

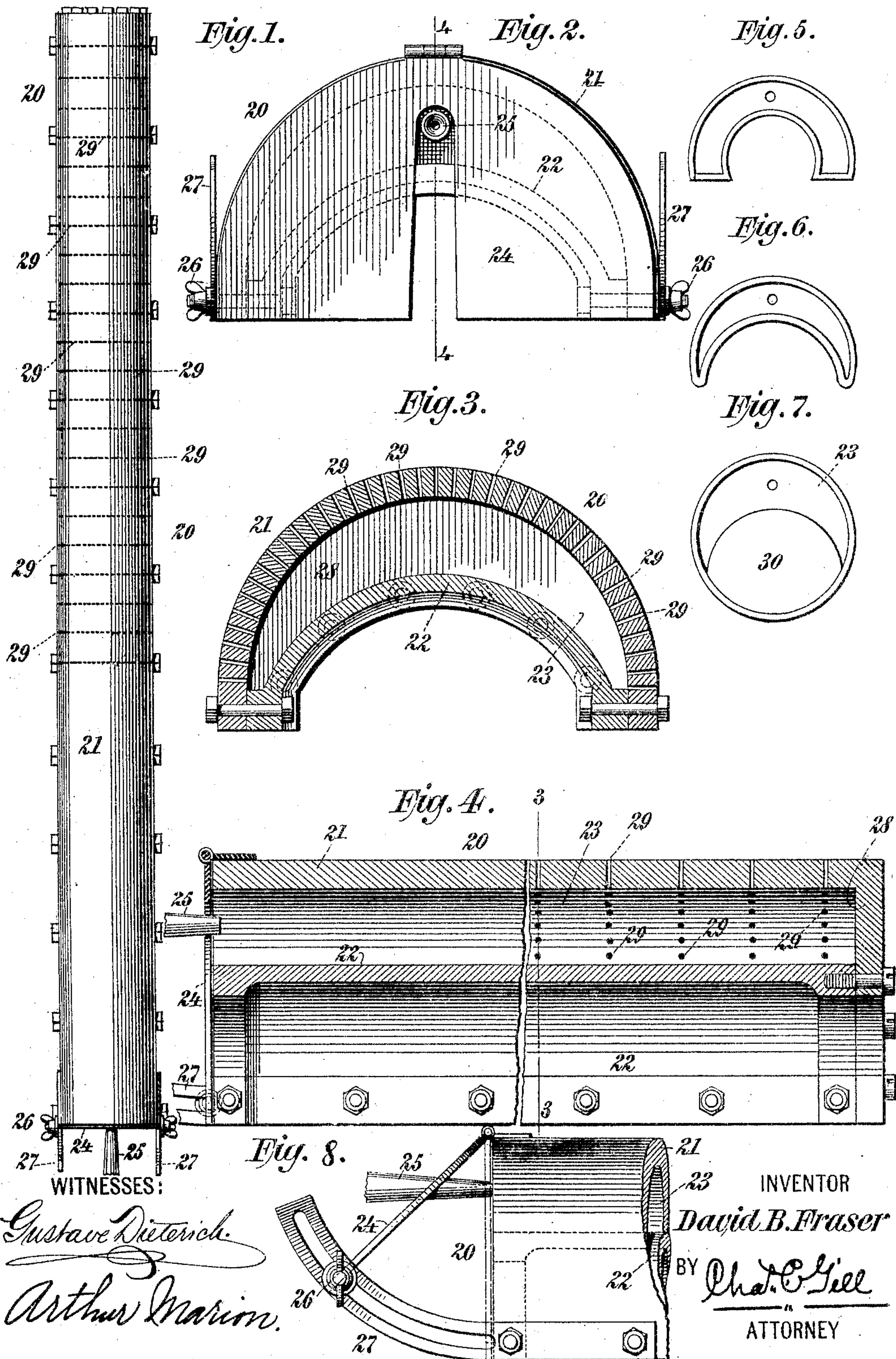
No. 776,659.

PATENTED DEC. 6, 1904.

D. B. FRASER.  
GAS BURNER.

APPLICATION FILED DEC. 31, 1903.

NO MODEL.





# UNITED STATES PATENT OFFICE.

DAVID B. FRASER, OF NEW YORK, N. Y.

## GAS-BURNER.

SPECIFICATION forming part of Letters Patent No. 776,659, dated December 6, 1904.

Application filed December 31, 1903. Serial No. 187,256. (No model.)

*To all whom it may concern:*

Be it known that I, DAVID B. FRASER, a subject of the King of Great Britain, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Gas-Burners, of which the following is a specification.

The invention relates to improvements in gas-burners; and it consists in the novel features hereinafter described and claimed.

My invention pertains more particularly to burners for use in generating heat to be used for roasting, cooking, and like purposes, and in this application I present my invention as embodied in a gas-burner adapted for use in coffee-roasting apparatus—such, for illustration, as that described and claimed in Letters Patent No. 627,993, granted to me on July 4, 1899.

The object of my invention is to produce a burner affording the maximum efficiency with the minimum consumption of gas, and to this end the burner of my invention embraces two features of novelty, one residing in the form of the burner in cross-section and the other in the special arrangement of the exit or ignition apertures therein for the gas.

In carrying out the first feature of my invention in its preferred embodiment I construct the burner in the form of an elongated shell having exit-apertures in one portion of its upper wall and containing an interior chamber which is approximately of crescent shape in cross-section or of concavo-convex outline with the concave form at the lower side of the shell, which at one end receives the gas and air and affords a mixing-chamber and throughout a suitable portion of its length beyond the mixing-chamber constitutes the burner proper.

In accordance with the second feature of my invention I arrange the exit-holes or ignition-apertures in straight rows or lines extending transversely of the burner and at right angles to the line of the flow of gas through the burner, the holes in each row or line being as close together as it may be possible to have them and the rows or lines of holes being uniformly spaced from one an-

other in series, there being a space of about two inches between each two rows of holes.

The invention will be more fully understood from the detailed description hereinafter presented, reference being had to the accompanying drawings, in which—

Figure 1 is a top view of a gas-burner constructed in accordance with my invention, the said burner being of a form applicable for use in the coffee-roaster of the aforesaid Letters Patent No. 627,993. Fig. 2 is an enlarged front end view of same. Fig. 3 is a transverse section of same on the dotted line 3 3 of Fig. 4. Fig. 4 is a longitudinal section, partly broken away, of same on the dotted line 4 4 of Fig. 2. Figs. 5, 6, and 7 are diagrammatic end views of several modified forms of the burner; and Fig. 8 is a side elevation of the front portion of the burner represented in Figs. 1 to 4, inclusive.

Referring to Figs. 1, 2, 3, 4, and 8, the numeral 20 denotes the burner as a whole, and, as will be seen, this burner is in cross-section of concavo-convex outline and comprises an outer section 21 and an inner section 22, both sections preferably being of arch form and securely bolted together at their lower side edges. In the preferred construction the outer section 21 will preferably define a half-circle and the inner section 22 a smaller arc of the same size of circle, whereby there is formed between the said sections a crescent-shaped chamber 23 for the air and gas, said chamber 23 along its outer wall defining a half-circle and along its inner wall less than a half-circle and gradually decreasing in depth toward its side edges, the depth of said chamber being considered as on radial lines extending from the center of the circle of which the outer wall of said chamber defines half. The said decrease in the depth of the crescent-shaped chamber 23 is important in attaining the best results and the maximum gas-pressure within the burner, and the said chamber 23 is uniform in cross-sectional area throughout its length, which is also a feature of importance in securing maximum efficiency.

The front end of the burner 20 is provided with a gate 24, preferably hinged, to control



the admission of air to the chamber 23, and this gate 24 is slotted to pass over the inlet gas-pipe 25, leading from any suitable source of supply. The gate 24 carries at its opposite lower edges suitable screws and thumb-nuts 26 for coöperation with slotted segmental bars 27, fastened to the burner in securing the gate in any of its adjusted positions in an obvious manner, it being desirable that the gate should be less open in starting the burner into operation than thereafter.

The rear end of the burner 20 is closed by means of the vertical crescent-shaped flange 28, formed on the section 21 and bolted at its lower edges to the end of the lower section 22. The upper section 21 is throughout the first portion of its length left unperforated, whereby the first portion of the chamber 23 is made to constitute a mixing-chamber for the gas and air, while beyond this mixing-chamber the said section 21 is provided with the series of rows of radially-disposed holes or ignition-apertures 29, these rows of holes extending on transverse lines across the section 21, from one side to the other thereof, and being at right angles to the line of the flow of gas through the chamber 23 or at right angles to the longitudinal line of said chamber. The apertures or holes 29 in each row are as close together as it is practicable to make and have them, and the rows of holes are separated from one another by uniform spaces of about two inches each.

One of the important features of the elongated burner is that its upper surface is projected upwardly and presents a greater surface area than its lower surface, whereby there is formed an interior chamber which is shallow but of considerable extent laterally considered, and in the preferred embodiment of the invention of gradually-decreasing depth toward its side edges, the result of this construction being a very great increase in the efficiency of the burner and economy in the gas consumption.

In Figs. 1 to 4, inclusive, I show the preferred form of the burner, and this form has been hereinbefore sufficiently described. I do not wish, however, to confine my invention to the precise form of burner shown in Figs. 1 to 4, inclusive, since this form may be modified somewhat without departing from the broader scope of my invention—as, for illustration, the inner chamber 23 may be given a more extended and more pronounced crescent outline, as shown in Figs. 6 and 7, and the burner may be made in one piece, as shown in Fig. 6, or it may be made from a tube or pipe, with a filling 30 introduced therein to create the chamber 23 of crescent outline. The form of burner shown in Fig. 5 is of concavo-convex outline in cross-section, and its upper surface presents a more extended area than its lower surface. The

chamber of the burner shown in Fig. 5 is uniform in depth—that is, radially considered the said chamber does not decrease in depth toward its side edges, as does the chambers of the burners shown in Figs. 3, 6, and 7. The chamber of the burner shown in Fig. 5 defines more than a half circle, and said chamber is of uniform cross-sectional area throughout its length.

The burners hereinbefore referred to will of necessity vary in length in accordance with the special conditions of their uses.

I prefer that one end of the burner structure be utilized as a mixing-chamber for the gas and air; but with less satisfaction the mixing of the gas and air may take place outside of the burner structure or in a chamber separate therefrom but leading thereto.

I do not of course limit the invention to the placing of the gate 24 and supply-pipe 25 at the vertical end of the burner 20, since these features are common in the art and they may be arranged at a horizontal portion of the burner instead of more conveniently at the vertical end thereof without departing from my invention.

The arrangement of the ignition holes or apertures 29, hereinbefore described, is of special value in a burner having the special chamber 23 and is also of value in burners of other forms, such as a tubular burner of the character disclosed in my aforesaid Letters Patent. The burners referred to afford an extended upper outer surface for the straight rows of small round holes 29, the burner shown in Figs. 1 to 4, inclusive, being the preferred form of burner and presenting an effective surface area about equal to that of a half-circle for the said rows, which should be at least two inches apart from center line to center line, so that the flames along the rows of holes may not commingle.

I do not confine the invention in respect of the form of the burner to the special arrangement of holes or ignition-apertures 29, hereinbefore described; nor do I confine in every instance the special arrangement of ignition-apertures to the special forms of burner shown.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. An elongated gas-burner having the outer convex wall and the inner concave wall, said walls forming between them the elongated chamber of concavo-convex form in cross-section and decreasing in depth, radially considered, from its center to its side edges, and said outer wall being provided with ignition-apertures; substantially as set forth.

2. An elongated burner having the outer and inner walls and forming between them the chamber of concavo-convex form in cross-section and of uniform cross-sectional area, said outer wall being provided with the series of straight transverse rows of small round ig-



5    nition-apertures, said apertures in each row being close together so that their flames may commingle and said rows being far enough apart to prevent the flame at one row from commingling with the flames at the adjacent rows; substantially as set forth.

10    3. An elongated burner having the outer and inner walls and forming between them the chamber of concavo-convex form in cross-section and of uniform cross-sectional area, said outer wall being provided with the series of straight transverse rows of small round ignition-apertures, said apertures in each row

being close together so that their flames may commingle and said rows being about two 15 inches apart to prevent the flames at one row from commingling with the flames at the adjacent rows; substantially as set forth.

Signed at New York, in the county of New York and State of New York, this 30th day of 20 December, A. D. 1903.

DAVID B. FRASER.

Witnesses:

CHAS. C. GILL,  
ARTHUR MARION.