(No Model.)

W. H. BRADLEY.

GAS BURNING AND HEATING APPARATUS.

No. 424,852. Patented Apr. 1, 1890

Fig. 1.

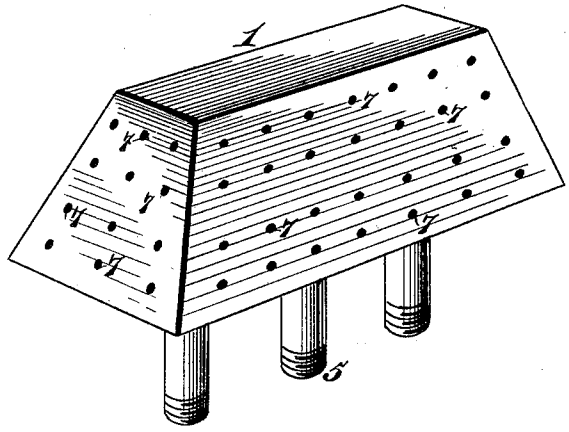


Fig. 2.

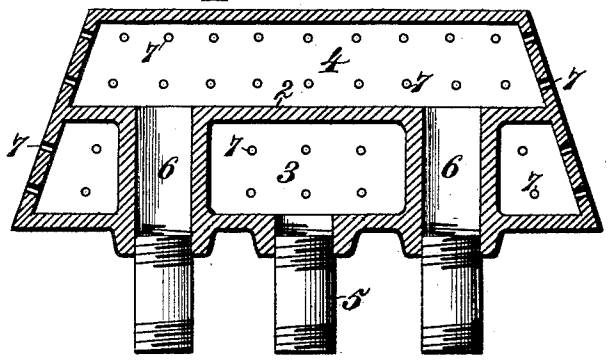
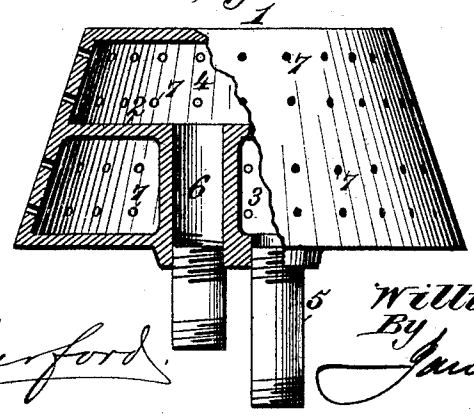


Fig. 3.



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UNITED STATES PATENT OFFICE.

WILLIAM H. BRADLEY, OF ALLEGHENY, PENNSYLVANIA.

GAS BURNING AND HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 424,852, dated April 1, 1890.

Application filed December 26, 1889. Serial No. 335,058. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. BRADLEY, a citizen of the United States, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented new and useful Improvements in Gas Burning and Heating Apparatus, of which the following is a specification.

My invention relates to that class of apparatus employed to effect the combustion of gas and atmospheric air for heating and other purposes.

It is the object of my said invention to provide a simple apparatus which may be constructed in any desired form and of any size, whereby gas of natural or artificial production may be burned in conjunction with air, the latter being introduced separately and commingled with the gas within the sphere of combustion, whereby it is superheated before burning, and a rapid circulation and supply of air to the burner is insured, producing a complete combustion and a perfect consumption of the products of combustion, enabling the richest hydrocarbon gases to be burned without smoke, giving a clear and brilliant flame, and intensifying and increasing the heat.

It is my purpose, also, to provide a simple and inexpensive construction of burner which may be introduced and used in heating, cooking, and other apparatus, and be placed either within an old form of such apparatus or in an especially-constructed device, the burner being of any shape and size, according to the purpose for which it is to be used, and being provided with one or more air-ducts, which enter and traverse the primary or gas chamber and discharge within a secondary air-chamber, whence the superheated air is expelled through numerous exits and mingled and burned with the unconsumed gas and with the products of combustion rising from the exterior of the primary chamber, entirely consuming the smoke, giving an intense heat and producing a material economy in the consumption of gas.

The invention consists in the several novel features of construction and new combinations of parts hereinafter fully described, and then definitely pointed out in the claims following this specification.

To enable others skilled in the art to practice my said invention, I will describe the same in detail, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of one form of heater embodying my invention. Fig. 2 is a central vertical longitudinal section of Fig. 1. Fig. 3 is a sectional elevation showing a different form of burner adapted to circular openings.

In the said drawings, the reference-numeral 1 designates the burner-casing, which may be constructed of iron, clay, or other refractory material. As shown in Figs. 1 and 2, this casing is in shape a frustum of an oblong pyramid, and it may be of any relative width and length, or it may be circular, as shown in Fig. 3, in which case it will be a frustum of a cone. The interior of the casing 1 is divided into two parts by a horizontal partition 2, forming a lower primary or gas-combustion chamber 3 and an upper or secondary air-combustion chamber 4. Entering the chamber 3 through the bottom of the casing is a gas-supply pipe 5, of suitable dimensions, according to the size of the burner.

Passing through the bottom of the burner-casing 1 are two air-ducts 6, which traverse the primary chamber 3 and pass through the partition-wall 2, discharging within the secondary chamber 4. These ducts draw their supply of air from any suitable source, whether the same is exterior to the building or not. The gas-pipe 5 may derive its supply from a natural-gas main, or it may receive manufactured gas—either coal-gas or any form of hydrocarbon gas.

The pyramidal or conical wall of the burner is perforated at uniform intervals by small openings 7. The gas entering the chamber 3 is burned at these exits; but its consumption is only partial. As the unconsumed constituents rise, together with the products of combustion, they mingle with the jets of air which flow through the openings leading from the secondary chamber 4, whereupon a further and complete combustion ensues, due to the sudden admixture with the partially-spent

gas of a body of heated atmospheric air, whereby an intense and complete ignition takes place, the previously-unconsumed gas and the products of the previous incomplete combustion being revived by the fresh supply of oxygen obtained from the superheated atmospheric air, and burning, under the forced draft produced, with great intensity and high heat.

I have shown in Figs. 1 and 2 two air-ducts; but I may employ one or more up to any number that may be required. I may also make the burner in the form substantially of a frustum of a cone, as shown in Fig. 3, to enable it to be used in connection with an apparatus having a circular opening.

The invention may be used in connection with fire-places, grates, or hearths and stoves of any kind, as well as in boiler-furnaces and other locations where a steady and easily-regulated heat is required.

I have shown in Fig. 3 a single air-pipe and a single gas-pipe only; but I may use any desired number of each, arranged in any manner suited to the purpose.

This invention permits the consumption of gas at exceedingly low pressures or at any pressure that may be employed.

As already set forth, I may use a single air-burner or more than one, the same having no connection with the gas-burner, but being simply placed thereon and supplied by separate air-pipes. The latter may be made from gas-pipe or any other suitable tubing.

What I claim is—

A gas-burner consisting of a casing or shell divided by a horizontal partition into a lower gas-chamber and an upper air-chamber, the side walls of each of which are provided with numerous jet-orifices, a gas-pipe opening into the gas-chamber, and an air-pipe extending through the gas-chamber and opening into the air-chamber, substantially as shown and described.

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

WILLIAM H. BRADLEY.

Witnesses:

WILLIAM BARKER, Jr.,

JAMES A. BRADLEY.