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BLUE FLAME GAS BURNER.

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1,238,632. Patented Aug. 28, 1917.

Fig. 1.

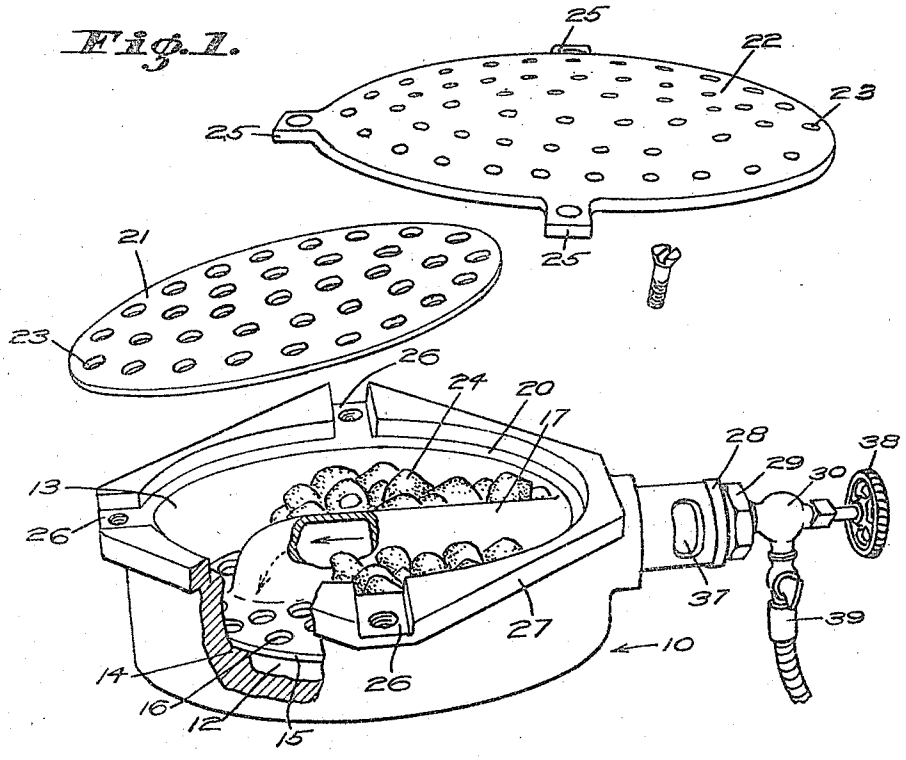
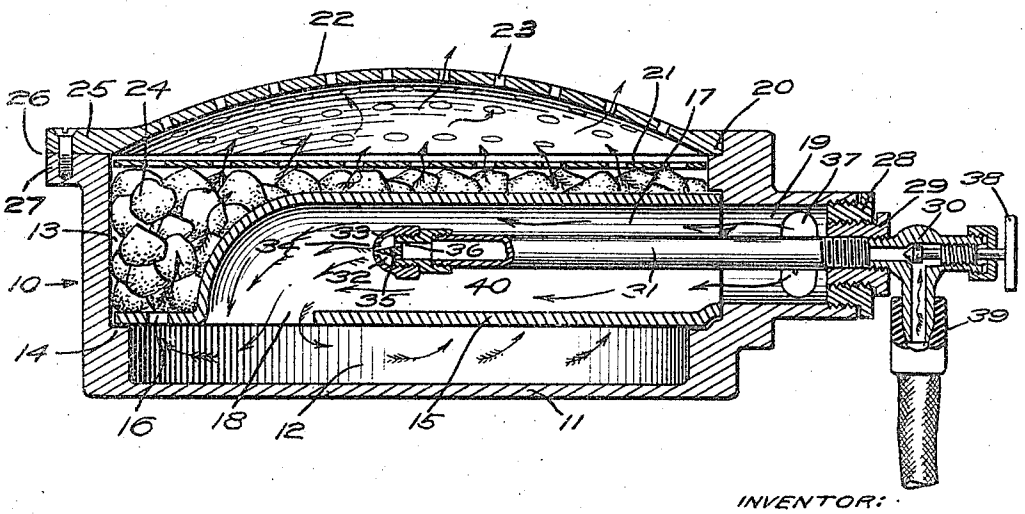



Fig. 2.




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# UNITED STATES PATENT OFFICE.

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## BLUE-FLAME GAS-BURNER.

1,238,632. Specification of Letters Patent. Patented Aug. 28, 1917.

Application filed August 14, 1916. Serial No. 114,764.

*To all whom it may concern:*

Be it known that I, ISRAEL H. CAISTER, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Blue-Flame Gas-Burners, of which the following is a specification.

This invention relates to a gas burner and particularly pertains to a heater burner of the blue flame type.

It is an object of this invention to provide a gas burner which will generate a maximum amount of heat and will cause the gas to burn with a clear blue flame.

Another object is to provide means within the burner for insuring that the gaseous fuel consumed therein will be properly and adequately supplied with air without restriction and will thereby allow the gas to draw its oxygen automatically as needed to cause complete combustion within the burner.

Another object is to provide means for heating and superheating the fuel prior to combustion and thereby producing a homogeneous mixture of air and the gaseous fuel.

Another object is to provide means for retarding the passage of the gas from the burner and thereby insuring that it is thoroughly heated to a high temperature before ignition.

Another object is to so construct the burner that the air and gas flowing therethrough will be required to travel a sufficient distance and through an obstructing chamber prior to being ignited and will thus be thoroughly and homogeneously mixed.

Another object is to provide a valve operating means for limiting the maximum of gas which may flow through the burner and other valve means for regulating the intensity of the flame within this limit.

It is a further object to provide a gas burner which is simple in its construction, may readily be repaired or dismantled, and which will when operating generate a clear blue flame of intense heat without the production of objectional fumes.

Other objects will appear hereinafter.

The invention is illustrated, by way of example, in the accompanying drawings in which:

Figure 1 is a view in perspective with parts broken away and other parts removed to show the construction and arrangement of the burner.

Fig. 2 is a view in vertical section taken through the burner on the center line of the inlet pipes and shows parts broken away to further illustrate the valve control.

Referring more particularly to the drawings, 10 indicates a cylindrical housing which is closed at its lower end by a bottom wall 11. The housing is formed with a lower inside bore 12 and an upper bore 13 of increased diameter thus producing an annular shoulder 14 upon which the primary grate 15 is adapted to rest. The grate 15 is circular and formed with a series of perforations 16 throughout its surface, and has a cylindrical fuel intake manifold 17 formed integral with it and extending across it. One end of the manifold 17 is in communication with an opening 18 formed through the grate 15 and leading to the chamber beneath the grate. The other end of the manifold extends outwardly and directly connects with an inlet opening 19 formed through the wall of the housing 10. The upper end of the housing 10 is formed with an annular shoulder 20 which supports a burner grate 22. A grate 21 is provided having a series of perforations 23 through it and of a size similar to the perforation 16 in the lower grate, the space intervening between the two grates being filled with clay lumps 24 or other suitable porous material, or non-combustible particles through which the gas may pass. The burner grate 22 is formed with a series of radial lugs 25 which fit within receiving slots 26 disposed around a flange 27 which is a part of the housing 10. This grate is convexed and is formed with a series of perforations 23 which are uniformly distributed over its surface and which are of diameters considerably smaller than the diameters of perforations 23.

The inlet passage 19 is internally threaded at its outer end to receive a reducing bushing 28 within which a connecting plug 29 is mounted. This connecting plug is engaged by the threaded end of a valve, which is adapted to communicate therethrough and to a gas supply pipe 31 through which the gas passes. The gas supply pipe 31 is of considerable length and extends within the air supply pipe 17 to a point adjacent the opening 18 where it is terminated. The terminating end of the gas supply pipe 31 is fitted with a needle valve 32 which is suitably screwed in place over the end and thereafter covered by an adjusting cap 33 which has a conical opening 34 in its end adapted to register with the needle 35. A series of perforations 36 are formed around the needle and allow gas to pass from the gas supply pipe through the opening 34 and to the burner, where it mixes with air passing through air inlet openings 37 to the passageway 19 and the gas supply pipe 17.

In operation the valve cap 33 is first adjusted to regulate the volume of gas which may flow through the burner. After this operation has been done the valve 30 may be opened by the hand wheel 38 and allow gas to pass through a supply pipe 39 to the gas supply pipe 31 and around the needle valve to the opening 18 formed through the grate 15. Simultaneous with the inflow of gas air will be drawn through the openings 37 and will mix with the gas in the chamber 40 after which the gas and air will pass through the opening 18 and then through openings 16 and into the space between the lower grate 15 and the intermediate grate 21. While in this space it will be obstructed by the clay lumps or other suitable porous material and this will produce the well known homogeneous combination between the air and gas. This action will be increased as the clay lumps absorb heat during the course of combustion and the gaseous fuel which will pass through the plate 21 will be in a state of perfect mixture. When the gas passes through the plate 21 it is entrapped within the space between plate 21 and the burner grate 22 due to the fact that the openings 28 through the grate 22 are smaller in diameter than the openings 23 in the intermediate grate 21. This arrangement of the perforations insures that the flow of gas will be retarded and will permit it to be superheated before passing through the burner grate 22 where it is ignited. When the gas is ignited it will burn with a clear blue flame having an intense heat and will produce such a perfect combustion that objectional fumes cannot be detected by persons in the room with the burner.

I claim:

1. A gas burner, comprising, a housing, a burner grate thereover, means for conveying gas and air within the lower part of the housing, a heat chamber within said housing and through which the gas and air must pass, non-inflammable particles within said chamber adapted to combine the gas and air in a homogeneous manner, a superheating chamber above said heating chamber, and means whereby the gas flowing from the heat chamber will be retarded within the superheating chamber.

2. A gas burner, comprising, a cylindrical housing, a gas inlet chamber formed at the bottom of said housing, a gas and air supply pipe adapted to communicate with said inlet chamber, a heat chamber disposed above the inlet chamber and in communication therewith, non-inflammable elements within said heat chamber to absorb heat and produce a homogeneous gaseous fuel from the air and gas delivered thereto, a superheating chamber disposed thereabove and in communication therewith, and means whereby the gaseous fuel passing from the heat chamber will be retarded within the superheating chamber prior to its combustion.

3. A gas burner, comprising, a cylindrical housing, an inlet opening through the side wall thereof, an intake pipe connecting therewith and extending inwardly therefrom, an initial mixing chamber in communication with said intake pipe, a gas supply pipe extending within said intake pipe. an adjustment valve over the end thereof, a service valve controlling the supply of gas thereto, a perforated partition wall disposed above said mixing chamber, fire clay lumps positioned over the partition wall, an intermediate wall above said lumps, a burner grate positioned over said intermediate wall, and means whereby the gaseous fuel may pass through the intermediate wall and be retarded prior to passing outwardly through the burner grate.

4. A gas burner, comprising a cylindrical housing, a fuel inlet opening through the side wall thereof, a fuel intake pipe extending into said opening, an initial mixing chamber surrounding said pipe, air supply openings in communication with said mixing chamber, an adjustable valve nozzle mounted upon the inner end of the intake pipe and within the initial mixing chamber, a service valve controlling the supply of fuel thereto, a mixing chamber formed in the bottom of the cylindrical housing and adapted to be supplied with fuel and air, a horizontally disposed perforated partition wall positioned over said mixing chamber, fire clay lumps supported by said partition wall and uniformly distributed thereover in a man-

ner to obstruct the fuel passing upwardly through the perforations, a second partition wall disposed over the lumps of fire clay and formed with perforations similar in size to those through the lower partition wall, and a burner grate of convexed shape mounted over said second partition wall and fitted with perforations of reduced diameter whereby the burning fuel passing from the interior of the housing will be retarded in its movement and more thoroughly ignited.

In testimony whereof I have signed my name to this specification.

ISRAEL H. CAISTER.

**Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."**