

(No Model.)

2 Sheets—Sheet 1.

P. J. FITZGERALD.  
VAPOR BURNER.

No. 523,766.

Patented July 31, 1894.

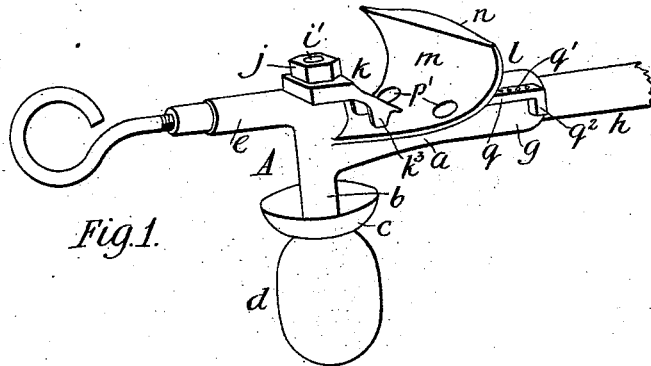


Fig. 1.

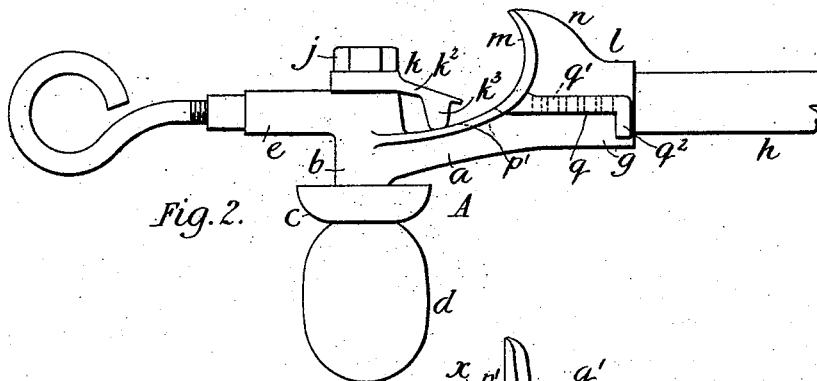


Fig. 2.

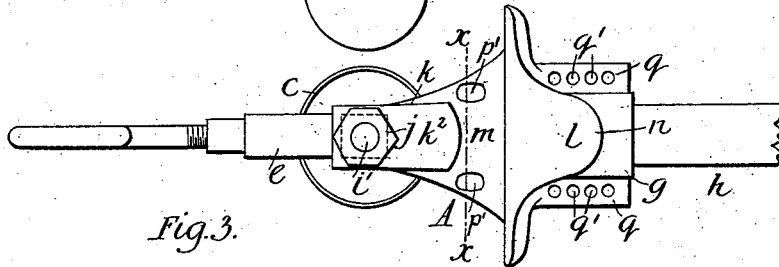


Fig. 3.

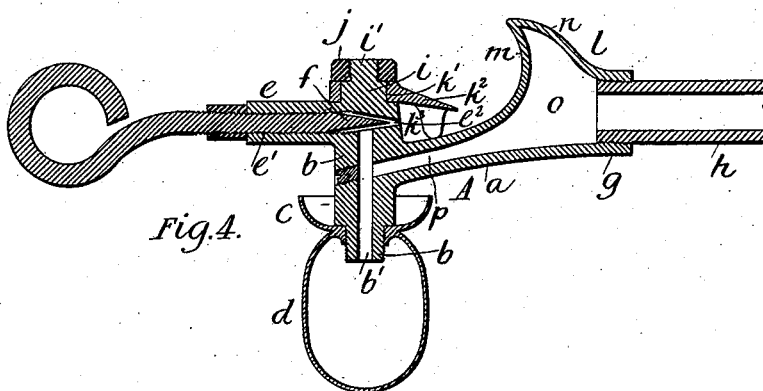


Fig. 4.

Witnesses

Wm. F. Noyes  
Geo. H. Brown

Inventor

Peter J. Fitzgerald

By *Wm. F. Noyes & Co.*  
his Attorneys

(No Model.)

2 Sheets—Sheet 2.

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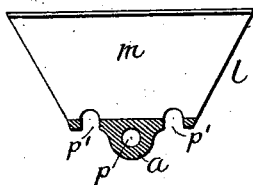


Fig. 5.

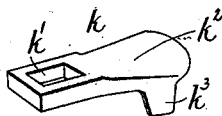


Fig. 6.

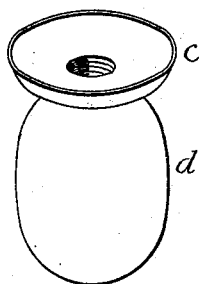


Fig. 7.

Witnesses

Wm. A. Norton  
Geo. H. Brown, Jr.

Inventor

Peter J. Fitzgerald

By *Wm. A. Norton & Co.*  
his Attorneys

# UNITED STATES PATENT OFFICE.

PETER J. FITZGERALD, OF HYDE PARK, MASSACHUSETTS.

## VAPOR-BURNER.

SPECIFICATION forming part of Letters Patent No. 523,766, dated July 31, 1894.

Application filed June 17, 1893. Serial No. 477,960. (No model.)

*To all whom it may concern:*

Be it known that I, PETER J. FITZGERALD, a citizen of the United States, residing at Hyde Park, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Vapor-Burners; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

15 This invention is directed to vapor burners and especially to the burners of that class in which is employed a metallic plate so arranged with relation to the jet of vapor or gas as that the latter is caused to impinge upon the plate at a suitable point and is thereby spread to form a flame for illuminating purposes. In the said class of invention attempts have been repeatedly made to produce a heating of the retort sufficient in degree to thoroughly convert into vapor, naphtha and other inflammable oils of low grades, it being well known by those versed in the art, that better results are obtainable from the use of such grades of oil as compared with higher grades, as for instance an increase in whiteness of flame and a consequent increase in candle power, and added to this the resultant decrease in the cost of maintaining the burner by reason of the comparative cheapness of the lower grades of material. But so far as I am aware the attempts to produce a burner capable of obtaining this result have not been productive of very successful results owing to many impediments, but especially, as before stated, to the incomplete vaporization due to the insufficient heating of the retort or converter. Again, in the use of low grades of oil, no burner has, so far as I am aware, been produced, wherein provision is made for successfully accumulating and removing all the heavier and unconsumed particles of the oil, which can only be vaporized at exceedingly high temperatures not attainable in burners of this type.

50 It is the object of my invention to produce a vapor burner of such construction and operation, as that all grades of naphtha and kin-

dred inflammable oils may be thereby economically and thoroughly vaporized and consumed to obtain the maximum amount of candle power of illuminating flame.

It is also an object of my invention to produce a vapor burner in which means of a new and novel nature are provided for the accumulation and removal of all the heavier and unconsumed particles of the oil, to prevent the apertures from becoming clogged, and the device becoming unfit for use.

Another object of my invention is to produce a vapor burner of simple and cheap construction, which is easy to manufacture, is compact and durable, and entirely automatic in its operation.

To these several ends my invention consists in a vapor burner provided with a hollow flame spreading device which serves the double purpose of expanding the jet to form the flame, and as a retort for converting into vapor the naphtha and other oils employed; in means for concentrating pilot flames together with the heat obtained from the main flame on the body of such retort, and in a removable drip cup, and a trap or other receptacle to receive the accumulation of the heavier and unconsumed particles of the oil after the vaporization of the lighter particles.

My invention also consists in certain details of construction of the said burner, all of which will fully and clearly appear from a reading of the subjoined description taken in connection with the accompanying drawings which form a part of this specification, and in which—

Figure 1 is a perspective view of a vapor burner embodying my improvements. Fig. 2 is a side elevation of the same. Fig. 3 is a top plan view. Fig. 4 is a vertical longitudinal sectional view. Fig. 5 is a vertical transverse sectional view taken on line *x-x* of Fig. 3. Fig. 6 is a perspective view of the bridge, and Fig. 7 a perspective view of the drip cup and cap, forming parts of my invention, the same being shown in enlarged views.

Referring to the said drawings by letters, A, denotes the burner which consists of a metal casting having the downwardly projecting screw threaded stem *b* for connection with the drip cup *c* and the trap *d* presently to be described, said stem being provided with a vapor

way or passage *b'* open at its lower end. The burner is further provided at one end with the horizontal arm *e* having an internally screw-threaded opening *e'* to receive the screw-threaded stem of the needle valve *f*; and at its other end with an internally screw-threaded socket *g* for connection with the oil supply pipe *h*. Extending upward from the inner end of the arm *e* is a square shaped lug *i* having a reduced screw-threaded portion *i'* to receive a nut *j*. This lug and nut serve as a means for rigid connection with the burner of the bridge *k* which has a square opening *k'* fitting said lug, a bridge portion *k<sup>2</sup>* adjacent to and above the jet opening *e<sup>2</sup>*, and two downwardly projecting lugs *k<sup>3</sup>* *k<sup>3</sup>* resting on the top of the branch *a* of the burner, and serving with the bridge as a guide for the jet of flame.

The retort is shown at *l* and is located between the burner proper and the inlet for the oil. This retort extends upward above the surface of the branch *a* and the socket *g* of the burner, and outward at each side thereof with its inner wall adjacent to and extending at right angles to the jet of flame, and vertically concave to constitute a flame spreader *m*, against which the jet impinges and is expanded to form the flame. The outer wall *n* of the retort is preferably curved outwardly and terminates at a point near the end of the socket which forms the connection with the oil supply pipe. The two walls *m* and *n* converge toward each other and are merged at each end in order to entirely inclose the converting chamber *o*, which latter communicates with the passage *b'* by means of a vapor way *p* in the branch *a*. The surface of the branch *a* and the inner wall of the retort by contact with the jet of flame are heated to the maximum degree, and the oil in its passage to the jet orifice is sufficiently vaporized to produce good results. I propose however to combine with the jet, two pilot flames which are directed to the entrance to the retort and the outer wall thereof and assist in heating and maintaining the temperature of the latter. Through the solid ends of the retort I form two openings *p'* *p'* which are flared in order to concentrate the flames, and on each side of the socket at the rear of the retort I arrange integral flanges *q* *q*, the lower surfaces of which are preferably in line with the openings *p'*, and are formed with a series of perforations *q'*. At the end of the flanges are downwardly projecting integral shoulders *q<sup>2</sup>* which form stops for the flame and concentrate it at the desired locality. The pilot flames on each side of the burner pass through the openings therefor in the retort, and thence under the flanges, which are preferably arranged below the center of the socket; and the flames are then checked by the shoulders or stops *q<sup>2</sup>* and concentrated on the surface of the socket. The flames are then divided and pass upward through the perforations *q'*, after which they are merged and contact with the outer wall of the retort

and mingle with the main flame. By this arrangement the retort is almost entirely surrounded by the hottest portion of the flame, and is heated to a sufficient degree to convert into vapor practically all the particles of the lowest grades of oil. In the event however of the non-vaporization and consumption of the heavier particles, such as tar, and similar substances, I provide a trap for such particles, of peculiar construction, and locate it at such a position with relation to the other parts as that the heavier and unconsumed particles are accumulated after the vaporization of the oil, as the separation of the heavy particles can take place only after the oil has become heated. This trap as before stated is shown at *d* and is secured to the lower end of the stem *b*, and communicates with the oil and vapor way through the passage *b'* which opens into said trap. The trap is internally screw-threaded at its upper end for connection with the stem, and when in position the trap serves as a closure for the said passage or way. All the heavy and unconsumed particles of oil pass into the trap and the accumulations can be removed from time to time by unscrewing the trap from the stem. In this way the vapor ways are kept constantly free from all deposits and the vapor has a free uninterrupted passage to the jet orifice.

For convenience, and cheapness in the manufacture, I propose to cast or otherwise form in one piece with the trap above referred to, the drip cup *c*, which latter is located above the trap and surrounds the stem and serves as the means for a preliminary heating of the retort.

The simplicity of my improved vapor burner is apparent and the operation will be understood at a glance. By reason of the construction employed, the retort is susceptible of being heated to a degree sufficiently high in temperature to convert into vapor practically all of the particles of the lower grades of oils, and is also equally efficient in burning oils of higher grades.

The vapor burner is neat in appearance, compact in form, and may be cheaply produced. By means of the peculiar means employed for accumulating the unconsumed particles all liability of clogging is overcome, and the vapor at all times has an uninterrupted passage.

Having now fully described and ascertained the nature of my invention and in what manner the same is to be performed, what I claim, and desire to secure by Letters Patent, is—

1. In a vapor burner of the class described, a retort located in the path of the jet of flame, having an upwardly extending flame spreading wall, openings in said wall, and flanges on each side of the retort above said openings, substantially as and for the purposes set forth.

2. In a vapor burner, the combination with a retort having an upwardly extending hollow portion, formed with solid ends and a

flame spreading wall, and passages in said ends, of perforated flanges on said retort having stops thereon, substantially as and for the purposes set forth.

5 3. In a vapor burner, the combination with a flame spreader and with the jet orifice, of a square shaped lug above said orifice having a reduced screw-threaded portion, a nut, and a bridge having a square opening for the lug, and the depending lugs, substantially as described.

10 4. In a vapor burner comprising in combination, a retort having an upwardly extended hollow portion formed with a flame spreading wall, and solid ends provided with flared openings, perforated flanges on the retort in line with said openings, having end shoulders or stops, the stem having a vapor way therein communicating with the retort, the drip cup

and trap removably secured on said stem, the arm, the needle valve, and the bridge, all substantially as described.

5. In a vapor burner the combination with the retort and the vapor way leading therefrom, the screw threaded stem having a vapor passage communicating with said way and leading upward to the burner and downward through said stem, and the drip cup and trap formed integrally and removably secured to said stem, the trap serving to close said passage, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

PETER J. FITZGERALD.

Witnesses:

WILL. T. NORTON,  
J. W. DUDLEY.