G. L. FOGLER.
SMOKE AND GAS BURNER.
(Application filed Apr. 25, 1899.)

2 Sheets—Sheet 1.

WITNESSES:

George L. Fogler

INVENTOR

BY

ATTORNEY
UNITED STATES PATENT OFFICE.

GEORGE LUTHER FOGLER, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF ONE-HALF TO OTIS D. SWETT, OF SAME PLACE.

SMOKE AND GAS BURNER.

SPECIFICATION forming part of Letters Patent No. 655,925, dated August 14, 1900.

Application filed April 22, 1899. Serial No. 714,484. No model.

To all whom it may concern:

Be it known that I, GEORGE LUTHER FOGLER, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Smoke and Gas Burners; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in smoke and gas burning furnaces, with especial reference to the principle as set forth in Letters Patent No. 607,166, issued on July 12, 1895.

These improvements comprise, in part, certain novel features which secure economy in space and render the burner more sensitive and capable of a greater range in capacity. These and other novel features combined with the original device accomplish absolute certainty in the complete consumption of fuel.

The invention lies also partly in the relative disposition of the burner, which is such as to direct the flow of smoke and gases in their passage from the fire-box into the combustion-chamber in such manner as is most favorable to combustion there and which places the outlets of the air-supply in such locations as has been found necessary to effect the complete conversion of the combustible products as they pass through the flues and combustion-chamber.

Illustrations of the devices and their arrangements embodying this invention are presented in the accompanying drawings, in which—

Figure 1 is a vertical longitudinal section of an application of the burner to an ordinary steam-boiler furnace, showing the principal, auxiliary, and some equivalent elements, all in their most preferred forms and positions.

Fig. 2 is an elevation of the burner as seen from the fire-box. Fig. 3 is an elevation of the secondary bridge-wall as it would appear from the fire-box with the primary bridge-wall removed. Fig. 4 is an elevation from the combustion-chamber, showing the parts connected to the bridge-walls, together with the transverse perforated air-duct in position. Fig. 5 is a detail view of the secondary flue. Fig. 6 is a detail view showing a variation in the construction of the secondary flue; and Fig. 7 is a detail view of the system of perforated air-ducts in the combustion-chamber, but not attachable to the bridge-walls, as viewed from the rear of the secondary flue.

Like letters of reference denote corresponding parts in the several views of the drawings.

A indicates the representation of the primary bridge-wall, and A' the primary flue. These are shown as water-backs, and although this construction increases the production of steam and protects the primary flue against the intense heat of the fire, yet a solid primary bridge-wall and solid primary flue will as certainly perform their functions in the complete consumption of the fuel. B is the secondary bridge-wall, through which the primary flue projects. Between these two bridge-walls a space is formed, as may be seen at a.

The primary flue A' is straight and may or may not have the inner flange at its rear end. The secondary or draft flue b converges toward its rear end and is adapted to be secured to the secondary bridge-wall, cover the projecting end of the primary flue, and extend into the combustion-chamber. This secondary flue may be and is preferably perforated, and is thereby adapted to receive air not only through the secondary bridge-wall, which is perforated at b' within the contacting edge of said sleeve, but also through its own walls, as shown at b''. This flue is preferably hollow, wholly or in part, and has small perforations b'' through its inner wall, and in that manner is adapted to receive its draft. The air may be conducted to the perforations in said flue through its outer wall by short independent pipes, as shown in Fig. 6 of the drawings; but I do not limit my claims to this particular means of supplying air to the perforations.
C shows an air-duct having one or more outlets, as shown at c, and placed in the secondary flue across the path of the flow from the fire-box into the combustion-chamber. 5 This duct is supplied with air in any desirable manner. The drawings show this duct to be located directly before the exit of the primary flue and within the secondary flue; but any other approximate disposition of the duct in which the flow from the fire-box is divided will not defeat the purposes for which it is provided. I do not limit my claims to the use of this duct in the secondary converging flue, as I may employ it in a single 15 or straight flue, as A'. This duct may also be multiple.

D shows one or more auxiliary ducts serving a purpose distinct from that of the duct C and placed so that the flames will pass directly over the perforations or outlets d', formed therein. D', having the outlets or perforations d' and located just beneath the rear end of the boiler, performs a function similar to that of the ducts D. It is so placed that the flames will pass under it and past the perforations or outlets therein and, like the ducts D, may be duplicated at pleasure with similar results.

E E are draft-openings connecting with the several air-distributing devices upon the bridge-wall and within the combustion-chamber. These openings may be provided with any approved appliance for controlling the drafts which they carry.

The operation of the burner as applied to an ordinary boiler-furnace or as it may be adapted to any other form of furnace is entirely automatic, as the quantity of gases and smoke to be burned provides, through the several draft-openings described, by means of the draft which it creates, the quantity of air required to accomplish its complete consumption, for as the fire in the combustion-chamber increases the draft increases proportionally, and the blaze in the combustion-chamber is therefore clean under all conditions.

The utility of the burner is apparent. The burning of the gases and smoke results in a great saving of fuel. The decided advantages of smokeless furnaces need not be mentioned. There being no forced draft, steam-jet, or movable part in the burner, its simplicity is accordingly very great. The strong draft which rushes through every part of the air-ducts keeps them clean without attention. This draft also serves to prevent the destruction of the burner by intense heat, and the distribution of the heat of the furnace over the entire extent of the lower shell of the boiler and into the tubes in case of a large fire adds considerably to the life of the boiler.

Having described all that is necessary to a full understanding of my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a furnace having a primary and a secondary flue, a transverse perforated air-duct within the secondary flue and supplying air in the direction of the draft, as described.

2. In a smoke and gas burner, the combination of a primary flue with the draft-flue set over the discharge end of the primary flue and provided with one or more openings through its wall and connecting with a supply of air.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE LUTHER FOGLER.

Witnesses:

CHAS. P. SWETT,
W. J. DANTE.