



# UNITED STATES PATENT OFFICE.

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## HYDROCARBON-BURNER.

SPECIFICATION forming part of Letters Patent No. 681,782, dated September 3, 1901.

Application filed February 8, 1899. Serial No. 705,008. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN GRAHAM, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia, State of Pennsylvania, have invented a new and useful Hydrocarbon-Burner, of which the following is a specification.

My invention relates to hydrocarbon-burners, my object being to provide compact and efficient means for vaporizing hydrocarbon and conveying the same mixed with the proper proportion of air to a suitable burner for its combustion.

My invention also consists in improved adjustable means for regulating the distance between the vapor-vent and the vapor-receiving aperture of the mixing and conveying tube.

My invention further consists in locating the mixing and conveying tube within the incandescent mantle, so that the intake-aperture of said mixing and conveying tube shall protrude through the top of the incandescent mantle.

My invention further consists in providing adjustable means for supplying additional air to the air-mixed vapor in close proximity to the point of combustion.

My invention also includes improvements in details of construction.

In the accompanying drawings, Figure 1 is an elevation of my device in part section. Fig. 2 is a cross-section on line *xx* of Fig. 1.

Similar numerals refer to similar parts in the different views.

Referring to the drawings, 1 represents in part section a supporting-piece adapted to be secured to an ordinary gas-fixture or any other suitable support. To this is secured the cylinder 2, surmounted by the gauze or perforated burner-cap 3, the latter being surmounted and inclosed by the incandescent mantle 4. Also supported by the piece 1 is the tube 5, which extends upward through the gauze-burner 3 and the mantle 4 and projects through the top of the latter. The tube 5 is provided at its lower extremity with apertures 6, for the purpose hereinafter designated.

Adjustably supported by an extension of piece 1 is the vaporizing-tube 7, rigidly secured after adjustment by the set-screw 8.

This tube 7 extends upwardly approximately parallel with tube 5, but to a greater distance than the latter, and carries at its upper end the horizontal extension 9, which is provided at its lower outward extremity with the removable nozzle 10, which is directed downwardly immediately over the center of the opening in tube 5, which may be designated the "mixing and conveying" tube. The mantle may be supported by the arm 11, adjustably secured to tube 7, as shown in Fig. 1.

The operation of my device as thus far described is as follows: Oil under pressure is admitted to the vaporizing-tube 7 through supply-tube 16 and regulated by any suitable valve in the supply-tube, but not shown in the drawings. As the oil rises in the vaporizing-tube it is heated by the flame and the incandescent mantle and becomes vaporized, or partially so, thereby. The vapor or partially-vaporized oil, as the case may be, is delivered into the extension-chamber 9 and completely vaporized, and is then driven through the needle-vent 13 of nozzle 10 into the mixing and conveying tube 5, drawing air in with it, which air and vapor becoming thoroughly mixed and heated by the surrounding flame is delivered through apertures 6 into the burner-cylinder 2 and to the burner-cap 3 for combustion. Additional air-supply may be introduced to the air-mixed vapor close to the point of combustion by the supply-tubes 12, which supply is regulated or entirely shut off by the rotatable perforated disk 14, manually operative by the projection 15.

The nozzle 10 is slightly tapered at its upper extremity or that part which enters the vaporizing-tube extension 9, so that it may closely fit the aperture provided therefor in said chamber 9 and may readily be removed therefrom for purposes of cleaning or replacing.

It will be observed that the usual needle-valve or check employed with vents of this character may be dispensed with in my device, as an approximately-accurate regulation of supply-pressure may be obtained by the ordinary valve on the oil-supply pipe. Final adjustment of the proportions of air and vapor is obtained by the regulation of the inlet-vents to the air-supply tubes 12 by the

movement of the disk 14 to secure the desired efficiency of combustion of the vapor.

A special advantage of the introduction of additional air to the vapor mixed with air  
5 just before the same is delivered to the burner is that the size of the mixing and conveying tube may be considerably reduced in cross-section without diminishing the efficiency of my device.

10 The shield or protector 17 serves to concentrate the heat about and increase the efficiency by the vaporizing-tube 7.

What I claim as my invention is—

1. In a hydrocarbon-burner for incandescent mantles the combination of a vaporizing-tube within the heat zone of the flame, a mixing and conveying tube extending through and surrounded by the burner and incandescent mantle, open at the top to receive the  
15 vapor mixed with air and adapted to convey the same to the burner, substantially as described.

2. In a hydrocarbon-burner for incandescent mantles the combination of an adjustable vaporizing-tube within the heat zone of the flame, a mixing and conveying tube extending through and surrounded by the burner and incandescent mantle, open at the top to receive the vapor mixed with air and  
25 adapted to convey the same to the burner substantially as described.

3. In a hydrocarbon-burner for incandescent mantles the combination of a vaporizing-tube within the heat zone of the flame having a detachable vapor-vent nozzle, a mixing and conveying tube extending through and surrounded by the burner and incandescent mantle, open at the top to receive the vapor mixed with air and adapted to convey the  
35 same to the burner substantially as described.

4. In a hydrocarbon-burner for incandescent mantles the combination of a vaporizing-tube within the heat zone of the flame, a heat-concentrating shield inclosing the portion of the vaporizing-tube non-adjacent to the flame, 45 a mixing and conveying tube, extending through and surrounded by the burner and incandescent mantle, open at the top to receive the vapor mixed with air and adapted to convey the same to the burner substantially 50 as described.

5. In a hydrocarbon-burner for incandescent mantles the combination of a vaporizing-tube within the heat zone of the flame, a mixing and conveying tube extending through 55 and surrounded by the burner and incandescent mantle, open at the top to receive the vapor mixed with air and adapted to convey the same to the burner and means adapted to be manually regulated for introducing additional air to the air-mixed vapor at close 60 proximity to the point of combustion substantially as described.

6. In a hydrocarbon-burner for incandescent mantles the combination of a vaporizing-tube within the heat zone of the flame having a detachable vapor-vent nozzle a mixing and conveying tube extending through and surrounded by the burner and incandescent mantle open at the top to receive the vapor mixed with air and adapted to convey the same to the burner and adjustable means for varying the distance between the vapor-vent nozzle and the intake-aperture of the conveying and mixing tube as and for the purpose substantially as described. 75

JOHN GRAHAM.

Witnesses:

JOHN THIEL,

JOHN W. REEVE.