May 9, 1933. P. M. FORSTER 1,908,135

GAS BURNER

Original Filed May 26, 1930

Fig. 1.

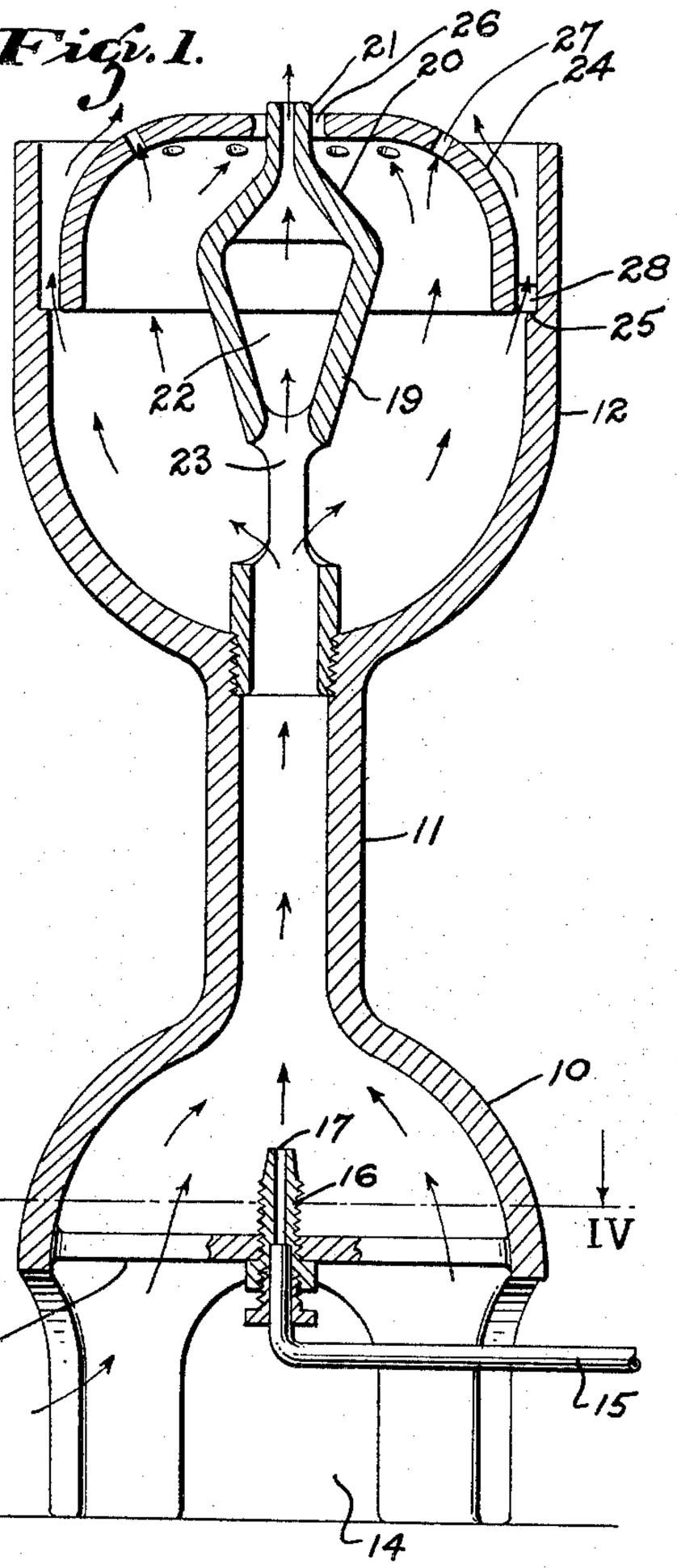


Fig. 2.

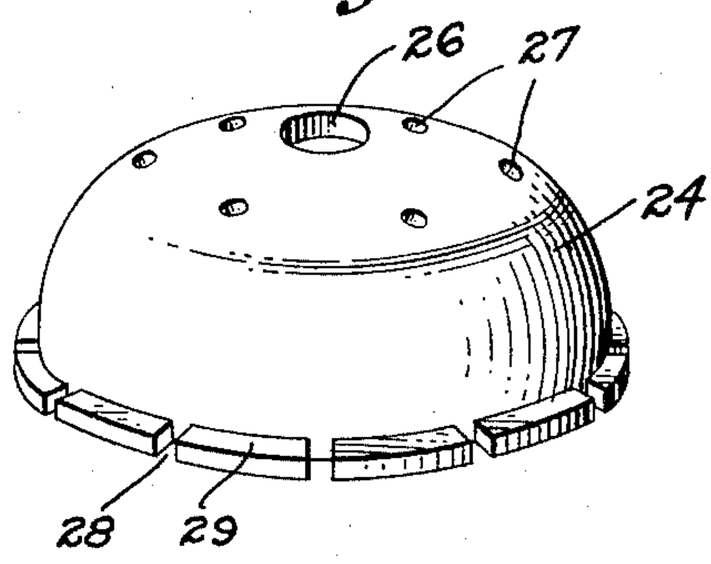


Fig. 4

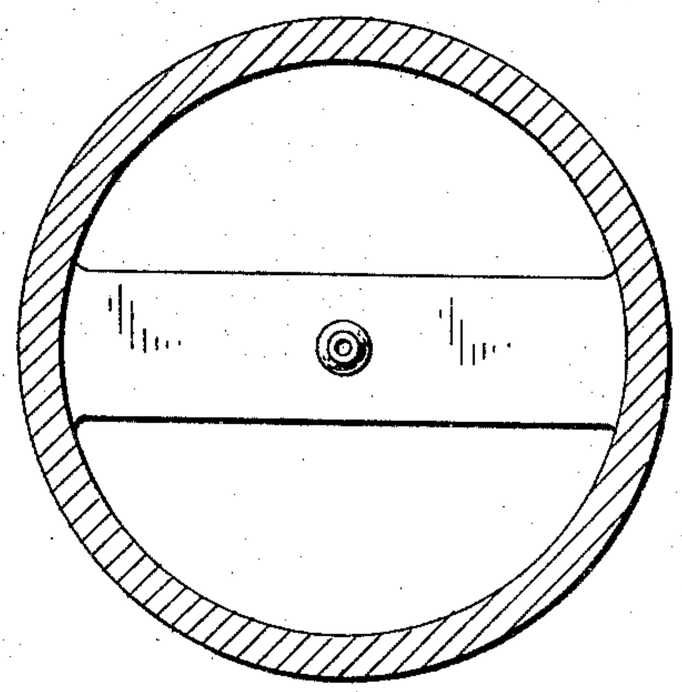
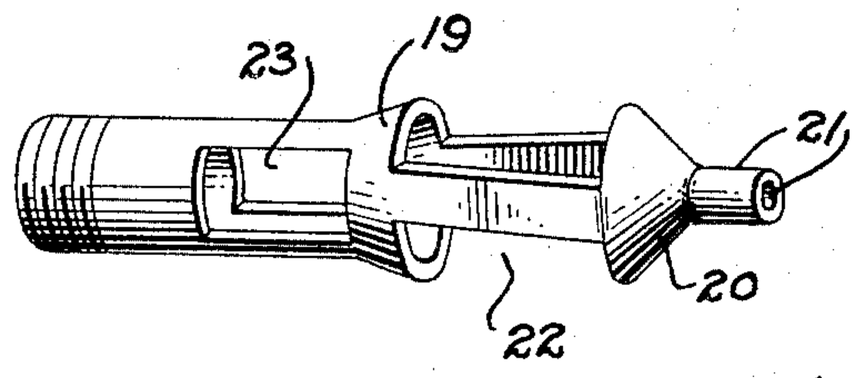


Fig. 3.



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UNITED STATES PATENT OFFICE

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GAS BURNER

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This invention pertains to gas burners and more particularly to an improved type of burner for fuels that require a large quantity of air to support combustion.

There are certain types of fuel such as natural gas that require a large quantity of air to be burned most efficiently. It is well known that in burning natural gas, a good combustion is characterized by a flame that is blue in color. If the flame produced is all blue, it indicates that excellent combustion is taking place.

Experiments have proven that about ten parts of air must be mixed with one part of natural gas to obtain good combustion, while with other fuels such as gasoline in vapor form as high as 16 parts of air to one part of the fuel must be used.

Hitherto, it has been common practice to direct air under pressure into the fuel stream in order to provide a proper mixture of air and fuel. This method, of course, necessitates the use of an air compressor which adds materially to the cost of using such fuels. The necessity of using compressed air also renders the fuel impractical for many purposes such as heating camp stoves or incubators or other devices where air under pressure is not readily accessible. The fuel, itself is put into portable containers under pressure for commercial use and to be able to use the fuel in this state without employing air under pressure is highly desirable.

It is, therefore, the principal object of the present invention to provide a burner that will create perfect combustion of fuels requiring a large quantity of air without the necessity of injecting air under pressure into the fuel stream or the burner.

In carrying the invention into practice, I provide a burner having a mixing chamber and a draft tube extending upwardly therefrom. The upper end of the draft tube terminates in a burner orifice. Fuel is injected by a nozzle through the mixing chamber and into the draft tube in a small stream and carries a large quantity of air with it. Part of the air and fuel that are so mixed pass through the burner orifice and are ignited. The remaining mixture passes through large vents, formed near the upper end of the draft tube, into a bowl surrounding the tube. This bowl is covered by a dome shaped cap which is provided with a number of burner holes. The mixture passing through these holes is ignited by the flame at the end of the draft tube and the flames so provided are also increased in length and heat by the draft caused by the draft tube flame.

One form which the invention may assume is exemplified in the following description and illustrated by way of example in the accompanying drawing, in which:

Fig. 1 is a central vertical section of a gas burner embodying my invention.

Fig. 2 is a perspective view of a burner cap.

Fig. 3 is a perspective view of a draft tube and,

Fig. 4 is a section taken on the line IV—IV of Fig. 1.

Referring more particularly to the drawing, I show a main shell comprising an air mixing chamber 10, a neck portion 11 communicating with the mixing chamber 10 and extending upwardly therefrom and a bowl 12 at the upper end of the neck 11.

The mixing chamber 10 is in the shape of an inverted bowl and has portions of its lower edge cut away as at 14 for the free admission of air.

A pipe 15 conveying fuel under pressure terminates in a nozzle 16 having a small orifice 17 formed therethrough the nozzle 16 is centrally supported in a bracket 18 extending between the inner walls of the mixing chamber 10 in such a position that fuel passing through the nozzle is directed into the neck portion 11.

A draft tube 19 is screwed into and forms an extension of the neck 11. This tube 19 terminates at its upper end in a tapered portion 20, as shown and is provided with an outlet orifice 21. The draft tube 19 is also formed with two large pairs of vents 22 and 23, which if desired may be combined into one or more long openings without hindering their function.

A dome shaped burner cap 24 is supported upon an annular shoulder 25 formed in the bowl 12. The burner cap 24 is provided with a centrally disposed hole 26 which forms a space through which the upper end of the draft tube 19 is adapted to project. The burner cap is also provided with a plurality of burner holes 27 formed at equally spaced intervals throughout its curved surface and notches 28 cut in its lower flanged edge 29.

In operation the fuel under pressure in the pipe 15 is directed into the neck 11 by the nozzle 16. As the fuel passes through the small orifice 17 it is in the form of a small stream which by means of its relatively high velocity draws a large volume of air through the cut away portions 14 and under the lower edges of the mixing chamber 10. This air mixes with the fuel in the neck 11 and in the draft tube 19 providing a highly combustible mixture, part of which passes through the outlet orifice 21 where it is ignited and continues to burn as long as the fuel supply continues to flow. The outlet orifice 21 is, however, only slightly larger than the orifice 17 on the fuel nozzle and it will be seen that a large quantity of air is mixed with the fuel ejected by the nozzle so that it is impossible for all of the combustible gas formed to pass through the orifice 21. In fact, a very small portion of this gas passes through this orifice and the remaining gas escapes from the vent tube 19 into the bowl 12 through the vents 22 and 23. The gas entering the bowl 12 in this manner is forced through the burner holes 27 and the notches 28 in the burner cap 24 and is ignited by the flame produced by the draft tube 19.

After burning for a short time, the flames cause the upper portion of the burner to become heated and the gas circulating through the bowl 12 expands from this heat and is ejected more forcibly through the burner cap producing a longer and hotter flame.

The flared shape of the mixing chamber 10 permits a large quantity of air to be mixed with the fuel and the central flame produced by the draft tube 19 creates such a draft over the top of the burner cap that the flames ejected from the burner holes 27 are about three times their normal length under the same fuel pressure where the draft tube is eliminated. The flames from the notches 28 around the edge of the burner cap are likewise increased in length by the draft created by the flames from the holes 27.

In practical experiments this type of burner has proved 100% efficient in burning fuel that under ordinary circumstances requires the introduction of air under pressure to support proper combustion.

While I have shown the preferred form of my invention, it is to be understood that various changes may be made in its construction by those skilled in the art without departing from the spirit of the invention as defined in the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A burner of the character described comprising a main shell having a mixing chamber at its lower end, a bowl at its opposite end, the bowl and chamber being connected by a neck portion, said mixing chamber being in the shape of an inverted bowl and being cut-away at its lower edge to provide air inlet openings, a fuel nozzle arranged centrally of the mixing chamber and being upwardly directed in axial alignment with said neck, a draft tube connected with the upper end of the neck and terminating at its upper end in a tapered portion, said tapered portion being formed with an outlet orifice, said draft tube being formed with large vent openings within the bowl, a dome shaped burner cap fitted within the upper end of the bowl and through which the upper extremity of the draft tube projects, said burner cap being provided with a plurality of burner holes.

2. A burner of the character described comprising a main shell having a mixing chamber at its lower end, a bowl at its upper end, a narrow neck portion connecting said mixing chamber and bowl, said mixing chamber having air inlet openings, a fuel nozzle in the mixing chamber arranged to direct fuel upwardly through said neck, a draft tube connected with the upper end of the neck and having large openings in its sides and a small orifice at its top, and a perforated burner cap surrounding the upper end of the draft tube and supported by the upper edge of the bowl.

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