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C. O. EVERHART

HYDROCARBON BURNER

Filed April 4, 1928

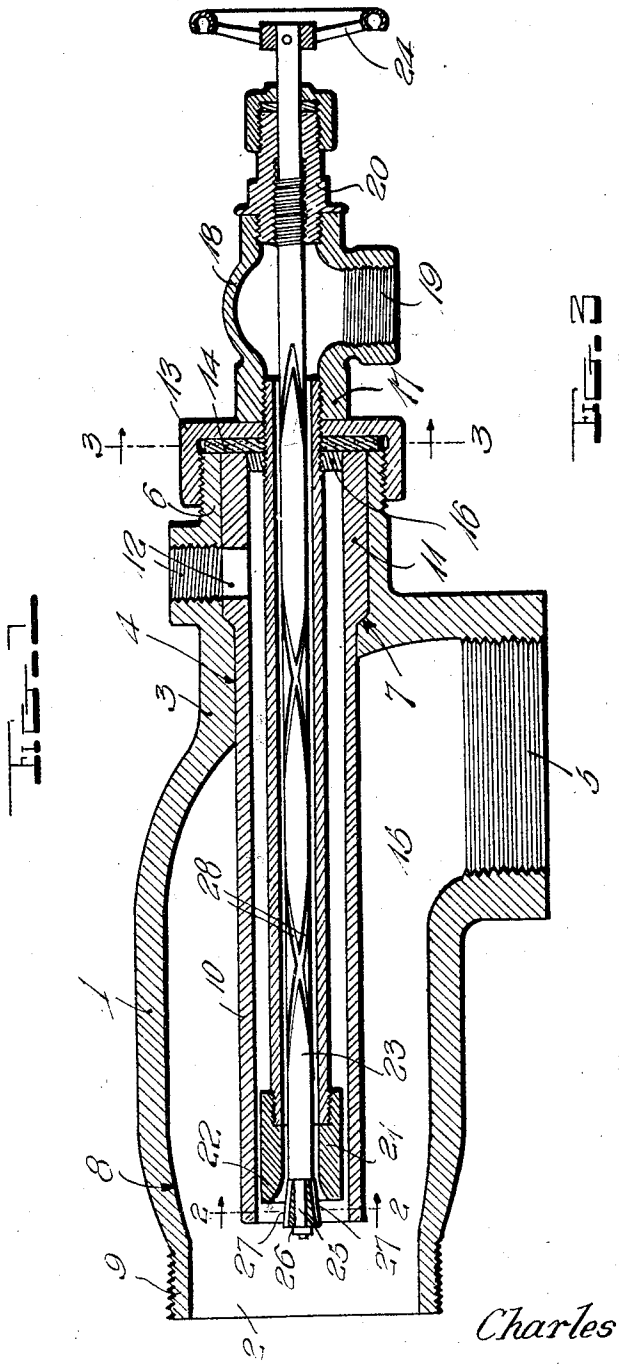


Fig. 1

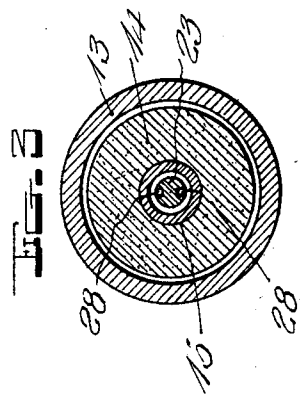


Fig. 3

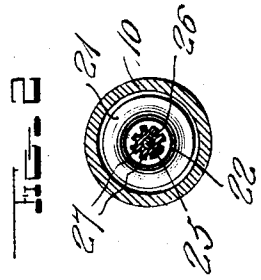


Fig. 2

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UNITED STATES PATENT OFFICE.

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HYDROCARBON BURNER.

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The invention relates to improvements in hydrocarbon burners of the type in which the fuel is mixed with steam or air, forming a highly combustible mixture which when ignited, gives intense heat, and the present disclosure of the invention is directed to such a burner in which provision is made for using the atomizing agent (air or steam) under either high pressure or low pressure, or in some instances, under both pressures.

It is one object of the invention to provide a burner of the type set forth which, while being rather simple and inexpensive, will be highly efficient and in every way desirable, whether used horizontally or vertically, and in this connection, it is a further aim to provide such construction as to advantageously lead the fuel to the point of atomization in the burner, in such a manner that the particles of fuel will be equally discharged into the path of the atomizing agent, insuring thorough mixture and excellent combustion.

Yet another aim is to provide a burner construction in which novel provision is made for normally securing a number of the parts in assembled relation, but for permitting quick and easy disassembly thereof for cleaning purposes or for making repairs, whenever necessary.

With the foregoing in view, the invention resides in the novel subject matter hereinafter described and claimed, the description being supplemented by the accompanying drawings.

Fig. 1 is a central longitudinal sectional view through a burner constructed in accordance with my invention.

Figs. 2 and 3 are transverse sectional views as indicated by lines 2—2 and 3—3 of Fig. 1.

In the drawings above briefly described, the numeral 1 designates an elongated substantially cylindrical body of hollow form, said body being open at its rear end 2, being closed at its front end 3 with the exception of a relatively small axial bore 4, and being provided with a lateral inlet 5 for air, which may be heated if desired. The front end 3 is provided with a forwardly projecting integral boss 6, through which the bore 4 extends, said bore opening through the front end of said boss and being counterbored to provide an internal forwardly facing shoulder 7 near the rear end of the bore. Near its rear end, the body 1 is rearwardly tapered internally, as shown at 8 and said body terminates in a contracted, internally cylindrical portion 9.

Passing axially into the body 1 through the bore 4 thereof, is a high pressure fluid feed tube 10, the rear end of said tube being open and terminating substantially in a transverse plane disposed at the rear end of the tapered portion 8 of the body 1. The front end of the tube 10 is provided with an enlargement 11 which is snugly yet removably fitted in the counterbored portion of the bore 4, the rear end of said enlargement tightly abutting the shoulder 7, while the front end of the tube 10 is flush with the front end of the boss 6. This boss and the tube, are formed with registering inlets 12 for an atomizing agent under comparatively high pressure, which agent may be either steam or air.

A cap 13 is threaded upon the front end of the boss 6, and a gasket 14 is positioned between this cap and the front ends of said boss and the tube 10. Passing through central openings in this cap and gasket and extending into the tube 10, is a fuel feeding tube 15, which tube is provided with relatively adjustable shoulders engaging the rear side of the gasket 14, within the tube 10 and the front side of the cap 13, respectively. In the present showing, one of these shoulders is formed by a nut 16 threaded upon the front end of the tube 15, within the front end of the tube 10, and the other shoulder is formed by a portion 17 of a pipe connection 18, threaded upon the front end of the tube 15. The fuel supply line is connected with the end 19 of the coupling 18, and this coupling is provided with a suitably stuffed bonnet 20, in axial alinement with the tube 15.

The front end of the tube 15 is provided with a tubular tip 21 preferably threaded thereon and disposed in closer proximity to the inner wall of the tube 10 than the tube 15. The rear end of this tip terminates a slight distance forwardly of the rear end of the tube 10, and is internally flared at 22.

Disposed axially within the fuel feeding tube 15, is a stem 23 which is threaded in the bonnet 20 and is provided at its front end with a hand wheel 24. The rear end of this stem is reduced at 25 and carries a frusto-conical spreader 26 whose smaller end is disposed within the flared portion 22 of the tip 21, said spreader being provided with longi-

tudinal peripheral grooves 27. Preferably, the stem 23 is formed with helically disposed grooves 28.

Fuel admitted to the coupling 18 under pressure, travels through the tube 15 and is sprayed in the form of a vortex, from the space between the flare 22 and the spreader 26, and when the atomizing agent is admitted through the passages 12 under pressure, it flows through the tube 10 and is discharged against the spray of fuel to thoroughly mix therewith. If desired, air, heated if preferable, may be admitted through the inlet 5 and will by the tapered portion 8 of the body 1, be directed toward the sprayed fuel to thoroughly mix with the latter. The atomizing agent may be directed either through the inlet 5, or through the inlets 12, or if desired, through both. In either instance, effective vaporization of fuel and mixture with the atomizing agent, will take place, and consequently high efficiency may be obtained from the burner.

Attention is invited to the fact that when any of the internal parts need removal for cleaning or repairing, unthreading of the cap 13 from the boss 6 will permit withdrawal of said parts, said cap normally acting to tightly hold the tubes 10 and 15 in place and also serving to tightly clamp the gasket 14 between itself and the front ends of the boss 6 and tube 10, providing a fluid-tight connection.

The fuel, in flowing to the burner tip, around the stem 23, is of course given some degree of whirling motion by the grooves 28, and if any of these grooves should become clogged with particles of fuel, rotation of the stem 23 by means of the hand wheel 24, will tend to dislodge such particles. Moreover, by turning said hand wheel, the size of the fuel discharge space between the flare 22 and the spreader 26, may be adjusted as occasion may demand.

As excellent results are obtainable from the details disclosed, they are preferably followed. However, within the scope of the invention as claimed, variations may be made.

I claim:

1. A burner comprising a substantially cylindrical hollow body open at its rear end, closed at its front end and provided with a lateral air inlet near said front end, said body being rearwardly tapered internally near its rear end but terminating in a cylindrical interior at said rear end, a high pressure fluid feeding tube disposed axially within said body and projecting from the closed front end thereof to a transverse plane substantially at the rear end of said tapered internal portion of the body, a fuel feed tube disposed axially within said high pressure fluid feed tube and having an enlarged tubular spray tip on its rear end spaced a slight distance forwardly from the rear end of said high pressure fluid tube, both of said tubes being open at their rear ends and said tip being internally flared at said rear end, and a stem passing longitudinally through said fuel feed tube, the rear end of said stem having a frusto-conical peripherally grooved spreader whose smaller end portion is disposed within said flared portion of said tip.

2. In a fluid fuel burner, a substantially cylindrical body open at its rear end, closed at its front end with the exception of a relatively small bore and provided with a lateral fluid inlet, said body having a cylindrical boss through whose front end said bore opens, said bore being counterbored to provide it with an internal shoulder near its rear end, a high pressure fluid feed tube inserted through said bore into the body and having an enlarged front end abutting said shoulder, said boss and tube having registering lateral fluid inlets and having their front ends disposed in a common transverse plane, a gasket contacting with said front ends of said boss and tube, a cap threaded on said boss and contacting with the front side of said gasket, a fuel feed tube passing through said cap and gasket into said high pressure feed tube, and relatively adjustable shoulders on said fuel feed tube contacting with the rear side of said gasket and the front side of said cap respectively, said cap serving to hold both of said tubes and said gasket tightly yet removably in place.

In testimony whereof I have hereunto affixed my signature.

CHARLES O. EVERHART.