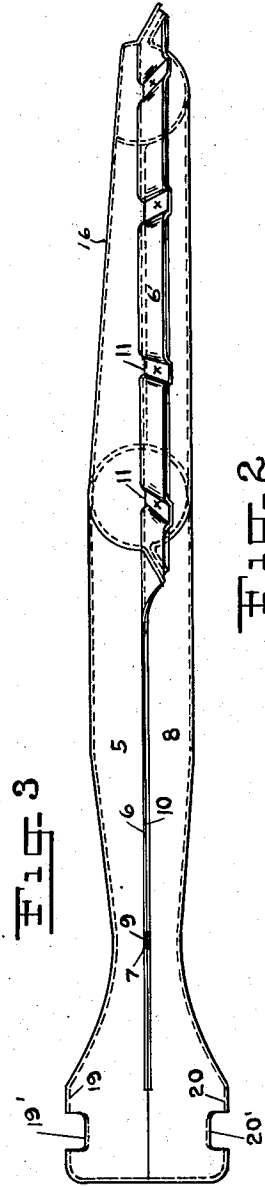


Fig. 2

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2 SHEETS—SHEET 2

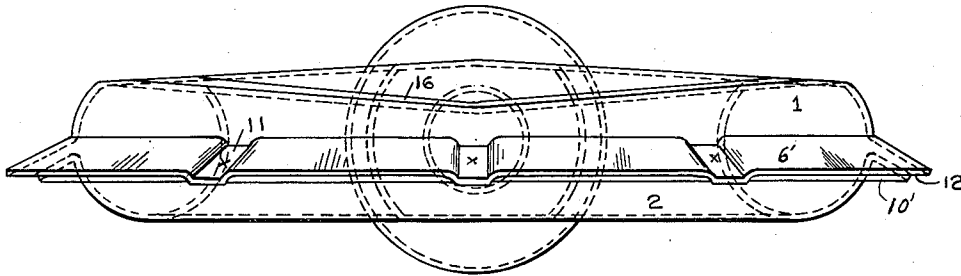


Fig- 4

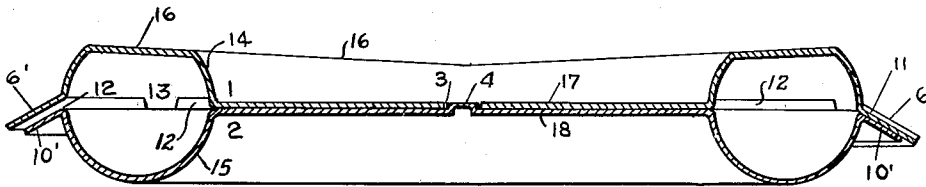


Fig- 5

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COMBINATION BAKING AND BROILING GAS BURNER

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6 Claims. (Cl. 158—99)

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The improvements relate to gas burners and primarily to burners for use in cooking ovens adapted to be employed for baking, broiling, roasting and other cooking operations. They are, however, usable in other burners.

Among the objects of the improvements are to produce a light, strong and simple burner of the character indicated; to reduce the manufacturing cost of the same in material, labor, manufacturing operations and overhead; to economize the consumption of fuel thereby and increase its heat producing efficiency, and to adapt it for use either as a single baking and broiling burner, located in the lower part of the oven, or as two duplicate burners mounted in the upper and lower oven the upper to be employed for broiling and similar operations and the lower for baking, roasting, etc., the burner being so constructed that it will serve both purposes.

Other objects and advantages will be apparent to those skilled in the art from the following description and the accompanying drawings which illustrate an exemplary embodiment of the improvements, and in which:

Fig. 1 is a plan of the burner with the upper half broken away at the front end of the venturi to expose the fuel supply and mixing valve construction shown in horizontal medial section;

Fig. 2 is a longitudinal side elevation of the burner;

Fig. 3 is an end view of the fuel supply conduit and the mixing valve cap;

Fig. 4 is an end elevation of the burner proper; and

Fig. 5 is a vertical section of the same substantially on the line 5—5 of Fig. 1.

The entire burner construction, including Venturi and Bunsen mixing valve chamber is formed of two substantially duplicate halves except for the positioning means and the connecting parts between the combustion jet supporting ports and these two halves are made of sheet metal stamped by suitable dies into the desired form and size, so that they can be fitted together and secured to form the complete burner accurate in every detail without measurement, finishing work or any tools or appliances, and when so assembled will constitute a relatively light, strong and highly efficient article.

Referring to the said drawings, 1 is the upper member or half and 2 the lower member. The upper member has an aperture 3 located centrally of the burner proper and the lower a boss 4 fitting the same while the longitudinal horizontal flange 6 of the venturi or mixed fuel supply conduit section 5 of the upper has a like aperture 7 and the similar section 8 of the lower has a boss 9 on its flange 10 fitting the same. This arrangement permits the two members to be brought together and accurately positioned for welding together and forming the finished burner.

The upper member around its peripheral flange 6' at the burner proper has a series of depressions with flat bottoms 11 spaced about 36° apart and

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these rest on the peripheral flange 10' of the lower member leaving spaces 12 between the two flanges, forming slots which provide the combustion supporting ports of the burner in communication with the fuel distributing channel 13 between the annular bulged portions 14 and 15 of upper and lower members respectively.

After the two members are placed together they are united by spot welding through the bottoms of the depressions 11 and the flange 10' and the longitudinal flanges 6 and 10, as indicated at x, and the fabrication of the burner is complete.

The length and width of the slots 12 have a definite relation to the width and spacing of the depressions 11 since it is very desirable that a substantially unbroken ring of combustion shall be maintained around the burner for satisfactory results, and it has been found that the slots should be more than double the width of the depressions and should be about $\frac{1}{8}$ inch in width. But the interruptions in the slot ports formed by depressions should be not more than $\frac{3}{8}$ inch in order to have the jets of combustion overlap them and merge to form a continuous ring of flame at half or full fuel valve opening. Slots $1\frac{1}{2}$ inches in length and $\frac{1}{4}$ inch interruption have been found satisfactory. The width of the slots can be accurately gauged by fixing the portions of the dies by which the depressions 11 are formed to produce the desired spacing between the upper and lower members at the slots and this width can be varied with only slight changes in the dies, as for use with natural or refined oil well casing or other gas, at will. It has been found also that with this burner construction the pressure variations in the gas mains are well taken care of. As most oven burners are under thermostatic control it is important that the burners shall be fully responsive to normal as well as abnormal variations in pressure.

The fuel distributing channel 13 is flattened at its top and gradually reduced in area toward the portion farthest from the Venturi inlet as indicated at 16, so as to prevent the loss of pressure at that part by the venting of the gas between it and the Venturi tube and a consequent uneven flame or a failure of the flame then under low gas supply. By providing this reduction at the top of the channel and above the orifices 12 the gaseous fuel is directed toward these ports and an even supply of fuel throughout the circumference of the burner head is insured.

It will be noted that the flange 6' of the upper member at the ports 12 extends beyond the outer edge of the flange 10' and that the two flanges are downwardly inclined. This not only provides a groove in which the fuel will be held for quick lighting and for even combustion at low valve pressure all around the burner but shields the combustion against up and down drafts by deflecting the air away from the orifices. It also directs the jets of the flame downwardly and spreads it laterally and downwardly

to some extent, so that when the burner is used for broiling it will project the flame properly and when it is used for baking it will be retarded to a certain extent and diffused before passing to the oven above. In this manner the burner is adapted to be used both as a broiling and a baking burner and will dispense with the use of an upper broiling burner. It is therefore in effect a two-purpose burner. The central portion 17, 18 of the burner head is closed and consists of a flat plate or diaphragm composed of the two central plates of the complemental members, surrounded by the annular fuel distributing conduit 13 and preventing the passage of air or combustion products through the interior. The aperture 3 in the disk portion 17 and the boss 4 in the disk portion 18 are located in the exact center of their respective members, and fit together snugly, so that the outer edges of the flanges 6' and 10' as well as the other parts in radial relation thereto are accurately positioned.

When the burner is used as a top burner for frying, boiling and other purposes, the flanges forming the combustion supporting slots may be disposed horizontally or turned upwardly to a certain degree, and other orifices for the distributing channel may be provided. The structure and methods and materials used in producing it, however, will be the same.

The mixing chamber is formed by the duplicate recesses 19 and 20 of the members 1 and 2 provided with air admission slots 19' and 20' respectively controlled by a rotatable cap 21 fitted on the exterior of the chamber thus formed and provided with recesses 21' adapted to register with said slots or partly close the same according to the position to which the cap 21 is rotated. This cap 21 is secured over the end of the chamber by a set screw 22 passed through the curved slot 21'' of the cap and threaded into the end of the portion 20. The portions of the cap around opening 29 in the chamber are turned inwardly as shown at 30 to form a ring in which the tubular valve seat member 24 is fitted.

The controlled inlet for gas fuel comprises this tubular valve seat member 24 having a rotating nut 25 on its outer end, the valve plug member 26 extending therethrough and normally into proximity to the valve seat 27 and the gas supply tube 28 on the exterior of which the tubular part 24 is threaded. The valve plug member is fixed in the gas supply tube 28 and extends centrally through its portion 28', on which part 24 is threaded, having at its inner end a conical plug 26', which by being made to approach or recede from the seat 27 will regulate the amount of gas admitted to the mixing chamber surrounding it and extending into the venturi 5.

The spot weldings indicated at x along the flanges 6, 10, 6' and 10', and located in the depressions 11 of 6', may be varied in number as may be required or found advisable to secure a tight joint between the two sections, and line welding may be employed to unite the flanges 6 and 10. These latter flanges terminate at the chamber portion 19, 20, so that the said portion presents a smooth exterior on which the cap 21 is snugly fitted. The central aperture 3 and boss 4 of the burner head in cooperation with the aperture 7 and boss 9 of the flanges 6 and 10 have been found sufficient to position the two sections accurately, but additional connections of this or other character may be employed. The disks 17 and 18 may also be welded together to insure tight contact between them, prevent

warping and give added strength to the structure. Other variations in details of construction may be made without departing from the invention. The term "loop-shaped" in the appended claims is not limited to a round or rounded loop.

The combination of the closed interior of the burner head and the peculiar formation of the flange forming the combustion supporting orifices produces an important result, in addition to insuring absolute accuracy in these parts, due to the fact that all unheated air passing upward from below the burner must pass around these orifices, through the combustion issuing therefrom laterally and downwardly and become mingled with the highly heated products of combustion. The downward inclination of the upper portion of the fuel distributing channel is also of importance and has been found to have a peculiar effect in connection with the form and location of the orifices and the specific gravity of the fuel. There are also other peculiar functions and advantages of the construction and arrangement shown and which the elements specified in the claims cooperate to produce.

What I claim is:

1. A combined baking and broiling oven gas burner comprising two substantially horizontal and coextensive sections secured together face to face and made of stamped sheet metal having opposed complemental upper and lower recesses forming between them an air and gaseous fuel admission and mixing chamber, a Venturi tube extending therefrom and in communication therewith at one end and a loop-shaped mixed fuel supply and distributing channel in communication with the opposite end of said tube, said channel being tapered from proximity to said tube to its portion farthest removed therefrom by an inclined flattened top of the upper channel forming recess to equalize pressure in said channel, peripheral downwardly inclined flanges on said sections surrounding said channel forming recesses, at least one of the sections having spaced downward projecting portions in its said flange around its channel forming recess and between said recess and the flange periphery, the latter being substantially parallel with said recess, the said flange of the other section being in contact with said projections whereby points of securement and fuel port slots between them are formed, and the upper of said flanges extending well beyond the periphery of said lower flange and overhanging the orifices of said slots whereby the said slots are protected against up and down drafts and the fuel issuing therefrom is given an outward and downward direction when under relatively high pressure and under lower pressure is distributed laterally to fill the space around the burner evenly under all pressures.

2. A combined baking and broiling oven gas burner comprising two substantially horizontal and coextensive sections secured together face to face and made of stamped sheet metal having opposed complemental upper and lower recesses forming between them an air and gaseous fuel admission and mixing chamber, a Venturi tube extending therefrom and in communication therewith at one end and a loop-shaped mixed fuel supply and distributing channel in communication with the opposite end of said tube, peripheral flanges on said members surrounding said channel forming recesses, at least one of the sections having spaced projecting portions in its said flange around its channel forming recess and between said recess and its periphery the

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latter being substantially parallel with said recess, the said flange of the other section being in contact with said projections whereby points of securement and fuel port slots between them are formed, and the upper of said flanges extending downwardly and well beyond the periphery of said lower flange and overhanging the orifices of said slots whereby the said slots are protected against up and down drafts and the fuel issuing therefrom is given an outward and downward direction when under relatively high pressure and under lower pressure is distributed laterally to fill the space around the burner evenly under all pressures, the said spaced downward projections being of relatively narrow width with respect to the length of the slots and welded to the contacting flange portion.

3. A combined baking and broiling oven gas burner comprising two substantially horizontal and coextensive sections secured together face to face and made of stamped sheet metal having opposed complemental upper and lower recesses forming between them an air and gaseous fuel admission and mixing chamber, a Venturi tube extending therefrom and in communication therewith at one end and a loop-shaped mixed fuel supply and distributing channel in communication with the opposite end of said tube, peripheral flanges on said sections extending from the venturi forming recesses in contact and welded together and other peripheral flanges surrounding said channel forming recesses, at least one of the sections having spaced projecting portions in its said flange around its channel forming recess and between said recess and its periphery the latter being substantially parallel with said recess, the said flange of the other recess being in contact with said projections, whereby points of securement and fuel port slots between the members are formed, the upper of said flanges extending downwardly and well beyond the periphery of said lower flange and overhanging the orifices of said slots whereby the said slots are protected against up and down drafts and the fuel issuing therefrom is given a lateral direction, all of said members being formed by the said two sections and the parts forming them being integral with their respective sections.

4. An oven gas burner comprising two substantially horizontal and coextensive sections secured together face to face and made of stamped sheet metal having opposed complemental upper and lower recesses forming between them an air and gaseous fuel admission and mixing chamber, Venturi tube extending therefrom and in communication therewith at one end and a loop-shaped mixed fuel supply and distributing channel in communication with the opposite end of said tube, peripheral flanges on said sections on both sides of said Venturi tube and surrounding said channel forming recesses in contact each with the flange opposite and welded thereto one of said flanges being spaced from the other at intervals around its channel forming recess, whereby fuel port slots between it and the opposite flange are formed, each of said members being an integral piece of sheet metal and each having a disk surrounded by said loop-shaped channel in radial contact with the disk of the other, a central projection on one disk and an aperture provided in the other of a size to receive and engage said projection, whereby the sections are positioned and aligned.

5. A gas burner comprising two substantially horizontal and coextensive sections secured to-

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gether and made of stamped sheet metal having opposed complemental recesses forming between them a Venturi tube and a loop-shaped mixed fuel supply and distributing channel in communication with the inner end of said tube, peripheral laterally extending flanges on said sections surrounding said channel forming recesses, spaced circumferential projecting portions on at least one of the said flanges between said recess and its periphery, the said flange of the other being in contact with said projections and welded thereto, whereby separated fuel port slots between the flanges are formed, and one of said flanges extending downwardly and well beyond the periphery of the other flange and the orifices of said slots whereby the said slots are protected against up and down drafts and the fuel issuing therefrom is given an outward and oblique direction, the spaced projections being of relatively narrow width with respect to the circumferential length of the slots each of which extends from one projection to the next and has its vertical width fixed by the vertical extent of said projections.

6. An oven gas burner comprising two substantially horizontal and coextensive sections secured together face to face and made of stamped sheet metal having opposed complemental upper and lower recesses therein forming between them, a mixed fuel supply conduit in communication with a source of fuel gas and air at one of its ends, a continuous mixed fuel distributing channel in communication with the opposite end of said tube and surrounding a rigid central portion, flat radially contacting parts of said sections comprising said central portion, peripheral flanges on said members surrounding said channel forming recesses each in contact with the opposite flange and secured thereto, one of said flanges being spaced from the other at intervals and united with the other at intervening intervals around its channel forming recess, whereby fuel ports slots between it and the opposite flange at least partly gauged and secured by said flat parts are formed and air rising from beneath the burner is directed over the orifices of said ports.

RICHARD H. MEINERS.

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