

F. C. CHADBORN.
BURNER.
APPLICATION FILED JAN. 14, 1910.

991,197.

Patented May 2, 1911.

Fig. 1.

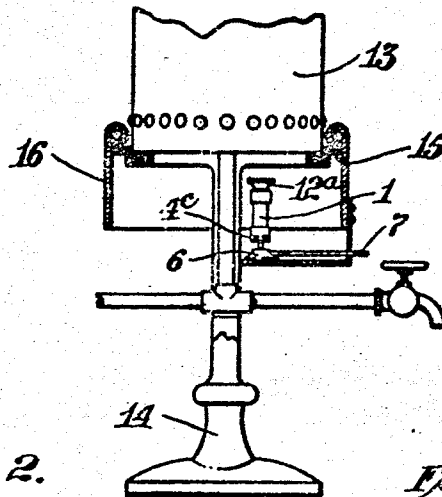


Fig. 2.

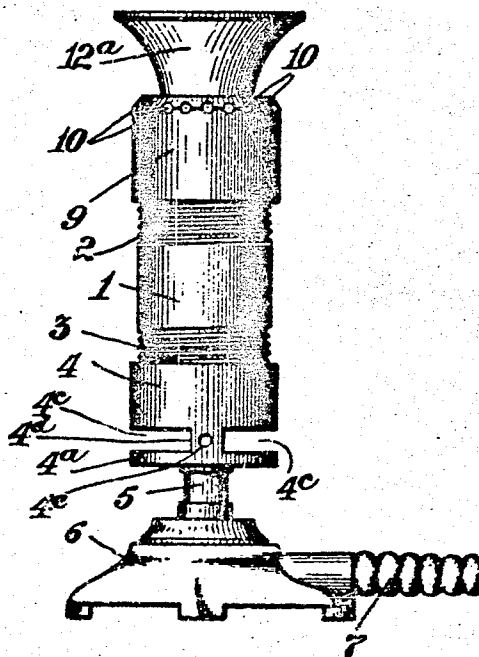
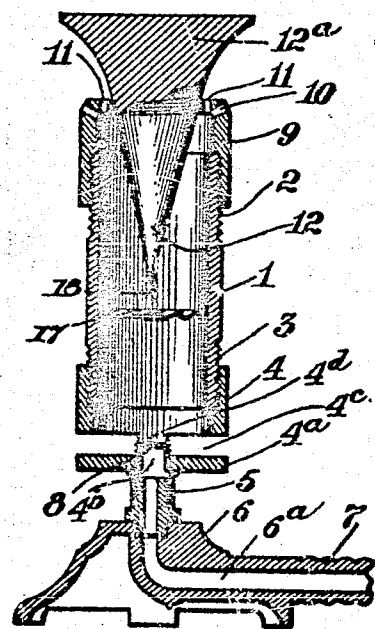


Fig. 3.



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BURNER.

991,197.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, FREDERIC C. CHADBORN, a citizen of the United States of America, residing at Newburgh, in the county of Orange, State of New York, have invented certain new and useful Improvements in Burners, of which the following is a specification.

My invention relates to an improved form of burner, especially although not exclusively adapted for burning gas.

The principal object of the invention is to provide a burner which with a minimum consumption of fuel will burn with an exceedingly hot flame, thus adapting the device for numerous uses wherein a great amount of heat with a limited use of fuel is essential or desirable.

Another object of the invention is to provide means whereby the entering fuel and air will be thoroughly mixed and agitated prior to its exit at the outlet orifices so that the air and gas mixture may be lighted directly at the outlet orifices, and such means further acting to prevent back fire or back flash of the flame to the fuel outlet.

A further object of the invention is to so construct the burner and arrange and correlate its several parts that it is easily attachable to and detachable from a fuel source thus making it easily portable, that it may be quickly taken apart, cleaned and reassembled, and that it may be located for use in places difficult of access by reason of the smallness of space available.

A concrete embodiment of the invention is illustratively exemplified in the accompanying drawing wherein—

Figure 1 is an elevational view, partly in section, of a water boiler showing my improved form of burner used in connection therewith as a water heater; Fig. 2 is an elevational view of my improved burner; Fig. 3 is a vertical sectional view thereof.

As stated above one of the main objects of the invention is to provide a burner structure consuming comparatively little fuel and producing a very hot flame, and I attain this object by so constructing the burner that the mixture of air and gas, of which the former preferably predominates to a large degree, is preheated prior to its escape, through the burner holes. The manner of mixing the air and gas and preheat-

ing the mixture may be accomplished in several ways, and in the drawing, I have shown the means at present preferred by me for attaining the result.

Referring first to Figs. 2 and 3, wherein the burner proper is shown, the numeral 1 designates the mixing tube which may be of any desired form, that illustrated being cylindrical and open at both ends. The tube 1 is provided preferably with upper and lower external screw threads 2 and 3, the lower threads being adapted to engage an internally threaded sleeve 4, which acts in the nature of a support for the tube 1 and which sleeve is formed with a lower plate 4^a centrally orificed at 4^b and having threads which are designed to engage corresponding threads formed exteriorly upon the burner tip 5. The burner tip is set into a foot, a pedestal or other support 6 having a fuel passage 6^a therein and communicating by means of a tube 7 with a source of fuel supply (not shown). In order to provide for an ample supply of air the sleeve 4 is cut away as shown at 4^c, leaving only two supporting webs 4^d which are themselves perforated at 4^e whereby the greatest possible quantity of air is admitted to the interior of the tube 1.

The area of the air admission openings in the sleeve 4 is designedly greater than the (fuel) gas orifice 8 in the burner tip 5, as I have found in practice that the greater the air quantity up to a certain amount, in proportion to the gas quantity, the hotter will be the flame.

Mounted upon the upper end of the mixing tube 1 is a cap 9 which is internally threaded to engage the threads 2 upon the upper outer surface of the tube 1. This cap is provided with a plurality of series of orifices 10 and 11, those designated 10 being bored to lead the air and gas mixture diagonally out of the cap 9 and those designated 11 being bored vertically through the head of the cap. The head of the cap 9 is centrally orificed to receive a preheating device for the air and gas mixture, this preheating device preferably consisting of an elongated teat 12, extending downwardly a considerable distance into the mixing tube 1 and the mixture of air and gas passing upwardly through the tube 1 impinges against the heated surface of the teat and

is in this manner preheated prior to its exit through the ignition ports 10 and 11. The upper part of the teat is preferably formed as a dome 12*, substantially of the form of an inverted truncated cone and serves as a spreader for the flame. It is to be understood that the teat and dome may be differently shaped and that their relative dimensions may be varied but it is of importance that the teat present a considerable surface area in order that the air and gas mixture may be well heated before reaching the openings 10 and 11.

It was above stated that one of the objects of the invention was to provide means for thoroughly mixing the fuel and gas, and the preferred means employed by me for this purpose is illustratively exemplified in Fig. 3, wherein the several burner parts corresponding to like parts in the other views bear like numeral indications.

In Fig. 3 I have shown an agitator or fan 17 revolvably arranged within the mixing tube 1, this fan being mounted to rotate upon a rod 18 depending from the teat 12. The fan is preferably placed at about the median part of the mixing tube 1 and its function is to thoroughly agitate and mix the air and gas flowing upwardly in the direction of the orifices 10 and 11. By employing an agitating device, such for example, as the fan 17, I may if desired, dispense with the preheating arrangement 12, but it is to be understood that it is within the scope of my invention to employ both the preheater and the fan in combination. When the gas enters the mixing tube 1 it causes the fan to rotate very rapidly, thereby providing for a thorough admixture of air and gas, and moreover the fan will prevent any back flash of the flame into the fuel orifice 8.

I have shown in Fig. 1 the application of the invention as a water heater in connection with an ordinary domestic water boiler. The boiler is designated 13 and is mounted upon a support 14 which is provided at its upper portion with a flange 15 designed to support an inclosing jacket 16 for the improved burner. It will be understood that the space within the jacket 16 and immediately under the boiler 13 is very poorly supplied with oxygen and that if a burning candle or flame were introduced into the space the flame would be extinguished practically immediately. I have found in practice however that by the use of my improved burner, a green intensely hot flame may be maintained in this space as long as the fuel supply is continued and I ascribe this result to the improved form of my burner wherein the air and gas are thoroughly mixed and may or may not be preheated prior to their passage through the orifices 10 and 11.

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

1. In a burner of the character described, the combination with a casing having its lower portion provided with openings of extended area for the admission of air in considerable quantities and its upper end provided with a plurality of series of flame escape orifices, one of said series being bored vertically through said casing and another series bored diagonally through the casing, of a preheating device held in the casing, said preheating device comprising a dome projecting upwardly and outwardly from the casing and formed integrally with a teat depending a substantial distance into the casing, and means for conducting fuel to said casing.

2. In a burner of the character described, the combination with a casing having its lower portion provided with openings of extended area for the admission of air in considerable quantities and its upper end provided with a series of vertically bored orifices and a series of diagonally bored orifices, of a preheating device held in the casing, said preheating device comprising a dome projecting upwardly and outwardly from the casing and formed integrally with a teat depending a substantial distance into the casing, a revoluble air and gas mixer held on said teat, and means for conducting fuel to the casing.

3. In a burner of the character described, the combination with a mixing tube and means for supplying air and gas thereto, said mixing tube having means for the escape of flame therefrom, of means closely adjacent said flame escape means and directly in the path of the flame issuing from the mixing tube and adapted to become highly heated by said flame, and means depending in the mixing tube and adapted to receive heat from said first named means and to act as a preheater for the mixture of air and gas passing through the mixing tube.

4. In a burner of the character described, the combination with a mixing tube and means for supplying air and gas thereto, said mixing tube having flame escape means, of a dome on said mixing tube made of a material adapted to become highly heated under the action of flame issuing from the mixing tube, said dome being arranged closely adjacent the said flame escape means and adapted to have the flames issuing therefrom impinge directly against the same, and a teat in the mixing tube adapted to be heated by the dome and adapted also to act as a preheater for the air and gas.

5. In a burner of the character described, the combination with a mixing tube and means for supplying air and gas thereto,

said mixing tube being provided with flame
escape means, of a dome on said mixing tube,
arranged closely adjacent said flame escape
means and directly in the path of the escap-
5 ing flame, said dome being in the form of an
inverted truncated cone and of a material
adapted to become highly heated under the
action of flame, and a teat secured to and
depending from the said dome into the mix-
10 ing chamber and being adapted to receive

heat from the latter for the purpose of act-
ing as a preheater for the air and gas mix-
ture passing through said mixing tube.

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

FREDERIC C. CHADBORN.

Witnesses:

OTTO MUNK,
LOUIS D. GORDON.

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