April 28, 1925.

1,535,491

H. W. PARTLOW

GAS BURNER

Filed Sept. 20, 1924

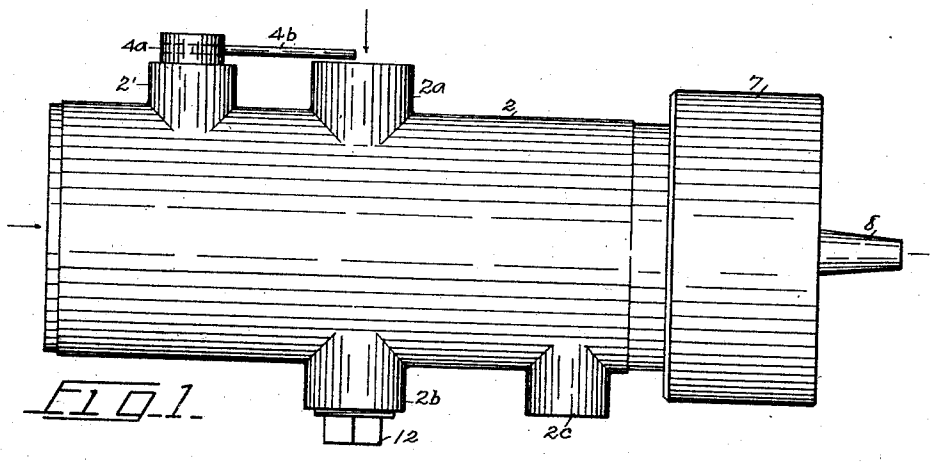


FIG. 1.

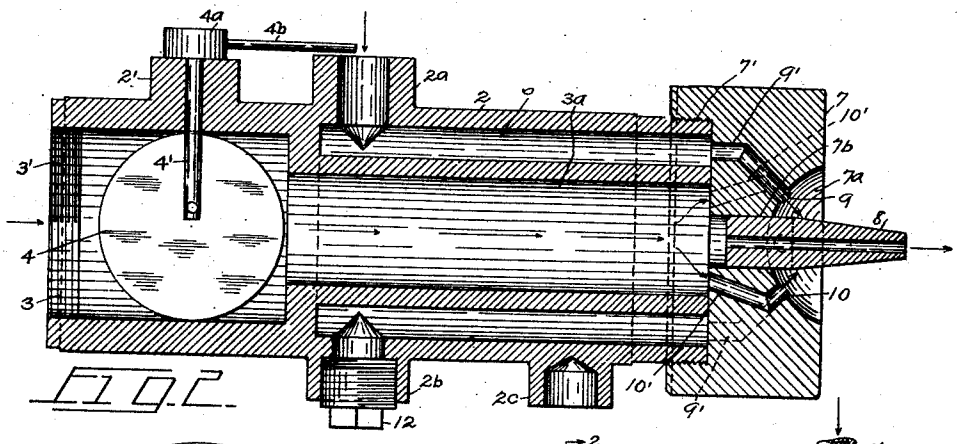


FIG. 2.

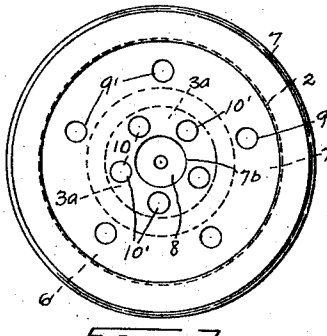


FIG. 3.

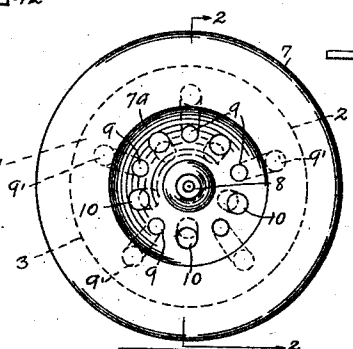


FIG. 4.

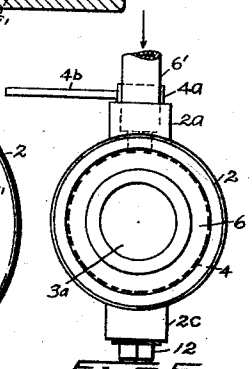


FIG. 5.

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UNITED STATES PATENT OFFICE.

HOWARD W. PARTLOW, OF UTICA, NEW YORK.

GAS BURNER.

Application filed September 20, 1924. Serial No. 738,864.

To all whom it may concern:

Be it known that I, HOWARD W. PARTLOW, a citizen of the United States, residing at Utica, in the county of Oneida and State of New York, have invented certain new and useful Improvements in Gas Burners, of which the following is a specification.

This invention relates to blast burners, in which air under pressure induces the gas and produces a mixture from which complete combustion ensues.

The object of the invention is to provide a burner of the class, comprising an elongated cylindrical body normally open throughout its length, one end of the body being closed by a threaded cap or head of novel design, which is provided with separate gas and air outlet passages. Interiorly the body is formed with a relatively large gas chamber, and with a concentric air chamber, the said chambers being non-communicating, and being arranged to discharge their contents through the said head independently; the arrangement of the burner being such that the combining and mixing of the gas and air, as well as the combustion of the mixture are effected entirely outside of the burner body, thereby obviating all danger of back-firing, or of injuriously heating any part of the burner. And a further object is to provide a novel arrangement of the air and gas discharges, whereby alternate jets of air and gas are delivered through a circular row of orifices formed in the outer end of the head, the said orifices being located in a semi-spherical cavity which is open to the atmosphere, and in which the mixing and combustion of the gaseous fuel takes place; the said cavity being equipped with a hollow conical deflector, which is disposed concentrically within the circle of discharge openings, against which the air and gas impinge radially, and when burned produces an annular flame; the said deflector receiving air directly from the air chamber of the body, by which the deflector is cooled; the said air being discharged by the deflector in the line of the axis of the annular flame, and near enough to the primary zone of combustion to effect the combustion of any unconsumed gas that may be carried along with the flame.

I attain these objects by the means set forth in the detailed description which follows, and as illustrated by the accompanying drawing, in which—

Figure 1 is a side elevation of the complete burner embodying my invention. Fig. 2 is a central vertical longitudinal section, taken on line 2—2 of Fig. 4. Fig. 3 is a view of the inner end of the head. Fig. 4 is an outer end view of the same. And Fig. 5 is a reduced right-end elevation of the body with the head removed.

In the drawing, 2 represents the main body of the burner, which is hollow throughout its length. According to the drawing, the left end of the body is formed with a relatively large air chamber 3, which is threaded at 3′ for attachment to any suitable air-supply, and in which is rotatably mounted a butterfly damper or throttle 4, for regulating the volume of air that may pass through the body. The damper 4 is operatively supported by a shaft 4′, which has its bearing in a boss 2′, the upper end of the shaft being fitted with a head 4^a, which is rotatable by a handle 4^b. The damper is shown open in Fig. 2 and is closed in Fig. 5. At the right of the damper 4, the air chamber is reduced, as at 3^a, and this portion of the chamber is surrounded by an annular gas chamber 6, which receives the gas through an opening in the boss 2^a, into which a supply pipe, as 6′, may be inserted (see Fig. 5). The right-hand end of the body 2 is externally threaded and screws into a threaded socket 7′ of a head 7, the bottom of said socket preferably being flat, and when the body and head are assembled, as shown in Figs. 1 and 2, the said parts are preferably brought tightly together, so as to prevent any leakage of the gas from the chamber 6 into the air chamber 3^a, and vice versa. The outer or free end of the head 7 is preferably formed with a relatively large semi-spherical cavity or recess 7^a, and with a concentric longitudinal opening 7^b, which aligns axially with the air chamber 3^a, and into which is disposed a hollow conical deflector or part 8, through which a column of air may pass from the chamber 3^a. The wall of the cavity 7^a is provided with a circular row of perforations or orifices 9 and 10, which are preferably arranged in alternate order, as best seen in Fig. 4. The bottom of the socket 7′ is formed with two concentric circular rows of outlet openings, as 9′ and 10′, both

of said series of outlets being connected with the orifices 9 and 10 by means of angular passages for respectively conducting gas and air from the chambers 6 and 3^a to the recess 7^a, as best seen in Fig. 2. The air is preferably forced through the chambers $3—3^a$ by any suitable pressure, and is discharged through the several orifices 10 simultaneously with the gas which is discharged through the outlets 9, the discharge from said passages being effected at an angle for directing both the air and gas against the deflector 8 at a point well within the relatively broad and deep cavity 7^a, as indicated by the arrows in Fig. 2. The mixture of gas and air is ignited within the cavity 7^a, which constitutes the primary point of combustion, the said cavity affording adequate shelter from atmospheric currents that may circulate around and across the outer face of the head 7. The annular flame which results from this combustion is then projected axially away from the cavity 7^a, and may be directed towards or against any surface or part to be heated, similar to the flame of the common blow-torch. The deflector 8 being hollow and receiving air direct from the chamber 3^a, is not liable to become overheated, and besides the jet of air from the deflector being discharged entirely within the annular flame, becomes mixed with any unconsumed gas that may escape combustion in the cavity 7^a. This novel provision tends to complete the combustion, thereby conserving gas, as well as materially increasing the heating capacity of the burner.

The bottom side of the body 2 is formed with a hollow boss 2^b, which is preferably tightly closed by a plug 12. The opening through this boss is provided mainly for supporting the cores during the casting operation. The bottom of the body is also provided with another boss 2^c, which is formed with a socket adapted to receive a standard or other means of support (not shown).

My blast burner, constructed and operated as herein shown and described is extremely simple and economical and is very effective. By establishing the mixing and burning points of the gas and air entirely outside of the body and its head, there is no danger of the burner back-firing, and owing to the peculiar disposition and arrangement of the gas and air passages 9 and 10, which are non-communicating, it is impossible for the air to enter the gas chamber 6, in order to effect a mixture that might explode within said chamber, and it is equally impossible for the gas to reach the air chamber 3^a and cause an explosion therein. My burner may be operated at its full capacity with maximum air pressure, or it may be operated at its lowest capacity by simply manipulating the damper 4, and by suitably regulating the gas-supply through the pipe 6'.

Having thus described my invention, what I claim, is—

1. In a burner, an elongated hollow body having an air chamber extending axially therethrough and a gas chamber surrounding the discharge end of the air chamber and having an inlet opening, a detachable head closing said discharge end having concentric circular rows of outlets registering respectively with the gas and air chambers adapted to conduct the gas and air to a mixing point outside the body and head, and a deflector projecting outwardly from the center of the head against which the gas and air impinge in radial jets and around which the mixture is burned, said deflector being hollow and being cooled by air derived from the air chamber independently of said outlets.

2. In a gas burner, a cylindrical body having an air chamber extending axially therethrough and an annular gas chamber extending partway into the body and surrounding the air chamber, the corresponding ends of the said chambers being open, a head for closing the open ends of said chambers, said head having separate passages arranged in concentric circular rows for conducting the air and gas outside of the head where the gas and air are mixed and burned, and a deflector projecting outwardly from the head and being surrounded by the outlet orifices of said passages against which the air and gas impinge in converging jets.

3. A blast burner, comprising an elongated body having a central longitudinal air chamber and an annular gas chamber, a head for closing the corresponding ends of the body chambers and having a semi-spherical recess in its outer face and an opening concentric to said recess, the inner face of the head being formed with concentric rows of angular passages adapted to independently conduct air and gas from said chambers towards said recess, the outlet orifices of said passages being arranged in alternate order in a single circular row, and a tubular deflector filling the central opening of the head against which the gas and air are discharged in alternate radial jets and become mixed, said deflector being hollow and being cooled by air received directly from the air chamber, the said air finally being discharged into the flame beyond said recess.

4. A gas burner comprising an elongated cylindrical body having a central air chamber extending therethrough and an annular gas chamber surrounding one end of the air chamber, a damper for controlling the volume of air passing through the body,

and a head closing the corresponding ends of the air and gas chambers, said head having a semi-spherical recess in its outer face and a threaded socket facing the body, said socket being provided with concentric rows of ducts registering with and adapted to independently conduct the gas and air from said chambers to a circular row of orifices in alternate jets, the said ducts being angular and adapted to discharge said jets towards the center of said recess.

5. A gas burner comprising a cylindrical body having a central longitudinal air chamber extending therethrough, a throttle in one end of said chamber, said body being formed with an annular gas chamber surrounding the air chamber beyond the throttle and having a gas inlet, a cap for closing the opposite end of the body and for preventing the mingling of the air and gas within the body, the outer face of said cap having a cavity, and said cap having passages for conducting the air and gas from the respective chambers into the cavity to be mixed and consumed outside the body and cap, the discharge orifices of said passages being arranged in alternate order, and an elongated hollow deflector extending outwardly from the center of said cavity adapted for directing the flame away from the cap and for discharging a jet of air into the flame beyond said cavity.

In testimony whereof I affix my signature.

HOWARD W. PARTLOW.