(No Model.)

V. H. SLINACK.

HYDROCARBON INCANDESCENT BURNER.

No. 589,446. Patented Sept. 7, 1897.

FIG. 1.

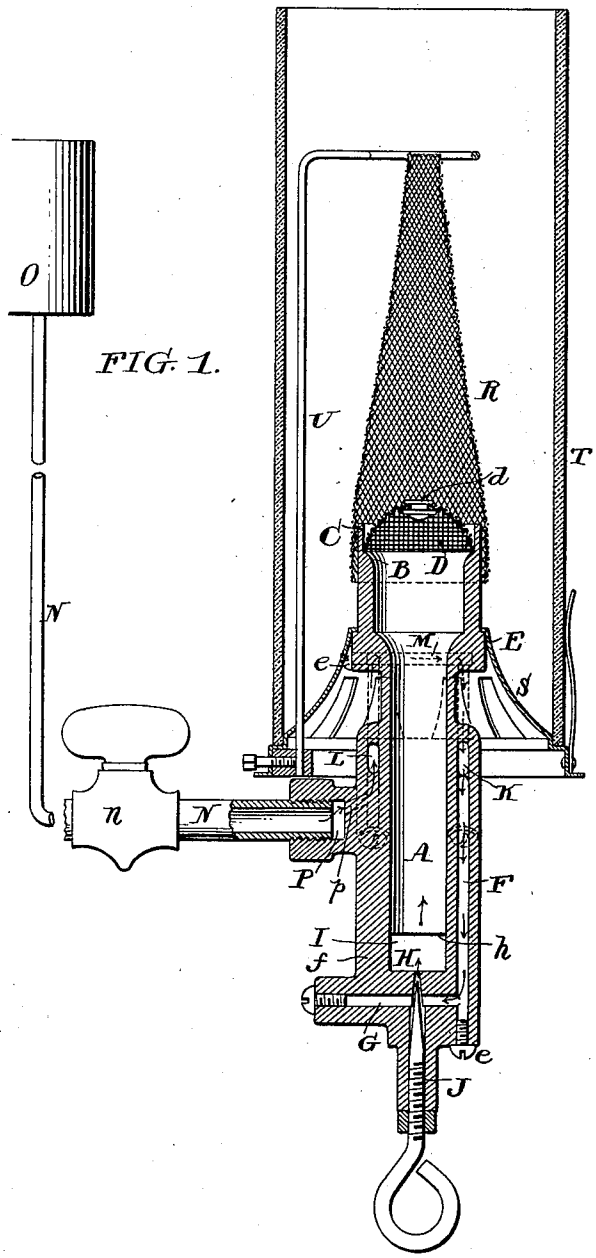


FIG. 3.

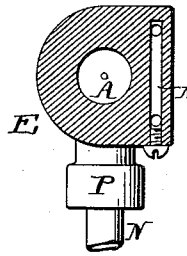
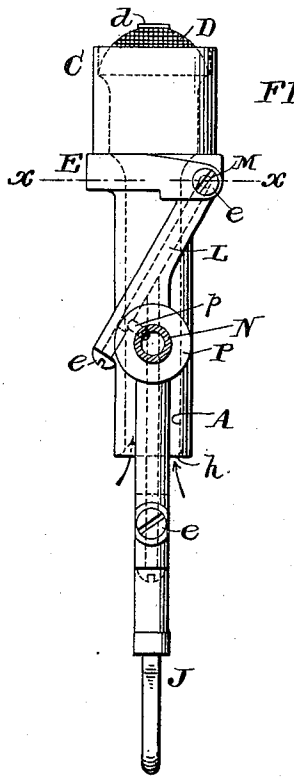


FIG. 2.



Witnesses.

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HYDROCARBON INCANDESCENT BURNER.

SPECIFICATION forming part of Letters Patent No. 589,446, dated September 7, 1897.

Application filed December 5, 1895. Serial No. 571,185. (No model.)

To all whom it may concern:

Be it known that I, VICTOR H. SLINACK, of the city and county of Philadelphia, State of Pennsylvania, have invented an Improvement in Hydrocarbon Incandescent Burners, of which the following is a specification.

My invention has reference to hydrocarbon incandescent burners; and it consists of certain improvements which are fully set forth in the following specification and shown in the accompanying drawings, which form a part thereof.

My invention has particular reference to that class of hydrocarbon-burners known as the "Bunsen" type, which involves the mixing of hydrocarbon vapor and air prior to being consumed, and in connection with a burner of this character I employ a mantle of refractory material, which may be rendered incandescent by the burning of the hydrocarbon vapor in contact therewith.

My invention comprehends certain features of construction of a hydrocarbon-burner of this class, whereby the same may be made cheaply, be simple, durable, and not liable to get out of order in operation, said details of construction being fully disclosed in the accompanying drawings, in which—

Figure 1 is a sectional elevation of an incandescent hydrocarbon-vapor burner embodying my improvements. Fig. 2 is a side elevation of the burner proper, with the chimney and mantle removed; and Fig. 3 is a cross-section of same on line *x x*.

A is a vertical mixing-tube, the walls of which form, essentially, the body of the burner. This mixing-tube is enlarged in diameter at the top, as at B, and terminates in the upwardly-extending annular rim C. Resting in the enlarged portion B is a burner-tip D, preferably formed of inverted-cup shape and made of woven wire, with a solid button *d* at the center or crown, the object of which is to deflect the gas passing through the meshes of the burner-tip, so that the flame may be directed across the top of the annular rim C, and also against the interior of the refractory incandescing mantle R. The hydrocarbon oil is contained in a tank O and fed downward by gravity through a pipe N, controlled by a controlling-valve *n*, and is delivered to a chamber P in the burner. The chamber P communicates by a passage-way *p* with an oblique passage-way L. (More clearly shown in Fig. 2.) The upper end of this oblique passage-way opens into one end of a horizontal transverse flue M, formed in a shoulder E of the mixing-tube. The other end of the flue opens into an obliquely and downwardly extending flue or passage-way K, into which a vertical flue F opens. The flue F leads down to a horizontal flue G, extending transversely under the mixing-tube and at some distance below its bottom, and from which there is an upwardly-directed nozzle H, controlled by a valve J. The vapor from the nozzle H is thereby caused to force its way upward into the mixing-tube and draw with it air through the spaces *h*.

It will be observed from an examination of the drawings that the various flues L, M, K, F, and G are all rectilinear and open at one end at the outside of the casting composing the burner-body, so that they may be drilled for economy of construction, and the open ends are closed by plugs or screws *e*, so that if the flues become clogged by deposits they can readily be cleaned. This enables the entire burner to be formed of a single integral casting, which greatly cheapens the cost of construction. The oblique passages L and K are designed to form a connection between the flue M and the flues upon each side of the burner lower down, which latter are in a plane which extends through the center of the mixing-tube. The flue F at the lower part forms a support for a vapor-nozzle structure at one side, and at the other side there is a solid casting *f*, uniting the nozzle structure with the lower part of the mixing-tube. This prevents any possibility of the nozzle being bent out of vertical position, which might result if sustained wholly from one side. By maintaining its position directly under the mixing-tube, so as to force the vapor vertically upward, a most thorough admixture with air is secured on the injector principle. Supported upon the upper shoulder of the enlargement E of the burner-body is the chimney-support S, which droops down-

wardly, with free passages for air, and sustains the chimney T. Extending upward from the support S is a wire U, over which the mantle R, of refractory material, is sustained.

The hydrocarbon oil is supplied from the tank O with sufficient pressure to prevent the vapor forcing its way back into the pipe N and also to govern in a large measure the extent of the pressure of the vapor from the nozzle H. In practice the tank O should be at a considerable distance above the burner, so that the column of oil in the vertical part of the pipe N is sufficient to secure the necessary amount of pressure. The burner is first heated by the application of a flame such as is produced by what is known as a "torch," and when sufficient heat is secured to vaporize the hydrocarbon oil the vapor escapes by the nozzle H and, mixing with the necessary quantity of air, passes through the mixing-tube A and is burned at the burner-tip D. The flame from the burner-tip D extends obliquely outward and upward, raising the mantle R to incandescence and at the same time heating the annular rim C of the burner-body, which conducts the heat downward to the flue M, raising it to a sufficient temperature to secure vaporization of the oil delivered to the said flue by the oblique passage L. The upper portion of the burner, comprising the annular rim C and the flue M, may be considered as a generator for vaporizing the hydrocarbon oil. The hydrocarbon vapor passes downward through flues K, F, and G and emerges through the nozzle H. The upward pressure of the hydrocarbon vapor creates a sufficient draft to suck in a necessary quantity of air through the passages *h*, and the upward rising mixture of air and hydrocarbon vapor is gradually heated until it emerges from the burner-tip, where it is burned.

It will be seen that with a burner of this construction an auxiliary generator-flame is not necessary, thereby securing economy in the consumption of the hydrocarbon oil. The pressure of the hydrocarbon oil entering the burner balances the back pressure of the hydrocarbon vapor and thereby controls the pressure under which the hydrocarbon vapor escapes from the nozzle H and the extent of the injector principles secured.

While I prefer the construction shown, the details thereof may be modified without departing from the principle of my invention.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a hydrocarbon-vapor burner, a body structure formed of one integral casting containing the following features, namely, an annular rim at the top, a series of straight passage-ways leading from the source of hydrocarbon-supply and extending upward toward one side of the annular rim then transversely across through the rim and near one lateral edge thereof and then downward and terminating in a nozzle directed upwardly, and also having a mixing-tube arranged above the nozzle and extending through the body structure to one side of the transverse passage-way through the annular rim to the top with provision for the entrance of air at the bottom, in combination with a burner-tip arranged at the upper part of the mixing-tube and adapted to direct the flame toward the annular rim, and a valve for the nozzle below the lower part of the mixing-tube.

2. In a hydrocarbon-vapor burner, a body structure formed of one integral casting containing the following features, namely, an annular rim at the top, a series of straight passage-ways leading from the source of hydrocarbon-supply and extending upward toward one side of the annular rim then transversely across through the rim and near one lateral edge thereof and then downward and terminating in a nozzle directed upwardly, and also having a mixing-tube arranged above the nozzle and extending through the body structure to one side of the transverse passage-way through the annular rim to the top with provision for the entrance of air at the bottom, in combination with a burner-tip arranged at the upper part of the mixing-tube and adapted to direct the flame toward the annular rim, a valve for the nozzle below the lower part of the mixing-tube, and a mantle of refractory incandescing material supported above the burner so as to be rendered incandescent simultaneously with the heating of the annular rim by the outwardly-directed flame.

3. In an incandescent hydrocarbon-burner, the combination of a burner comprising a vertical mixing-tube, a burner-tip at the top of the mixing-tube for directing the flame outward in an annular shape, a vapor-nozzle a short distance below the mixing-tube, straight flues extending through a heated portion of the burner and connecting with each other for vaporizing the hydrocarbon and supplying it to the nozzle, one of said straight flues extending transversely across through the solid metal between the burner and mixing-tube and connecting with the upper ends of the other straight flues, a reservoir for hydrocarbon oil arranged at a considerable distance above the burner, a stand-pipe leading from the oil-reservoir and connected with the flues of the burner for supplying hydrocarbon oil under pressure, an incandescing mantle above the burner and adapted to be heated by the combustion of the admixed air and hydrocarbon vapor formed in the mixing-tube, and a valve to control the draft created from the hydrocarbon-nozzle.

4. In a vapor-burner, the combination of the burner-head, generator, oil and vapor flues and mixing-chamber all in one integral casting in which the generator consists of a horizontal transverse straight aperture M between the mixing-tube and burner-head located wholly to one side of the vapor-aperture between the burner-head and mixing-

tube and having its ends connected to the upper ends of two straight oblique passages L K, to one of which the oil-supply nozzle P connects and to the other of which a vertical flue F connects leading to the vapor-nozzle H at the bottom below the mixing-tube, and a regulating vapor needle-valve for the nozzle.

In testimony of which invention I have hereunto set my hand.

VICTOR H. SLINACK.

Witnesses:
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ERNEST HOWARD HUNTER.