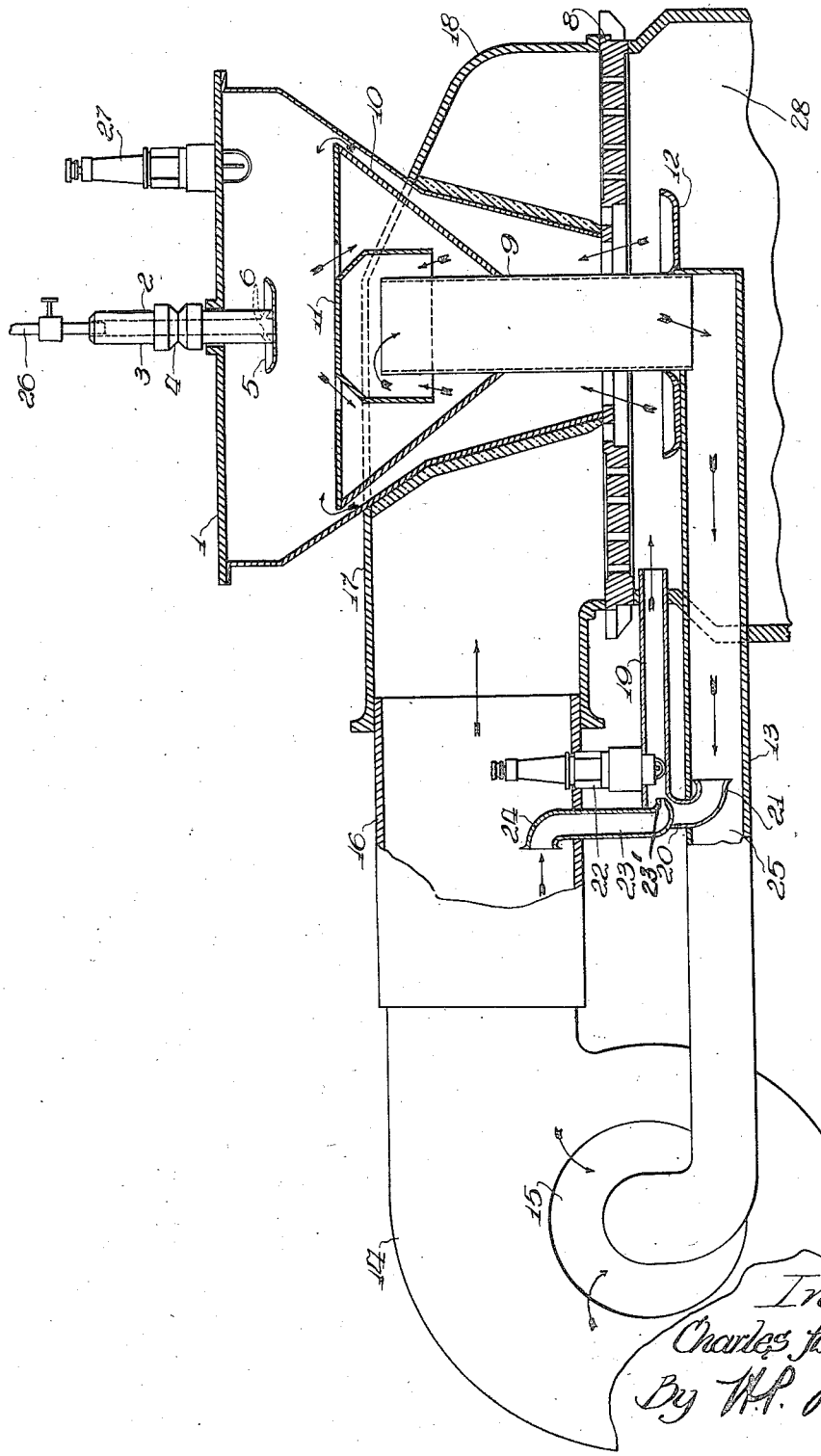
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LIQUID FUEL VAPORIZER AND BURNER

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LIQUID FUEL VAPORIZER AND BURNER

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5 Claims. (Cl. 158—53)

This invention relates to a liquid hydro-carbon vaporizer and burner.

The principal object of the invention is to provide an improved vaporizer adapted to utilize the heavier hydro-carbon fuels.

Another object is to provide a burner in which vaporization is initiated by partial combustion and continued by contact with the fuel to be vaporized with a portion of the hot products of complete combustion.

This method and apparatus for carrying it out is described and claimed in my co-pending application Serial No. 399,685, filed October 14, 1929, this application disclosing a modification.

Another object is to provide means for igniting the main burner when vaporization has been continued by the initial vaporizing means long enough to supply combustible products for the main burner.

The drawing shows a diagrammatic sectional view of a device embodying the invention. A closed vaporizing chamber 1 is provided at the top with a distributing rotor 2. The rotor consists of a hollow shaft 3, a pulley 4 by which the rotor is driven, and a dished distributing disk 5. The disk 5 is mounted at the lower end of the rotor within the vaporizing chamber and closes the lower end of the hollow shaft. Small ducts 6 are provided for distributing oil to the upper surface of the disk. The lower portion of the vaporizing chamber is in the form of a section of a cone and extends downwardly into contact with a central opening 7 in a perforated burner grating 8. Said grating is fitted over a conventional combustion chamber 28, a portion of which is shown extending downwardly from the grating. A centrally positioned conduit 9 extends from below the burner grating upwardly into the vaporizing chamber. The conduit 9 and the lower wall of the vaporizing chamber form an annular passage-way for gases from the flame side of the burner grating into the vaporizing chamber. A conical baffle member 10 attached to the conduit 9 extends in spaced relation to the wall of the vaporizing chamber, forming a narrow annular passage therebetween. A cap-like baffle member 11 is positioned over the upper end of the conduit 9 to provide a tortuous path for gases leaving the vaporizing chamber.

At the lower end of the conduit 9, a radially extending flange 12 is positioned a short distance below the burner grating. The outer periphery of the flange is upturned. A conduit or pipe 13 attached to the lower end of the conduit 9 below the flange 12 extends outwardly from the region of the burner to the intake of a centrifugal fan 14. The fan 14 is also provided with an air intake 15. The outlet of the fan extends to a conduit or pipe 16, which joins a housing 17. The housing 17 surrounds the lower portion of the vaporizing casing and is provided with a tapering outlet passage 18, which registers with the upper surface of the burner grating 8. A firing tube or conduit 19 extends into the burner casing below the grating 8. At its outer end the tube 19 is provided with a bent portion 20 which extends into the conduit 13. A flared end 21 on the bent portion 20 extends into the path of gas flow in the conduit 13 in a direction opposite to the direction of the gas flow. A spark plug 22 is inserted into the firing tube 19. A second tube or conduit 23 extends from the conduit 16 into the firing tube 19. Within the conduit 16, the tube 20 is provided with a flared inlet 24 facing opposite the direction of gas flow. At the other end, a restricted outlet 23' is positioned centrally in the firing tube 19 forming a forcing nozzle when pressure in the conduit 23 is in excess of the pressure in the conduit 19.

In the operation of this vaporizer and burner, liquid fuel is delivered in regulated amounts through a pipe 26 into the hollow shaft 3 of the rotor. The fuel passes through the duct 6 onto the disk 5 and is delivered from the edges in a finely divided form. By means of a spark plug 27, the finely divided spray is ignited in the vaporizing chamber 1. The fan 14 is put into operation, air is forced through the conduit 16 and the housing 17 to the burner grating 8. Due to pressure built up on the flame side of the grating, air passes upwardly between the lower wall of the vaporizing chamber and the conduit 9. Combustion takes place in the vaporizing chamber whereby a portion of the oil is burned and the remainder is vaporized by the heat of such partial combustion and by the sensible heat of the gases. The partial combustion and vaporization products pass around the baffles 10 and 11, to the conduits 9 and 13, to the intake of the fan. Such products are mixed with air in the fan, which forms an effective mixing means, and delivered through the burner grating. The rich products of combustion passing through the conduit 13 strike against the enlarged end 21 of the ignition tube and pass into said tube. The products from the fan strike against the enlarged end 24 of the tube 23 with a greater pressure than is existing in the conduit 13. It will, therefore, be understood that gases will pass through the restricted outlet 25 with an injector action

whereby the rich vaporization products from the conduit 13 are entrained and forced through the ignition tube 19. This rich combustible mixture is ignited by the spark plug 22, whereby a blast is formed, which is projected into the burner casing below the grating. Combustion is then initiated at the main burner.

After the main burner is in operation, the gases being drawn up into the vaporizing chamber are no longer combustible. It is, therefore, evident that combustion will cease in the vaporizing chamber, vaporization being continued thereafter by sensible heat from the hot complete combustion products.

It is to be understood that applicant has shown only a preferred embodiment of his device and that he claims as his invention all modifications thereof falling within the scope of the appended claims.

What is claimed is:

1. A liquid fuel vaporizer and burner comprising a vaporizing chamber, means to distribute liquid therein, a burner grating, means for delivering hot burned gases from the flame side of the grating to the vaporizing chamber, gas and air mixing and moving means, means for delivering gases from the vaporization chamber to said means, means for conducting gases from the mixing and moving means to the burner grating, igniting means for the burner grating consisting of a conduit positioned to receive gases from the means for delivering gases from the vaporizing chamber to the mixing and moving means and to deliver said gases to the flame side of the grating, a conduit positioned to receive gases from the means for conducting gases to the burner grating and extending into the first named conduit, and an igniting device positioned in said first named conduit.

2. A liquid fuel vaporizer and burner comprising a vaporizing chamber, means to distribute liquid therein, a burner grating, means for delivering hot burned gases from the flame side of the grating to the vaporizing chamber, gas and air mixing and moving means, means for supplying air thereto, a supply pipe leading from the vaporization chamber to the mixing means, a delivery pipe leading from the mixing means to the grating, igniting means for the burner grating consisting of a conduit positioned to receive gases from the supply pipe and to deliver said gases to the flame side of the grating, a conduit positioned to receive gases from the delivery pipe and extending into the first named conduit, and an igniting device positioned in said first named conduit.

3. An igniting structure for a hydro-carbon vaporizer and burner containing a combustion chamber, a supply pipe for carrying a rich combustible gas and a delivery pipe for carrying said gas after it is mixed with air for combustion and in combination therewith a conduit having an open end positioned in the supply pipe and extending into the combustion chamber of the burner, a second conduit having an open end in the delivery pipe and extending into said last mentioned conduit, and means positioned to ignite the gases in the first mentioned conduit.

4. An igniting structure for a hydro-carbon vaporizer and burner containing a combustion chamber, a supply pipe for carrying a rich combustible gas and a delivery pipe for carrying under pressure said gas after it is mixed with air for combustion and in combination therewith a conduit having an open end positioned in the supply pipe and extending into the combustion chamber of the burner, a second conduit having an open end in the delivery pipe and extending into said last mentioned conduit, said second conduit terminating in a forcing nozzle whereby rich gas is drawn from the supply pipe through the first mentioned conduit, and means positioned to ignite the gases in said first mentioned conduit.

5. An igniting structure for a hydro-carbon vaporizer and burner containing a combustion chamber, a conduit for carrying a rich combustible gas and a conduit for carrying said gas after it is mixed with air sufficient for combustion and in combination therewith a conduit having an open end positioned in the conduit carrying the rich combustible gas and extending into the combustion chamber of the burner, a second conduit having an open end in the conduit for carrying the mixed gas and air and extending into said last mentioned conduit, and means positioned to ignite the gases in the conduit extending into the combustion zone.

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