E. E. BILLOW.

BURNER.

APPLICATION FILED DEC. 24, 1906.

910,267. Patented Jan. 19, 1909.

Fig. 3.

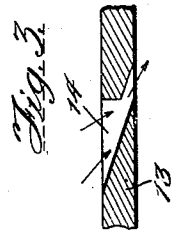


Fig. 1.

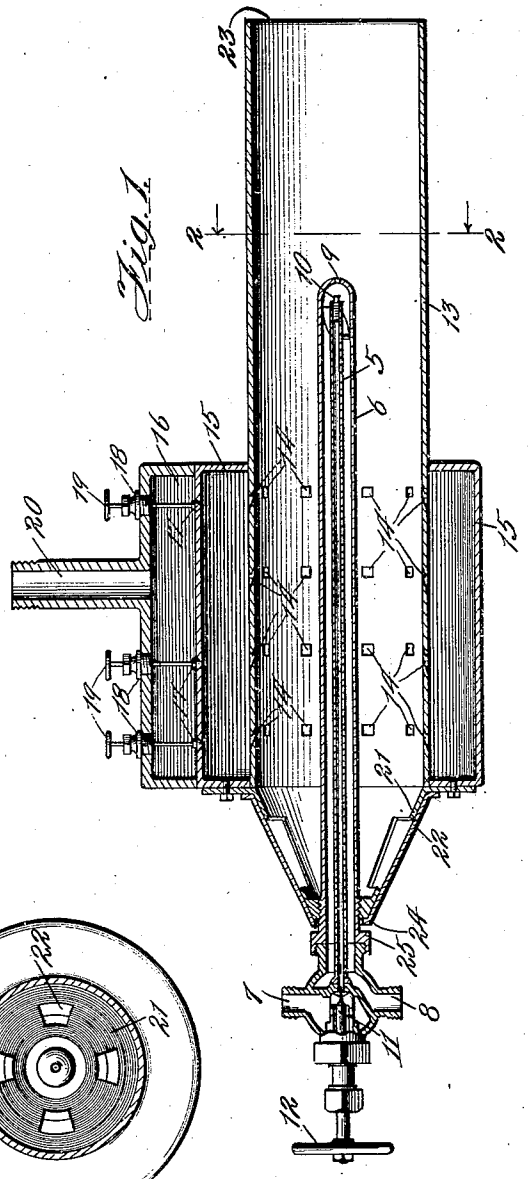
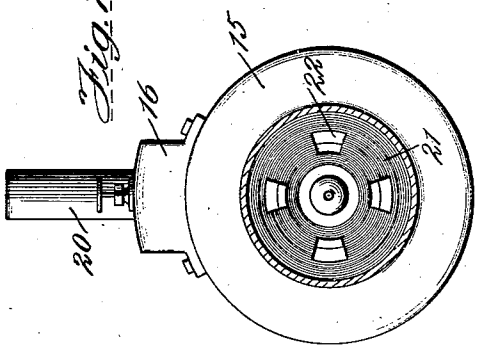


Fig. 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

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BURNER.

No. 910,267. Specification of Letters Patent. Patented Jan. 19, 1909.

Application filed December 24, 1906. Serial No. 349,205.

To all whom it may concern:

Be it known that I, ELMER E. BILLOW, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Burners, of which the following is a specification.

My invention relates to burners more particularly of the type adapted to use a combination of both fuel gas and liquid fuel.

It is well known that the supply of natural gas in some of the regions where it has heretofore been extensively used is becoming deficient and uncertain: and where used for steam generating and other purposes in cool weather or other adverse circumstances the burners which under normal circumstances would receive enough natural gas for the duty imposed upon them, fail to generate sufficient heat. I propose to remedy the deficiency under this and similar circumstances by providing a burner adapted to furnish an auxiliary supply of fuel in the form of atomized liquid hydrocarbon. I accomplish this object by the mechanism illustrated in the accompanying drawings, in which:

Figure 1 is a longitudinal central sectional view of my improved burner. Fig. 2 is a transverse section thereof taken on line 2—2 Fig. 1. Fig. 3 is a detail showing the inlet passages for fuel gas in the mixing chamber.

Similar reference numerals refer to similar parts throughout the several views.

Referring to the drawings 5 represents an inner tube and 6 an outer tube inclosing the same, the inner tube being adapted to convey liquid fuel from a supply passage 7 and the outer tube being adapted to supply air, steam or other oxygen carrier under pressure to the mouth 9 of the outer tube past the mouth 10 of the inner tube. A valve 11 operated by hand wheel 12 or other suitable device serves to control the flow of liquid fuel through tube 5; and the parts 5 to 12 just described constitute an atomizer such for example as the one described in detail in Patent 630,320 dated August 8, 1898 for an invention in atomizers of which I am one of the two joint inventors. The precise construction of the atomizer however, is not an essential feature of this present invention.

Laterally inclosing the atomizer is a mixing chamber 13 which in the preferred form is cylindrical and concentric with tubes 5 and 6. At a point behind the discharge mouth of the atomizer, tube 13 has a set of apertures 14, these apertures being preferably distributed symmetrically so as to equalize and thoroughly distribute the gas entering the tube through them. As shown in Fig. 3 these apertures in the preferred form emerge obliquely so that the gas in passing outward will also be given a motion concurrent with the flow of atomized fuel emerging from the mouth of the atomizer. Circumferentially inclosing the tube 13 at the apertures 14 therein is a gas chamber 15 to which a supply of natural or artificial fuel gas is supplied in any suitable manner. In the preferred construction gas is supplied to chamber 15 by means of the gas chest 16 mounted at some convenient portion thereof and communicating with chamber 15 through the valves 17. The valve bonnets 18 are mounted on chest 16 and the valves 17 are controlled by means of hand wheels 19 or similar devices. By providing a plurality of inlet controlling valves 17 the supply of gas may be accurately regulated. Gas is supplied to chest 16 through the pipe 20.

It will be noted that the mixing chamber 13 extends beyond the mouth of the atomizer. The purpose of this construction is to keep the natural and the atomized gases together for some distance beyond the discharge mouth of the atomizer. This increases the efficiency of mixture.

The preferred means of regulating admission of air to mixing chamber 13 is the twyer which consists of the two interfitting shells 21, 22, shell 21 being secured to chamber 15 and the outer shell being rotatable thereon. These interfitting shells are provided with suitable apertures which when the rotatable shell is in one position register and when in another position do not register. The amount of air admitted may thereby be regulated. An air admitter or twyer of this construction is also described in the aforesaid Patent 630,320.

In the preferred construction which is here shown the inner shell of the twyer is threaded and the outer tube 6 of the atomizer is correspondingly threaded so that the atomizer may be screwed into the shell 21 and be supported thereby. An inwardly extending flange 24 is formed at the rear end of shell 22 which is held down in position by means of the shoulder 25 which is formed

on tube 6 behind said flange. This furnishes a simple construction and also a durable and substantial one, for as shell 21 is secured to chamber 15, the chamber 15, shell 21 and atomizer are all rigidly held together.

In the operation of the device, when one or more of the valves 17 are open gas flows through pipe 20 and chest 16 into the distributing chamber 13 through the apertures 14, the flow being directed through the mouth of the atomizer 9 by reason of the pressure in chamber 15 and the slanting formation of said apertures. The amount of air necessary to obtain perfect combustion is regulated by the twyer or air admitter 21, 22. When it is required to generate a greater amount of heat than is generated by the combustion of the fuel gas alone, valve 11 is opened up a proper amount so as to admit liquid fuel into the tube 5. At the same time, air, steam or other oxygen carrier under pressure is admitted through passage 8 with the result that the liquid fuel is atomized and issues in a spray from the atomizer mouth 9. The spray issuing from the mouth of the atomizer then mixes intimately with the fuel gas in mixing chamber 13 and the combined and thoroughly mixed gases ignite at the mouth 23 of the mixing chamber. Thus the amount of heat generated may be perfectly controlled by controlling the atomizer even though the supply of fuel gas be irregular and deficient.

What I claim as new and desire to secure by Letters Patent, is:

1. In a burner the combination of a mixing chamber open at one end, a gas chamber circumferentially surrounding the same, and communicating therewith by suitable passages, an atomizer having its discharge mouth in front of said gas chamber but behind the open end of said mixing chamber, means for regulating the flow of gas from said gas chamber, and means for regulating the flow of atomized fuel from the mouth of said atomizer.

2. In a burner, the combination of a tubular mixing chamber open at the discharge end, a gas chamber at the rear end of said mixing chamber, said mixing chamber having apertures distributed over its surface and leading from the gas chamber into the mixing chamber and directed obliquely inward and forward toward the discharge end of said mixing chamber, an atomizer having its discharge mouth located in front of the gas chamber and behind the discharge opening of said mixing chamber, means for controllably supplying gas to said gas chamber and means for controllably supplying air to said mixing chamber behind said gas chamber.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

ELMER E. BILLOW.

Witnesses:
CLAYTON O. BILLOW,
J. HENRY MEYER.