No. 744,098. PATENTED NOV. 17, 1903.

J. T. PEDERSEN.

LIQUID FUEL HEATER BURNER.

APPLICATION FILED MAR. 4, 1903.

NO MODEL.

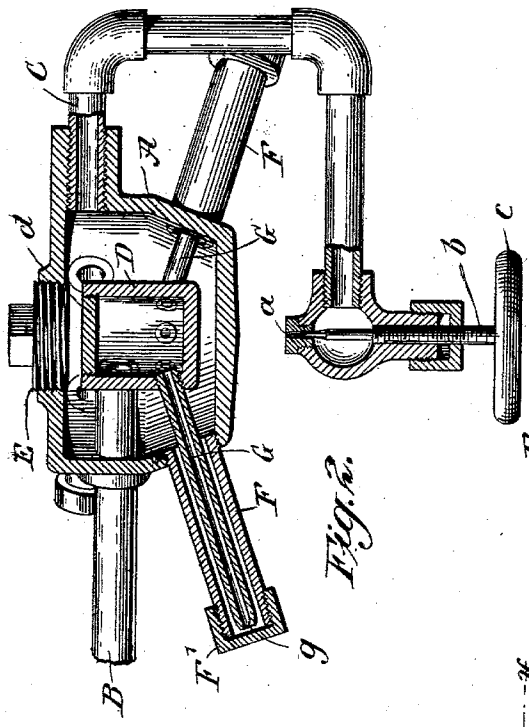

Fig. 2.

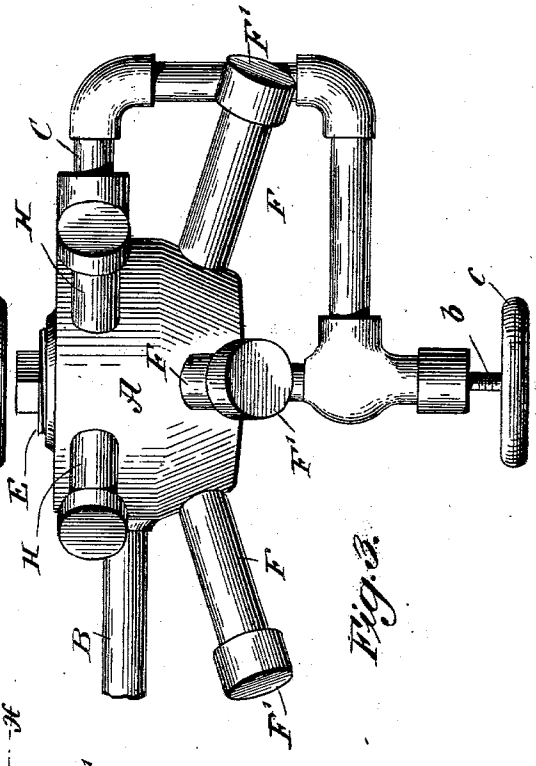

Fig. 3.

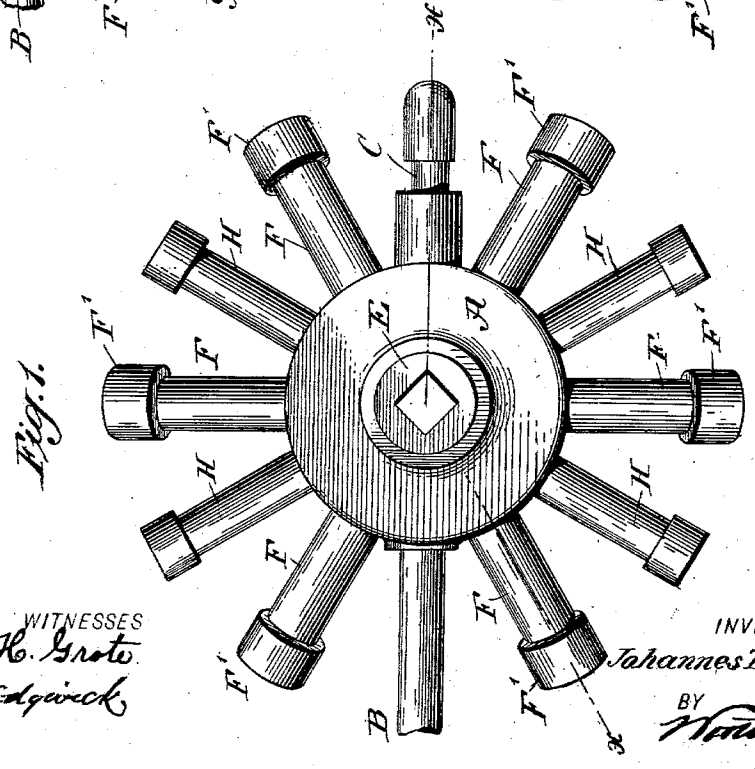

Fig. 1.

WITNESSES

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No. 744,098. Patented November 17, 1903.

UNITED STATES PATENT OFFICE.

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LIQUID-FUEL-HEATER BURNER.

SPECIFICATION forming part of Letters Patent No. 744,098, dated November 17, 1903.

Application filed March 4, 1903. Serial No. 146,074. (No model.)

To all whom it may concern:

Be it known that I, JOHANNES TH. PEDERSEN, a citizen of the United States, and a resident of the borough of Queens, city of New York, in the county of Queens and State of New York, have invented certain new and useful Improvements in Liquid-Fuel-Heater Burners, of which the following is a full, clear, and exact specification, reference being had to the accompanying drawings and to the letters marked thereon.

This invention relates to that variety of liquid-fuel-heater burners wherein the fuel is converted into gas or vapor within the burner structure and issues therefrom under more or less pressure, mingles with the surrounding air, and is then consumed for the purpose of producing the requisite heat.

While the improvements are applicable to burners of any size or capacity from the smallest to the largest, they are chiefly advantageous for use in situations where a considerable volume of heat or flame is required, as for the heating of steam-boilers and similar uses, being especially applicable in connection with boilers which are movable, as those upon carriages or trucks and vessels.

The principal objects of the invention are to provide or produce a simple, cheap, reliable, and effective burner of the class named wherein extensive surfaces are provided for insuring the proper vaporization of the liquid fuel, wherein means are supplied for superheating the vapor before it passes out at the gas-jet orifice, and also means for keeping the liquid fuel separated as much as possible from the gas or vapor within the main chamber of the burner.

Subordinate objects are to provide for a constant supply of liquid fuel to the auxiliary vaporizing-chambers independently of the position of the burner, to prevent the liquid fuel from being forced over to the gas-jet orifice before it has been converted into gas or vapor, and to render the various parts easily accessible for cleaning or repairs, as may be necessary.

To accomplish the foregoing objects and to secure other and further advantages in the matters of construction, operation, and use, my improvements involve certain new and useful arrangements or combinations of parts, peculiar features of construction, and principles of operation, as will be herein first fully described and then pointed out in the claims.

In the accompanying drawings, forming part of this specification, I have shown at Figure 1 a top or plan view of my improved burner in its most approved form, the tank for holding the liquid fuel and means for suspending the burner in place for use being omitted, as these may be of any preferred form. Fig. 2 is a vertical view, partly in section and partly in elevation, upon planes through the broken line $x x$ of Fig. 1. Fig. 3 is a side elevation corresponding with Figs. 1 and 2.

In all the figures like letters of reference wherever they occur indicate corresponding parts.

A represents the main shell or chamber of the burner, which is preferably of cast metal and is made thick enough and strong enough to withstand the heat and pressure to which it is subjected. This chamber constitutes the main receptacle for the vaporized material after the operation of the burner is commenced.

B is a supply-pipe by which the liquid fuel, as oil or other vaporizable material, is fed to the burner from a suitable tank or receptacle, and C is the discharge-tube, leading from the upper part of the main chamber A and by suitable connections to the gas-jet orifice *a*. This latter is controlled by any preferred form of valve, preferably by a needle-valve, which prevents the orifice from becoming clogged. When the needle-valve is used, it is moved to or from its seat by a suitable screw-shaft, as *b*, turned by a convenient handpiece, as *c*.

Located within the shell or chamber A is a smaller receptacle D, preferably sustained above the bottom of the shell A and free from the sides and top thereof, and this receptacle is closed in any suitable way, as by a plug *d*, so that communication between its interior and that of the shell A can only be had by means to be hereinafter specified. A plug, as E, in the top of shell A closes the orifice

through which the receptacle D is introduced. The supply-pipe B passes through shell A and communicates only with the interior of receptacle D, the joints being properly secured to prevent leakage.

F F are short sections of tubing tapped into the lower portions of the side wall of shell A, located radially around the burner and closed at their outer ends, as by removable caps F′ F′. These form the extended auxiliary chambers for the vaporization of the liquid fuel, and they are, when made in the form shown, preferably located at about equal distance from each other around the burner. It is obvious that these chambers might be otherwise formed in connection with the shell A; but in the construction shown any one may be easily removed and replaced, if required.

G G, Fig. 2, are delivery-tubes connected with the receptacle D and extending within the tubes F and nearly to their outer extremities, being smaller than said tubes F and being provided with comparatively small delivery-orifices, as at *g*.

When the burner is in operation, there is a uniform pressure on the liquid fuel to force it out at the orifices *g*, and it is vaporized in the tubes F and backs up into the main chamber A. The liquid being exposed to the heat of the flame in the narrow space between tubes F and G is more easily and effectually vaporized than when admitted to a single chamber of the usual form employed in heater-burners. To render the vaporized material better fitted for burning, I provide means for superheating it before it is delivered to the burner-orifice. For this purpose a number of tubes, as H H, extend out from the upper part of the shell A, communicating with the interior thereof and being closed at their outer ends. The tubes H extend out to about the same distance as the tubes F, and they are equally exposed to the flame produced by the burner. Vapor or gas generated in the tubes F passes into the chamber A, where it is further heated and expanded and enters the tubes H H, where it is still more highly heated or superheated and forces its way back to the chamber A and then down through the tube C to the burner-orifice in a manner easily understood. The tubes H H are preferably located perpendicularly to the axis of the burner and, like the tubes F, may be removed for cleaning or other purpose, if necessary.

The tubes F F are inclined downwardly, as indicated in Figs. 2 and 3. The purpose of this arrangement is to prevent the oil or other liquid from flowing back into the chamber A before it is vaporized and to insure always a proper supply of oil or liquid to the auxiliary vaporizing-chambers no matter what may be the position of the burner. For instance, when the burner is employed on a steam vessel the movements of the vessel alter the perpendicularity of the burner. By inclining the tubes F downwardly, substantially as indicated, no matter how the burner may be tipped liquid will always be projected into the uppermost vaporizing-tubes, and being delivered into these tubes through a small orifice the tubes cannot be flooded before the burner is returned to its normal position. Thus the vaporization is carried on at all parts of the burner in very nearly equal degrees and under all circumstances of movement.

The initial lighting of the burner may be accomplished in any of the usual ways, either by flooding the burner and igniting some of the material which first passes out at the burner-orifice or by heating the burner by the application of a separate flame. The flame passes up between and around the projecting tubes and quickly vaporizes the contained liquid. By the construction indicated the central or main chamber is made comparatively small, while the surfaces exposed to the heat of the flame are quite extensive and do not impede its upward passage to perform the work required of it. The vaporizing capacity of the improved burner is always equal to the greatest amount of fuel that can be fed to it.

Being constructed and arranged substantially in accordance with the foregoing explanations the improvements have been found to answer all the purposes or objects of the invention hereinbefore alluded to.

Having now fully described my invention, what I claim as new herein, and desire to secure by Letters Patent, is—

1. In a burner of the character herein set forth, the main chamber, an interior fuel-receptacle, auxiliary vaporizing-chambers projecting from the main chamber, and tubes extending from the interior receptacle and arranged to deliver fuel at or near the extremities of the auxiliary vaporizing-chambers, the parts being combined and arranged substantially as and for the purposes explained.

2. In a burner of the character herein set forth, the combination with the main chamber of an interior receptacle and auxiliary vaporizing-chambers projecting therefrom, of the fuel-conducting tubes leading from the interior receptacle and provided at their extremities with contracted orifices, substantially as and for the purposes explained.

3. In a burner of the character herein set forth, the combination with the main chamber of auxiliary vaporizing-chambers arranged around and projecting from the main chamber and inclined downwardly, and means for delivering fuel into said inclined chambers, substantially as and for the purposes explained.

4. In a burner of the character herein set forth, the combination with the main chamber and series of auxiliary vaporizing-chambers connected therewith and extending therefrom, of superheating-chambers extending

from the main chamber and located above the auxiliary vaporizing-chambers, substantially as and for the purposes explained.

5. The combination as before set forth, of the main chamber, an interior chamber and fuel-supply pipe connected therewith, auxiliary vaporizing-chambers extending from the main chamber, fuel-feeding tubes extending into the vaporizing-chambers, superheating-chambers connected with the said main chamber and discharge-tube and gas-jet orifice, all constructed and arranged for operation substantially as explained.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHANNES TH. PEDERSEN.

Witnesses:

C. SEDGWICK,

WORTH OSGOOD.