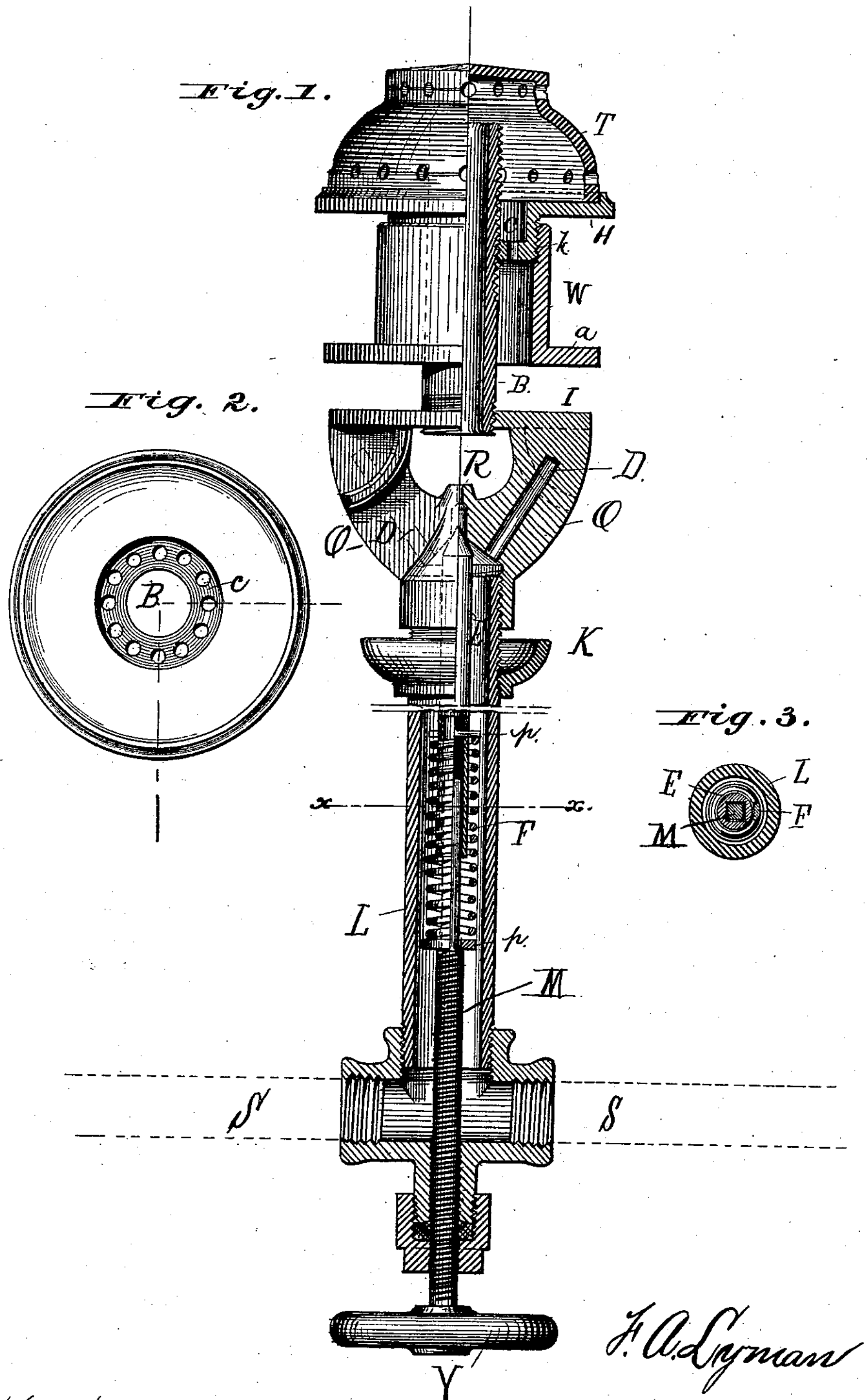
F. A. LYMAM.

VAPOR-BURNER.

No. 189,242. Patented April 3, 1877.



Attest:
H. S. Perrine
E. D. Sutton

F. A. Lyman
Inventor.
By Worth Osgood
Attorney.

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

FORDYCE A. LYMAN, OF CLEVELAND, OHIO.

IMPROVEMENT IN VAPOR-BURNERS.

Specification forming part of Letters Patent No. **189,242**, dated April 3, 1877; application filed February 8, 1877.

To all whom it may concern:

Be it known that I, FORDYCE A. LYMAN, of Cleveland, county of Cuyahoga, and State of Ohio, have invented certain new and useful Improvements in Vapor-Burners, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

Figure 1 is a partial section and elevation of the burner; Fig. 2, a plan of the base of the burner, showing the perforations leading to the heating-drum; and Fig. 3 is a cross section on line *x x* of Fig. 1.

The objects of my invention are, mainly, to provide an effective means of regulating the amount of gas intended to be consumed for the purpose of forming an auxiliary heating-flame; to provide a heating-drum which shall effectually prevent the accumulation or deposit of soot upon the burner; to supply a chamber or chambers for a quantity of reserved gas or superheated oil; and to provide a valve-stem which shall be so constructed as that it will not be damaged by the cooling of the burner, or by being pressed too strongly against its seat; to accomplish all of which it (the invention) consists in certain novel combinations and arrangements of parts, all of which will first be fully described, and then pointed out in the claims.

L is the ordinary stand-pipe of the burner, which rises from the supply-pipe S, and serves to conduct the oil to the point where it is vaporized. This stand-pipe is surmounted by the burner-supporting arms O O, which also serve to convey heat to the upper portion of the supply-pipe, usually denominated the "vaporizing-chamber."

Heretofore these arms have been heated by jets of inflamed gas impinging thereon, or by convection of heat from the burner proper, and no means has been provided for regulating the size of this auxiliary gas-jet. For economy in the consumption of the liquid fuel, as well as the proper and most efficient working of the burner, it is desirable that some such means be employed, and for this purpose I have designed the following means:

I surmount the arms O O by a plate, I, upon which the auxiliary jet must impinge. This jet is conducted downwardly from the burner-cap T, within a short pipe or drum, W, surrounding the screw-threaded pipe B, which carries the mingled gas and air from the orifice R to said burner T. Upon the bottom of pipe or drum W is a horizontal flange, *a*, which may be brought nearer to or farther from the plate I, as desired, by simply revolving the burner upon the screw-threaded pipe B, the burner and drum being connected, and the latter having within it the perforated and screw-threaded flange *c*. From this construction it is apparent that the amount of gas which issues beneath the plate *a* will be dependent upon the size of the opening between said plate and the plate I, and that this opening may be increased or diminished, as desired.

The economical consumption of fuel, and its most perfect combustion, is often dependent upon the relative distance between the gas-jet orifice and the mixing-chamber, and this distance is variable, according to the quality and quantity of oil being consumed. Ordinarily it should be from three to three and one-half inches. From the construction already described it will be observed that the burner T may be brought near to or withdrawn from the orifice R at pleasure; and in order that the adjustments of the burner T and drum W may be made with any required nicety or precision, said drum is connected to the bottom of the burner by means of a short screw-thread, *k*, permitting it to be lowered a little distance, if necessary, without disturbing the position of the burner.

The drum W is, when the burner is in operation, filled with a highly-heated flame, and such is the intensity thereof as to prevent the accumulation or deposit of soot upon any portion of the burner. This feature avoids the disagreeable odor which often arises in this class of burners from the burning soot, and adds greatly to the heating effects of the device.

Within the arms O O I provide chambers D D, which serve to contain a reserve supply of heated oil or gas, deriving their supply, of course, from the oil-pipe L, into which they open. This reserve supply of oil or gas is very useful in cases where the burner is extin-

guished and relighted in a short time thereafter, and it renders the necessary vaporization of the oil more uniform and more easy to be accomplished. The chambers present a supply of oil which is very easily heated by the initiatory flame from the oil-cup K in the operation of starting the burner.

The burner is, ordinarily, lighted by allowing a small quantity of oil to flow over into the cup K, which, upon being ignited, heats up the vaporizing-chamber and its surrounding parts, and thus supplies the initiatory vapor, which is afterward kept up by the heat from the burner or from the auxiliary heating-flame.

The inner flange *c* is located below the base of the mixing-chamber, thereby affording an auxiliary chamber, which collects and directs the gas intended to be employed in the drum W.

It is desirable that the valve employed to regulate the flow of oil or gas be made to revolve in its seat, in order to clear the same from obstructions, which frequently occur, in the shape of dust and sediment.

Heretofore the needle-valves, which are most commonly employed in this class of burners, have been made with solid shafts, and are, therefore, frequently forced strongly against their seats, to the constant wear and injury of the latter. This style of valve is, moreover, liable to injury by the contraction of the valve-chamber upon cooling after being highly heated, causing a great strain on the valve-seat, or else the bending of the valve-rod.

To avoid this difficulty, and yet preserve the valuable features of the needle-valve, I propose to construct the shaft in two sections and interpose a spring, by which construction I am enabled still to revolve the valve, and thus keep the seat clear, to prevent the valve being forced forward too strongly, and to provide for its automatic contraction to correspond with that of the valve-rod chamber.

In the drawing, E is the section having the valve projection, and M the portion which is screw-threaded to cause its adjustment to or from the valve-seat. The section E has a hollow angular socket, fitting loosely over a corresponding projection on the section M, and between the two sections is interposed the spiral spring F, exerting its elastic influence upon the two parts through the medium of suitably-fastened plates or pins *p*.

From this construction and arrangement it is obvious that any revolution of the section M through its hand-wheel Y will cause a similar revolution of the valve, that if the valve be pressed to its seat further advancement of the section M will only cause its angular projection to slide within the section E, and bring into play the elastic force of the spring, and that no amount of contraction in the pipe L can operate to bend the valve-shaft.

The devices illustrated for the purpose of regulating the auxiliary heating-flame and for preventing injury to the valve-rod are the simplest which I have been able to contrive. It is apparent that many ways may be devised for producing the same or like results, all of which would fall within the spirit of my invention and meaning of my claims. I will, therefore, state that I do not desire to be confined to the exact devices illustrated in the drawing.

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

1. The heating pipe or drum W, serving to conduct gas from the mixing-chamber downwardly, for the purpose of forming the auxiliary heating-flame, the same being vertically adjustable independently of said burner or mixing-chamber, substantially in the manner and for the purposes set forth.

2. In a vapor-burner in which the supply of oil is fed to the vaporizing-chamber from a point below the same, the combination, with said vaporizing-chamber, of the hollow arms projecting upwardly therefrom, for the purpose of supporting the burner, and adapted to contain a reserve supply of oil, as and for the purposes explained.

3. In a gasoline or vapor stove, the combination of the gas-jet orifice, forming the valve-seat, and a valve having a sectional shaft and interposed spring, for the purposes explained.

4. In combination with the burner T, the depending and adjustable drum, having a horizontal flange at its lower end, operating in conjunction with the plate I, for the purpose of regulating the auxiliary flame, substantially as shown.

5. The perforated flange *c*, in combination with the screw-threaded pipe B and burner T, substantially as set forth.

6. The combination of the burner-supporting arms, provided with cap or plate I, the screw-threaded pipe B, and vertically-adjustable drum W, having the horizontal flange, as and for the purposes explained.

7. The valve-rod composed of the two sections E and M, and provided with plates or pins *p*, combined with the spring F, the whole being arranged and adapted to operate in the manner shown and described.

In testimony that I claim the foregoing I have hereunto set my hand in the presence of two witnesses.

F. A. LYMAN.

Witnesses:

JOHN R. CROSS,

S. B. SMITH.