

E. G. VAN ZANDT.
GAS BURNER.

APPLICATION FILED NOV. 8, 1909. RENEWED JULY 5, 1912.

1,045,472.

Patented Nov. 26, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

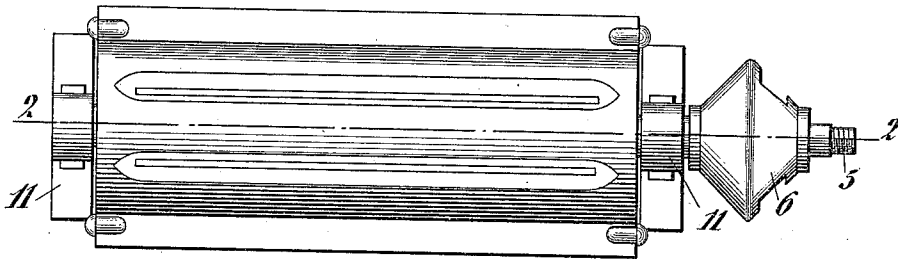


Fig. 2.

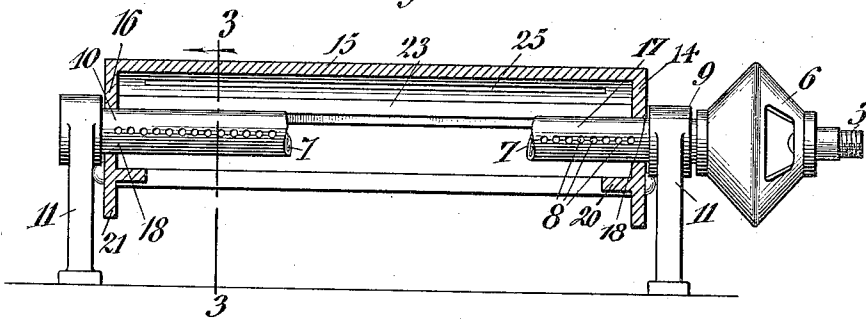
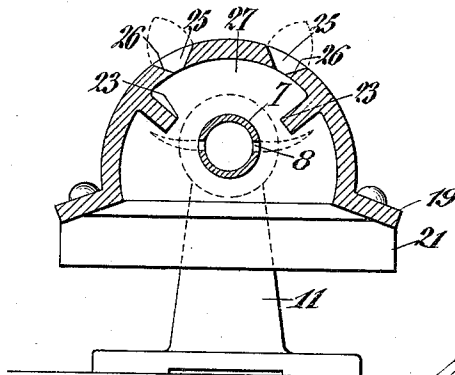


Fig. 3.



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2 SHEETS—SHEET 2.

Fig: 4.

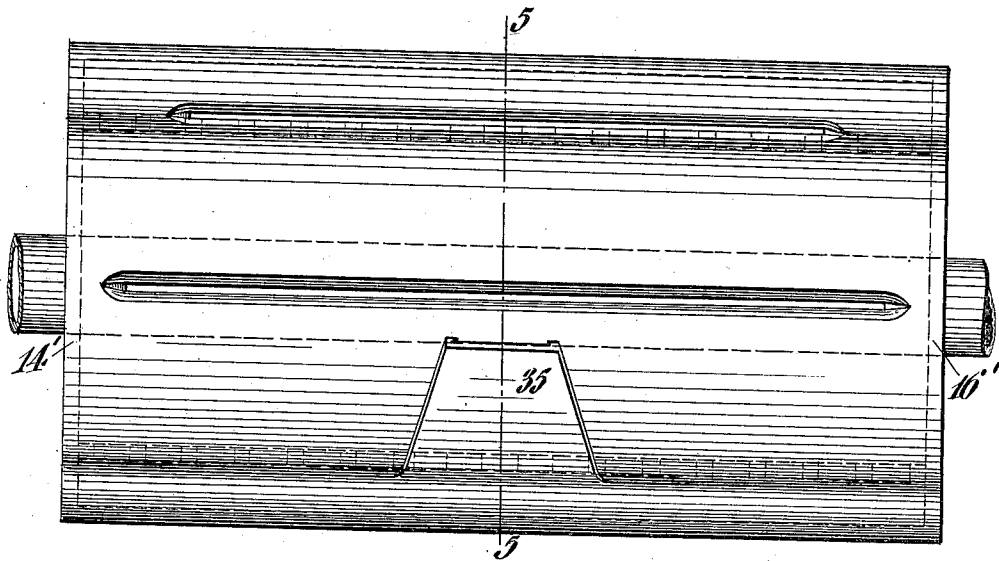
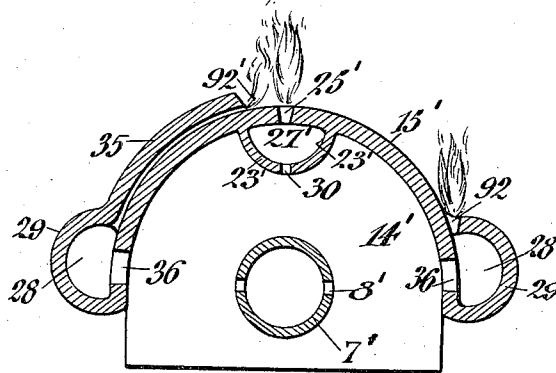


Fig: 5.



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UNITED STATES PATENT OFFICE.

EDWIN G. VAN ZANDT, OF ST. LOUIS, MISSOURI, ASSIGNOR TO VAN ZANDT GAS APPLIANCE COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF MISSOURI.

GAS-BURNER.

1,045,472.

Specification of Letters Patent.

Patented Nov. 26, 1912.

Application filed November 8, 1909, Serial No. 526,684. Renewed July 5, 1912. Serial No. 707,907.

To all whom it may concern:

Be it known that I, EDWIN G. VAN ZANDT, a citizen of the United States, and resident of the city of St. Louis and State of Missouri, have invented certain new and useful Improvements in Gas-Burners, of which the following is a specification.

This invention relates to gas-burners and more particularly to such as shown in the United States Letters Patent No. 838,596, granted to me December 18, 1906, and Letters Patent No. 876,507, granted to me January 14, 1908; and this invention relates more particularly to certain improvements there-

in. The object of the invention is to provide means for carrying the degree of the combustion of the gas to the highest practical state, and to enable the second burning of the gas to be carried on, and make such means especially adapted for use in ovens, etc.

In the accompanying drawings, Figure 1 is a plan-view of one embodiment of my invention, Fig. 2 is a vertical longitudinal sectional view taken on line 2—2 of Fig. 1. Fig. 3 is a transverse vertical sectional view taken on line 3—3 of Fig. 2, Fig. 4 is a plan-view of a modified form of my invention, and Fig. 5 is a vertical transverse section taken on line 5—5 of Fig. 4.

Similar reference characters indicate corresponding parts throughout the several views.

Referring to the drawings, and more particularly to Figs. 1, 2 and 3, the feed-pipe 5 is provided with an air-mixer 6 of approved form, which is connected with a burner consisting, in the embodiment shown in the drawings, of a pipe 7 provided with a plurality of small holes 8, all substantially in a horizontal plane and so arranged that the flame emanating from the holes is at a small angle to the horizontal, substantially as shown by the dotted lines in Fig. 3. These holes 8 are arranged closely together and are spaced equally distant apart. The pipe 7 is arranged with one end 9 adjacent the mixer, and this and the other end 10 are supported by suitable supports 11. A shell or container 15, consisting of an elongated member having a cross-section substantially that of a semi-circumference, is provided at its ends with walls 14 and 16 having bores 18 therein for the passage of

the pipe 7. The shell is further provided at the lower edges thereof with outwardly and downwardly extending flanges or wings 19, which extend the full length of the elongated shell 15. The ends 14 and 16 of the shell 15 are provided with inwardly and substantially horizontally-extending flanges 20 and also with downwardly-extending flanges 21, which flanges are transversely arranged as respects the axis of the shell 15, which is open at the bottom. The inner part of the shell 15 is provided with inwardly and downwardly extending walls or deflecting ribs 23 which have an inclination to the horizontal of about 45°, as shown in Fig. 3. These walls 23 extend substantially the full length of the shell 15 in its longitudinal direction, and are of such a length that their free edges are above the flames emanating from the openings 8 of the burner. As shown in Fig. 3, the jets of ignited gas emanating from the openings 8 strike the shell along its interior wall somewhat below the walls 23 and thereby the products of combustion impinging against the interior of the shell are obstructed in their upward movement or deflected from the path which they might naturally take. They are also temporarily retained between the walls 23 and the shell, and thus further heated. The shell and walls 23 form a small reservoir or container 27 for the gases which are to be burned. The shell 15 is further provided with elongated openings 25 of tapering or V shape, so as to flare outwardly, which openings, in the embodiment shown in Figs. 1 to 3, extend substantially the full length of the shell and are arranged some distance above the downwardly-extending walls or deflecting ribs 23 and being restricted form burner openings.

The relation of the burner to the shell, the position of the walls or deflecting ribs, and the position of the openings 25 is such that the unburned gases and the products of combustion formed by the burning of the gas at the burner are obstructed in their movement, and after having been thus retarded and simultaneously subjected to heat and air, flow over the ends of the flanges into the upper part of the shell where they are subjected to further heat and whence, when sufficiently treated, they pass out of the openings 25. Here the unburned gases are ignited and form a hollow flame almost

transparent, with the bottom of the flame playing along the inclined surface 26 of the openings 25, as shown by the dotted lines. The gas thus ignited and emanating from the openings 25 constitutes, so to say, a second gas which is ignited and adds perceptibly to the heating capacity of the burner, destroying at the same time all the poisonous elements, which are detrimental both to good health and to the best results to which the heater may be put.

A modified form or other embodiment of my invention is shown in Figs. 4 and 5, having a shell 15' of elongated shape, and of a cross-section substantially that of a semi-circumference, with a burner consisting of a pipe 7', with diametrically opposite openings 8', these parts being identical with the corresponding parts of the embodiment shown in Figs. 1 to 3. But in this embodiment the shell 15' is not provided with the flanges 19, 20 and 21, nor with the downwardly-extending walls 23. The shell, however, is provided with end-walls 14' and 16', and is also provided with chambers 28 formed of outwardly, upwardly and inwardly extending curved walls 29 having perforations 36 which connect them to the interior of the shell 15, and having perforations 92 where their upper edges join the shell 15', whereby the products of combustion are permitted to pass from the chambers 28, to be burned. Instead of providing the shell with two openings 25, as shown in Figs. 1, 2 and 3, the embodiment shown in Figs. 4 and 5 is provided with a single opening 25' substantially vertically above an opening 30 between the free ends of the curved downwardly-extending walls 23' and which opening 25' is restricted forming a burner opening. The arrangement, curvature and position of the walls 23' is such that the flanges perform substantially the same function as the walls 23 of Figs. 1, 2 and 3. In the embodiment of Figs. 4 and 5 the combustible gases mixed with the products of combustion are collected below the inner wall of the shell and the walls 23, and when the shell or container 15' is full to overflowing, these heated gases pass through the opening 30 and into the chamber 27' formed by the shell and walls 23'. Here they are again subjected to further heat and finally emanate through the opening 25' and are ignited at the exterior of the shell. The opening 25' is preferably tapering or of V-shape in cross-section. The opening 30 is smaller than the openings 36 so as to act as a restriction, in order to cause the gases to pass out of the openings 36.

The walls 29 extend along the entire length of the shell 15', and one of them is extended at the upper part of the center portion thereof and continues concentrically along the exterior of the shell 15', as shown

by 35 in Figs. 4 and 5, and terminates near opening 25' of the shell 15. During their passage along the exterior of the heated shell, the gases are heated, and at the discharge-opening 92' ignited, and impinge against the flame emanating from opening 25'. The gases collected in the chambers 28 and 27' are heated to a considerable extent by the jets of ignited gas emanating from the opening 8' of the burner and, passing out of the discharge or burner openings 92, 92' and 25', are ignited and form a thin, transparent, hollow flame.

I have described several embodiments of my invention, but I do not wish to limit myself to the details of the same, which were necessary to be shown for a full understanding of the invention, since changes may be made therein without departing from the spirit of my invention, which consists in providing a shell having closed ends and an open bottom and an opening at the upper part entirely free to the atmosphere, said shell being adapted to collect the products of combustion of the initial burner, but the opening on the upper part of the shell being restricted so as to cause the burning of the unignited products of combustion at the exterior thereof at the opening, said initial burner being near the lower part of the shell. And further in providing reservoirs within the shell, and means for guiding the products of combustion and causing them to burn at the end of said means, which end is restricted so as to form a burner opening. And also in providing chambers at the lower edges of the shell for the products of combustion having outlet openings for the burning of the products of combustion.

I claim as new:

1. In a gas-burner having an elongated initial burner, a horizontal semi-cylindrical shell having closed ends and an open bottom and an opening at the upper part entirely free to the atmosphere, said shell being adapted to collect the products of combustion of the burner, but the opening at the upper part of the shell being restricted so as to cause the burning of the unignited products of combustion at the exterior thereof at the opening, said initial burner being near the lower part of the shell.

2. In a gas-burner, the combination of an initial burner, a shell having an opening at the top thereof, restricted so as to prevent the flame of the initial burner from passing therethrough, but to cause the burning of the unignited products of combustion at the exterior of the opening, means in said shell forming therewith an inner reservoir adjacent to said opening and an outer reservoir within the shell to one side of said opening, said initial burner being within and at the lower part of the shell.

3. In a gas-burner, the combination of a

shell having an opening in the top thereof and inwardly projecting flanges on opposite sides of said opening and said flanges forming an inner reservoir between themselves and below said opening, and forming with the walls of the shell an outer reservoir within said shell to one side of said opening, and an initial burner within said shell.

4. In a gas-burner, the combination of a shell having an opening in the top-part thereof and downwardly-projecting flanges on opposite sides of said opening and forming an inner reservoir between themselves and below said opening, and forming with the walls of the shell an outer reservoir within the shell to one side of said opening, and an initial burner within said shell and adapted to discharge products of combustion directly into said outer reservoir.

5. In a gas-burner, the combination of a shell or container open at the bottom and provided at the top with a restricted outlet-opening, inwardly and downwardly projecting flanges on opposite sides of said opening and forming between themselves an inner reservoir under said opening, and forming with said shell outer reservoirs within the shell on each side of the inner reservoir, and an initial burner under said inner reservoir, within said shell, and adapted to discharge products of combustion laterally and upwardly directly into said outer reservoirs.

6. In a gas-burner, the combination of a horizontal semi-cylindrical shell open at the bottom and having a restricted opening at the top, means forming an inner reservoir under said opening and an outer reservoir within the shell to one side of the inner reservoir, and an initial burner within said shell adapted to direct products of combustion into said outer reservoir.

7. In a gas-burner, an initial burner, a shell over said initial burner and having an opening, an outwardly-extending flange forming a chamber with the shell and extending upwardly concentrically to the shell so as to form a guide-channel having its discharge-opening adjacent to the opening of the shell.

8. In a gas-burner having an initial burner and a shell over said initial burner and having an opening restricted to form a burner opening for the burning of the products of combustion, means for guiding the products of combustion from the lower part of the shell to the upper part, and having a re-

stricted upper end to form a burner opening whereby the products of combustion from the initial burner are burned at the exterior of the shell at that opening, said burner openings being so arranged as to prevent the flame of the initial burner from passing therethrough.

9. In a gas-burner, the combination of a shell having an opening at the top, a chamber at the lower edge of the shell and communicating therewith, means adapted to conduct products of combustion from said chamber and to discharge them adjacent to said opening, and an initial burner in said shell.

10. In a gas-burner, the combination of a shell having an opening at the top, chambers at the lower edge thereof and communicating with the interior of the shell and provided with outlet openings, and an initial burner adapted to discharge products of combustion into said shell.

11. In a gas-burner, the combination of a shell having an opening at the top, a pair of downwardly and inwardly projecting flanges one on each side of said opening and forming between themselves a gas-reservoir and, at their free edges, a narrow opening, and an initial burner within said shell.

12. In a gas-burner, the combination of a shell having an opening at the top, a pair of inwardly projecting flanges, one at each side of said opening, and forming between these a gas reservoir and having their free edges extending toward each other, and an initial burner within said shell adapted to discharge products of combustion below the flanges.

13. In a gas burner, a horizontal semi-cylindrical shell having an open bottom, end walls closing the ends of the shell and extending below the body portion thereof, means extending beyond the body portion of the shell at the sides thereof for retarding the products of combustion, and a burner opening at the upper part of the shell for burning the unignited products of combustion at the exterior of the shell at the opening, and an initial burner within the shell at the lower part thereof.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

EDWIN G. VAN ZANDT.

Witnesses:

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C. P. GOEPFEL.