

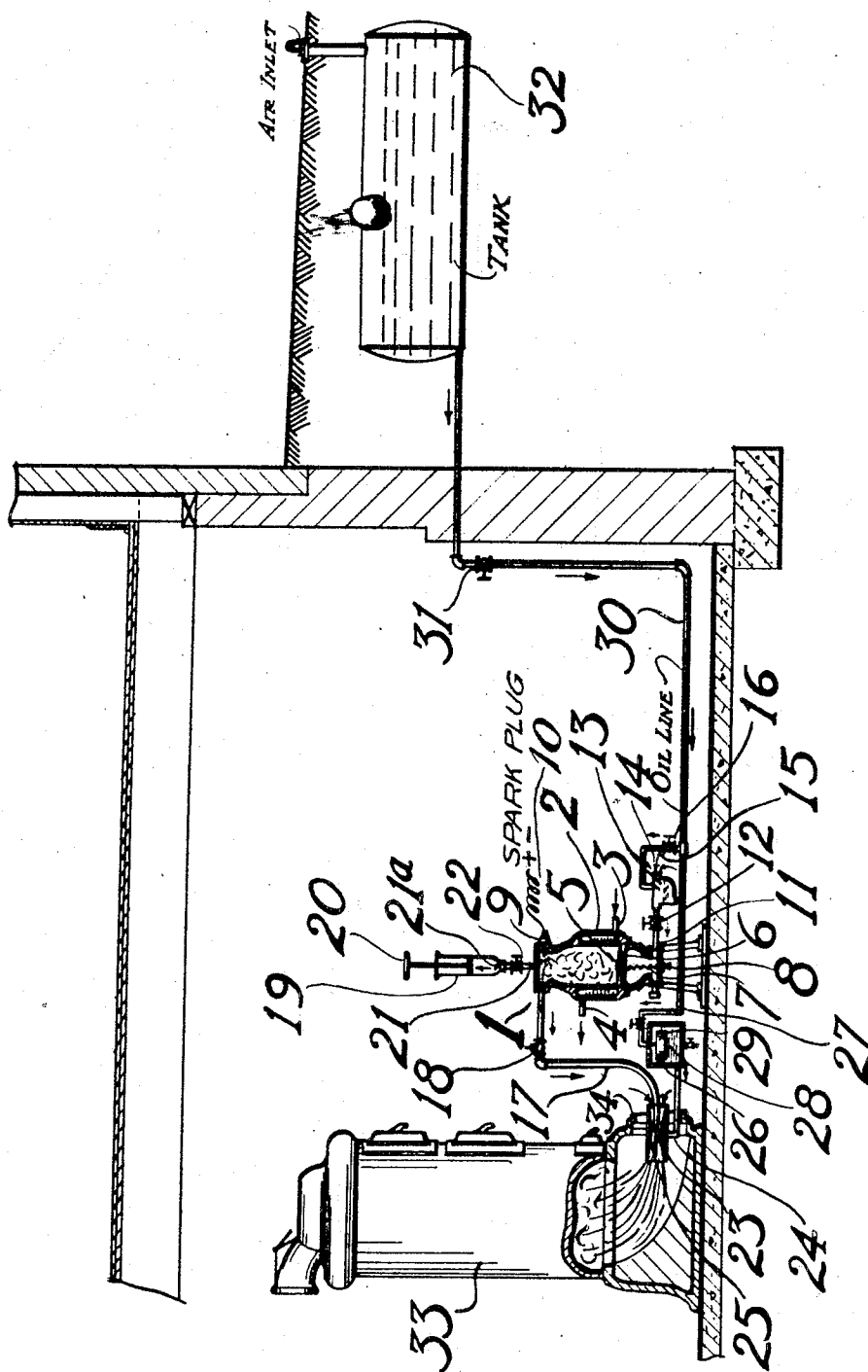
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APPARATUS FOR BURNING LIQUID FUELS

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APPARATUS FOR BURNING LIQUID FUELS

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This invention relates to improvements in apparatus for burning liquid fuels. My invention comprises, particularly, the generation of hot gaseous products of combustion under superatmospheric pressure and the direction of the same against a stream of liquid fuel in such a manner as to atomize and/or volatilize the said fuel. Air to support combustion is introduced to the atomized fuel in one or more stages, as desired, and the resulting mixture burned in the usual way.

The figure is a side elevation, partly in section, of an apparatus in which my method may be carried into effect.

Referring specifically to the drawing, the combustion chamber 1 is surrounded by any suitable cooling means such as the water jacket 2 supplied with a cooling fluid by means of the inlet and outlet pipes 3 and 4 respectively. This chamber is equipped with an inlet valve preferably of the flapper type 5 seating on the support 6 and held in a normally closed position by means for maintaining tension thereon, preferably the spring 7 connected to the adjustment screw 8. The chamber is equipped with any suitable ignition device such as the spark plug 9 which may be supplied with high tension current by means of the lead 10. The chamber 1 is supplied with a combustible mixture by means of the intake pipe 11, controlled by the valve 12, which in turn communicates with any suitable type of fuel supply device such as carburetor 13 receiving air through the inlet 14 and hydrocarbon fuel e. g. kerosene or gasoline through the pipe 15 controlled by the valve 16.

A long, narrow pipe 17 leads from the combustion chamber 1. It is provided with a valve 18 or any equivalent means for controlling flow. A pump 19, operable by means of the handle 20 communicates with the combustion chamber through the pipe 21 equipped with check valve 21a opening outwardly from the chamber. The pipe 21 is controlled by the valve 22.

The pipe 17 terminates at point 23 and immediately adjacent to this point terminates the pipe 24 which is adapted to supply liquid fuel. A Venturi throat 25 preferably sur-

rounds the ends of pipes 17 and 24. Oil is supplied through the pipe 24 in any regulated manner but the supply is preferably controlled by means of a float feed device 26. This device receives oil through the pipe 27, passing into the receptacle 28 and the oil in receptacle 28 is controlled by the float 29 in such a way that oil rises in pipe 24 to a height slightly less than the total height of the pipe 24 at the open end so that oil cannot overflow from the end of pipe 24 but can only escape therefrom under the influence of a suction created by the discharge of hot gases from the pipe 17. Pipes 27 and 15 both receive a supply of oil fuel from the pipe 30 controlled by valve 31 communicating with the storage tank 32.

I may, of course, supply different kinds of liquid fuel to the float control device 26 and the fuel supply device 13 respectively or I may supply a mixture of gas such as natural gas or illuminating gas and air to the explosion chamber 1 by means of any suitable mixing device.

The method of operation of the apparatus described is substantially as follows: Liquid fuel is admitted to the carburetor 13, the valves 16 and 12 being open for this purpose, the valve 18 is then closed and valve 22 opened. By means of the suction pump 19, I create a partial vacuum in the chamber 1 such that an explosive mixture is drawn in. The valve 22 is then closed and the valve 18 opened. I then apply suitable current to the ignition means 9 to explode the mixture in 1. The hot gaseous products of combustion escape through the pipe 17 and in escaping acquire sufficient momentum in this pipe so that a partial vacuum is created in 1 at the end of the explosion cycle which partial vacuum operates to draw in a new charge of explosive mixture. The length and diameter of pipe 17 are fixed to obtain this result, depending upon the size of the combustion chamber in 1. The spark plug 9 is continuously operated and a substantially continuous succession of alternate explosions and replenishments of the charge takes place. The theory and manner of operation of an explosion chamber of the type hereinabove referred to, is described

in the "Gas Turbine" by Henry Harrison Suplee, copyright 1910, J. B. Lippincott Co., pages 246 and 247, to which reference is made for a more complete exposition of this device.

- 5 Fuel is then passed through pipe 27 to the regulating device 26. This fuel flows by gravity into the pipe 24 from which it is aspirated, atomized and in part vaporized by the current of hot, gaseous combustion products from 17. Primary air is drawn in through the Venturi throat 25 to mix with the atomized liquid fuel. The combustible mixture thereby created is ignited by some ordinary means and burns in the stream of secondary air which enters through the space 34 around the venturi. The operation of the burner is thereafter automatic and continuous.

- 20 While I have shown the mechanism applied to a dwelling heater, it will be understood that it can be applied for any purpose involving the combustion of liquid fuels.

- 25 The foregoing description is for purposes of illustration. It is my desire that the invention be limited only by the appended claims or their equivalents in which it is my intention to claim broadly all novelty inherent in the invention.

I claim:

- 30 1. A burner mechanism for liquid fuels comprising in combination an explosion chamber, a flapper valve opening inwardly to the said chamber, means for maintaining tension on said flapper valve to hold the same in normally closed position, means for supplying an explosive mixture to said chamber through said flapper valve, ignition means in said chamber, a constricted outlet leading from said chamber, open at the end remote from said chamber, the length and diameter of said outlet being so proportioned that products of combustion passing therethrough acquire sufficient momentum to produce a suction in said chamber sufficient to open said flapper valve and induce a renewed charge of explosive mixture in said chamber, an oil pipe terminating in an open end, which open end is disposed in such relationship to the open end of said constricted outlet that oil issuing from said oil pipe is disseminated by a current of gases issuing from said constricted outlet.

- 55 2. A burner mechanism for liquid fuels comprising an explosion chamber, a flapper valve opening inwardly to the said chamber, means for maintaining tension on said flapper valve to hold the same in normally closed position, means for supplying an explosive mixture to the said chamber through the said flapper valve, ignition means in said chamber, a constricted outlet leading from said chamber, open at the end remote from said chamber, the length and diameter of said constricted outlet being so proportioned that products of combustion passing through ac-

quire sufficient momentum to produce a suction in the said chamber, sufficient to open said flapper valve and induce a renewed charge of explosive mixture, an oil pipe terminating in an open end, which open end is disposed in such relationship to the open end of said constricted outlet that oil is aspirated from said oil supply pipe and atomized by a current of gases issuing from said constricted outlet, and a float feed device adapted to maintain a normal level of oil in said oil supply pipe slightly below the open end thereof so that oil can only escape therefrom under the influence of a suction created by the discharge of gases from the said constricted outlet.

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