(No Model.)

W. R. JEAVONS.

OIL BURNER.

No. 475,401. Patented May 24, 1892.

Fig 1.

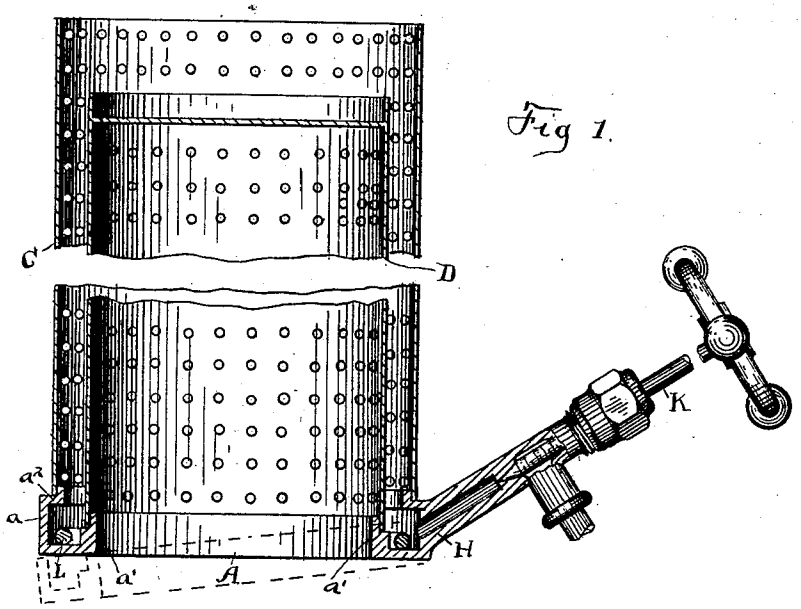


Fig 2.

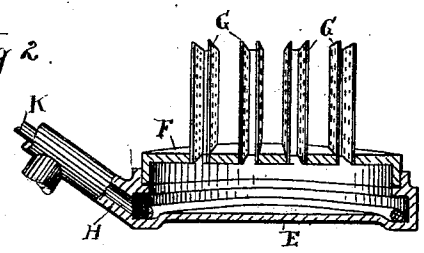
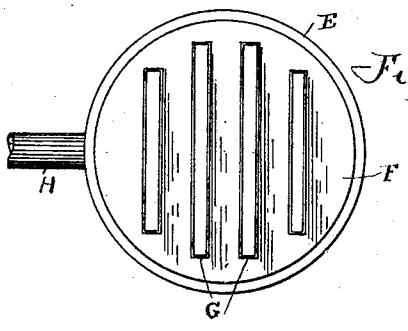


Fig 3.



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WILLIAM R. JEAVONS, OF CLEVELAND, OHIO, ASSIGNOR OF ONE-HALF TO JOHN A. LANNERT, OF SAME PLACE.

OIL-BURNER.

SPECIFICATION forming part of Letters Patent No. 475,401, dated May 24, 1892.

Application filed December 20, 1888. Serial No. 294,151. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM R. JEAVONS, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Oil-Burners; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to hydrocarbon-burners; and it consists in the method and construction substantially as shown and described, and particularly pointed out in the claims.

In the construction and operation of burners prior to my invention different ways of obtaining a distribution of hydrocarbon oils or vapors or carbureted air have been known, among which may be mentioned, first, the distribution of oil by capillary attraction, as by a wick, in which the oil is drawn to the surface of a wick and consumed, as in an ordinary lamp. In this style of cases vaporization occurs directly at the point of combustion and the oil itself is distributed; secondly, by spraying the oil by means of a jet of air or steam under pressure; thirdly, by generating the vapor in a suitable retort in which the vapor is subjected to a head or pressure and depending on the artificial pressure in the retort to distribute or feed the vapor. This style of burner is exemplified in the well-known vapor-burner which feeds through a jet-orifice; fourthly, by evaporating or vaporizing gasoline or other light hydrocarbon on an exposed surface by passing a current of air over the same and then feeding the carbureted air to the burner, the old and well-known carbureting devices being of this class.

My invention as herein shown and described is wholly different from each and all of the several methods or ways of utilizing, distributing, or conveying hydrocarbon oils or vapors above specifically enumerated or known to me, and involves, first, the conversion of the oil into vapor by exposing the oil to a heated surface and then distributing or conveying the vapor by its gravity to the place or places where or about which the vapor is supplied to the burner and maintains combustion. In carrying out this method or process I rely on the superior density or gravity of the hydrocarbon vapor, as compared with air, to distribute or move the vapor in the presence of air to the points where it is utilized in support of combustion, and I find that where the conditions are suitable I can always rely upon the vapor to gravitate in proper form an quantity and with uniform equality to every portion of the channel or space provided for it. If the structure of the burner be circular, as in Fig. 1, the vapor travels or runs around on both sides from about the supply-tube, where the oil is vaporized and rises gradually to a uniform level all around, very much as would water or any other liquid. The vapor being heavier than air, there is no material admixture with air when this distribution or movement occurs, though of course there may be some admixture with air without affecting the distribution by gravity and without materially changing the character of the vapor in so far as combustion is concerned. It is, however, deemed best for all purposes to keep the vapor free from air as much as possible while the distribution thereof occurs, as this more certainly insures its distribution and prevents it from rising out of its channel or traveling space while gravitating to its destination and promotes gradual combustion in the combustion-chamber. I may mention here that the vapor, even in the substantially pure state in which it is protected by my method of handling it, is very liable to disturbance if exposed to air-drafts, currents, or eddies, and hence should be shielded from all such influences or conditions. To this end certain simple conditions alone are required—as, for example, a channel, holder, or space which is so inclosed or guarded as will provide a suitable path for the vapor and prevent disturbance by air, and also prevent such open and free exposure to air as will permit the vapor to be consumed before it is distributed, and thus defeat the uniform and constant supply thereof evenly to all points of the burner. If these principles of construction be observed, the vapor will take care of itself in the presence of air and the flame it supplies and will travel by gravity to all the points provided for it and distribute uniformly

without perceptible admixture with the air although constantly exposed to air, and will rise to any level that may be fixed for admixture with air and to supply the burner. Indeed a very small or light supply of vapor, if protected as provided herein both from air-currents and combustion, will distribute itself evenly over a considerable area at a long distance from the point of production and maintain an even supply to a largely-extended flame.

In the accompanying drawings, Figure 1 is a vertical central section of one form of burner embodying my invention. Fig. 2 is a vertical central section of a modified form of the burner, and Fig. 3 is a plan view of Fig. 2.

Referring first to Fig. 1, A represents the burner holder, channel, or space in which the vapor is distributed and contained to supply or feed the burner, and in a sense serves as a reservoir of supply. It is essential, however, to the operation of the burner that the vapor contained in the said holder be protected from air-currents and from combustion, and to this end I have found that the best protection is afforded by so constructing the burner that the walls and surroundings will exclude disturbing currents. Thus, for example, in Fig. 1, the holding-chamber or air-space has an outer wall a and an inner wall a' and a flange or projection a^2, extending inward a short distance over the holding chamber or channel in which the vapor is conveyed and providing a seat for the outer tube. The outer wall in this instance rises higher than the inner wall, and the combustion or burner tubes, walls, or pipes C and D rise from about the opening between the two walls a' and a and the rim or flange a^2. The said burner tubes or walls are perforated over their entire surface for the admission of air to the flame-space between them, so that combustion may occur from the bottom to the top of said space and the air be fed in at successive elevations. In Fig. 2 the same result is accomplished by providing a pan or dish shaped holder E, which has a cover F, and in this instance four several combustion-tubes, walls, or pipes G, fixed at intervals into said cover and extending almost across the same. Oil is fed to both forms of burners here shown in like manner through tube or pipe H, controlled by valve K. Either the heavier or the lighter hydrocarbons may be used with this construction of burner.

In the bottom of holders A and E are shown a strand of absorbent material L. This strand is of some non-combustible material, such as abestus, and is only for the purpose of initially heating the burner and parts when heavy oils are used. To assist the oils to spread quickly throughout the absorbent material, so as to quickly produce a large initial flame, the holder or channel A may be tipped more or less, as shown by dotted lines. If light oils are used, such as gasoline, &c., which in themselves are inflammable, the asbestus strand may be left out; but with heavy oils that will not ignite on a metallic surface some absorbent material is necessary to produce an initial flame.

To initially heat the burner shown in Fig. 2, the cover F is removed, and when the holder and parts are in vaporizing condition the cover is replaced, the vapor then gravitating or distributing and feeding in equal volume at the different outlets between the perforated tubes. In operation—say with kerosene-oil, which in itself is not inflammable at ordinary temperature—oil is admitted to the absorbent, which absorbs some of it and which can be ignited as a wick. The flame from this soon heats the burner or holder and other parts to a vaporizing condition. When having heated the burner, vaporization occurs directly on the heated metalic surfaces in or near the inlet-duct H and the wick performs no other office until initial heating again occurs in subsequent use of the burner. The vapor thus generated being protected from adverse air currents, gravitates after the manner of water and travels or distributes all around and throughout the holder or channel. This dense clear vapor fills the holder to the exclusion of air, so that combustion cannot occur therein, but occurs outside the holder between the perforated tubes or walls where air can combine with it in the proper manner to produce perfect combustion. It will be seen that in this case the holder or channel not only forms a protection for the distributing vapor, but acts, also, as a generator or vaporizer to convert oil into vapor. However, the vapor might be all generated outside of the holder A—in the duct H, for instance—and the action of the vapor traveling within the holder would be substantially the same when discharged into it, the holder of course being heated to prevent condensation.

The combustion or flame chamber or space herein referred to is the space between the concentric walls shown in Fig. 1 and within the perforated tubes or walls shown in Figs. 2 and 3.

The distributing or carrying channel, holder, or space mentioned in the foregoing description has reference to the means provided for carrying the vapor by gravity to the place or places or points where it is supplied to the burner, flame, or combustion-chamber. This combustion-chamber is so constructed that the vapor rises therein to more or less height before all of it is consumed. When air is admitted from the outside through openings at different elevations, the consumption is gradual and a tongue of unconsumed vapor extends up centrally between the walls, with small blue globules of flame about the lower openings and a gradual increase of flame as the successive openings are reached and air in increasing quantity is supplied, until the entire space is filled with blue flame and combustion is made complete. In any and all cases of constructing a burner according to to this invention the lowest air inlet or open-

ing determines the starting-point of combustion, and the amount of combustion will depend largely on the quantity of air admitted. If complete combustion were to extend so low as to interrupt the distribution or traveling of the vapor, it would cripple or defeat the object of the invention.

It will be seen by the foregoing description that my invention comprises a construction in which vapor is received and distributed in a channel or chamber by gravity in such quantity as to prevent admission of air through the supply-opening provided for the vapor and to cause a steady and uninterrupted flow of vapor to the combustion-chamber.

It is of course understood that when the burner has been started the channel or holder or space in which the vapor distributes or is contained remains hot, and by this reason prevents the condensation of the vapor. Otherwise, if the surface were cold the vapor would condense thereon. In the present case the surfaces are heated by the conductivity of the metal.

By the words "free opening" as used herein I mean an opening of sufficient area to supply the vapor freely to the burner and in which no artificial or outside pressure is employed to cause the vapor to flow into the combustion-chamber—such, for example, as a head of oil or other equivalent means commonly used in gasoline-stoves to force the vapor through a jet-orifice.

In the use of the word "vapor" I mean vapor in a substantially pure state without material admixture with air.

Having thus described my invention, what I claim is—

1. A hydrocarbon-vapor burner consisting of a vapor-holder constructed for the free and uniform distribution of the vapor therein by gravity and having a free opening for the escape of vapor, in combination with perforated combustion-walls having a flame-space between them in communication with the said holder, substantially as described.

2. A vapor-burner having the channel in which the vapor is distributed or conveyed by gravity, substantially as described.

3. A vapor-burner having a vapor receiving and conveying channel or chamber provided with a free opening of relatively small area communicating with the combustion-chamber, in combination with a combustion-chamber having openings for the admission of air to support combustion, substantially as described.

4. The process herein described, consisting first in converting the oil into vapor and then conveying the vapor by gravity to the place where it is oxygenized, substantially as described.

5. The process herein described of converting liquid hydrocarbon into vapor and conveying and burning the vapor, which consists first in vaporizing the oil by exposure to a heated surface, then conveying the vapor by gravity to the points where it is to be burned, and then supplying air to the vapor in limited quantities to meet the demands of combustion, substantially as described.

WILLIAM R. JEAVONS.

Witnesses:
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H. T. FISHER.