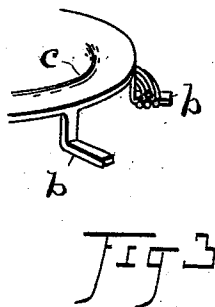
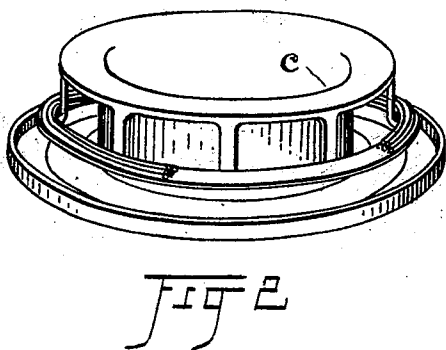
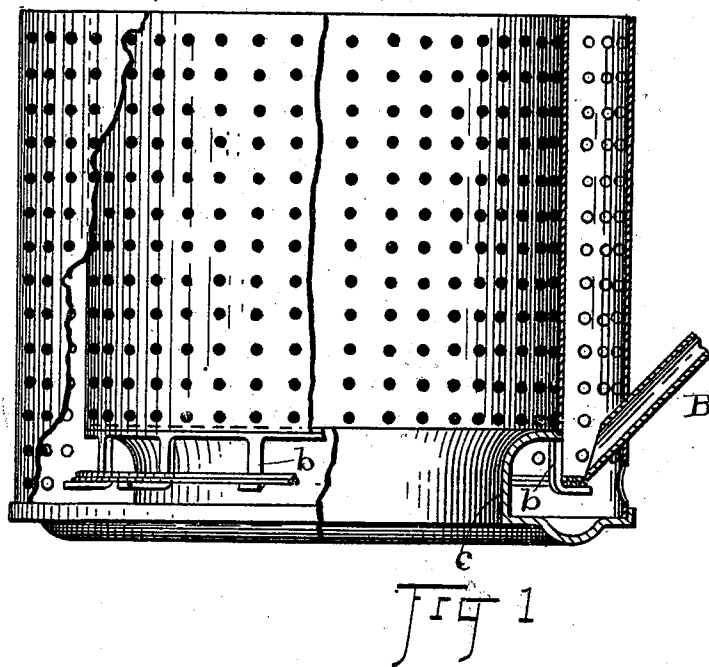


(No Model.)

J. A. LANNERT, W. R. JEAUVONS & W. H. WILDER.
VAPOR BURNER.

No. 517,048.

Patented Mar. 27, 1894.



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VAPOR-BURNER.

SPECIFICATION forming part of Letters Patent No. 517,048, dated March 27, 1894.

Application filed March 13, 1893. Serial No. 465,713. (No model.)

To all whom it may concern:

Be it known that we, JOHN A. LANNERT and WILLIAM R. JEAVONS, residing at Cleveland, in the county of Cuyahoga and State of Ohio, and WILLIAM H. WILDER, residing at Northampton, in the county of Hampshire and State of Massachusetts, citizens of the United States, have invented certain new and useful Improvements in Vapor-Burners; and we do hereby declare that the following is a full, clear, and exact description of the invention, which will enable other skilled in the art to which it appertains to make and use the same.

Our invention relates to a novel method of and construction for conveying or distributing hydro-carbon oils for initial starting of burners, and of means to initially ignite oils that do not volatilize or vaporize at ordinary temperatures, such as kerosene, &c. This method is particularly applicable to the class of burners shown in patent to W. R. Jeavons, No. 475,401, dated May 24, 1892. Heretofore in this class of burners, when non-volatile or heavy oil was used, such as kerosene oil ordinarily used in lamps, and which is not inflammable at ordinary temperatures, the initial flame for heating the burner was produced by the oil burning from an asbestos strand or wick, and this strand was always dried out when the burner got under headway, it being undesirable to have any oil whatever in the burner when at rest. Thus it happens in starting with a wick that the initial oil is more or less soaked up at the point of delivery and the oil and flame spread but slowly. There have, also, been tried other methods of distributing oils laterally over substantially horizontal surfaces, such for example, as by gravity of the oil itself in or through a trough.

Our method of conveying or distributing the oil is distinct or different from either of the above mentioned, and different from any known to us, and consists in and embraces the utilization of several distinct tendencies or inherent properties of the oil itself, the several tendencies in a more or less measure co-operating to produce the desired result. In order that it may be fully understood it should be mentioned that in hydro-carbon oils and especially kerosene oil, the ratio of its adhesive and cohesive qualities is such as

to produce beneficial results when surrounded by proper conditions. For instance, a drop of oil may hang from some point on a linear horizontal metallic surface and by reason of the adhesion of the oil to the surface and the cohesion of suspended particles of oil to the adhering particles. If now another surface be brought parallel to the first surface in such relation to the drop of oil as to prevent its elongation downward, thus sustaining in the oil an undiminished transverse cohering area relative to the weight of oil suspended, additional oil supplied will spread the drop out laterally between the parallel surfaces to greatly extended distances, for the reason perhaps that the cohesive force of the oil to keep the mass from rupture is greater than the lateral resistance to the movement of the cohering mass. Whatever the exact cause, oil supplied to parallel horizontal surfaces separated to a considerable degree, will not drop off, but as a web will fill the space between the surfaces and extend or move laterally as more oil is supplied. This movement of the oil may or may not correctly come under the term capillary action as the oil under these conditions moves horizontally, yet not against gravity to any great degree. It will be obvious, however, that the nearer the surfaces for oil adherence are brought together, the better will be the conditions for capillary action. In fact in manufacture it is easier to construct the oil conveying device with considerable capillary capability than strictly on the lines above described, and, indeed, this capillary capability materially increases the efficiency of the device inasmuch that it makes it efficient in uneven positions. Another factor that is present and may co-operate in the lateral conveyance of oil on a metallic device such as here shown, is that hydro-carbon oil, and especially kerosene oil, has a peculiar faculty or habit of running away from flame or heat. Whether this proceeds from a subtle process or vaporization of the particles near the heat and their almost immediate condensation at a point farther removed; a simple repulsion of oil by the flame, or a combination of both actions or from some cause unobserved by us, is an open question. However, whatever the physical

cause or action, the fact is that a flame will quickly move a considerable quantity of oil laterally and will even move a considerable body of oil against the action of gravity, or
5 up an inclined surface where the oil will not itself go, and if flame or heat follow the moving oil, the action may be continued to greatly extended distances of travel with remarkable rapidity. In order to present the most favorable
10 conditions for the transfer or travel of oil by this process, the oil carrying body or surface is isolated as much as possible from other elements, and the oil supplied at or near the point where the flame or heat is first applied
15 so as to constantly replace the oil driven away by the heat with a fresh supply of oil. In this way oil is quickly driven to all points of the oil carrying or holding body and the flame quickly follows around on the surface
20 of the oil to produce a large initial flame at all points of the oil carrying or holding body or surface. The oil, however, travels in advance of the flame and traverses the surface ahead of the flame. Another point involved
25 or included in this style of initial heating devices is the manner or method of igniting or inflaming heavy oils, such as kerosene, &c., on a metallic surface or surfaces. It is extremely difficult, if not quite impossible, to ignite kerosene oil upon cold metallic surfaces under generally existing conditions. The reason of this
30 is that kerosene does not volatilize or become inflammable under a temperature of about 150° Fahrenheit, and if the flame of a match or taper be applied to one portion, the oil at
35 this portion instead of heating and igniting, is driven away by the heat as before described, leaving the metallic surface substantially bare, and if the flame be advanced the oil
40 will quickly retreat before it and no ignition of the oil will occur. In this movement it keeps crawling onto or over the cold surface and is in no condition to ignite.

Oil is an imperfect conductor of heat, and
45 we have discovered that, notwithstanding what has just been said, if a film or body of oil can be maintained on a comparatively cool or cold metallic surface to act as an insulator, the outer surface of the oil can be brought to
50 a vaporizing temperature and ignition will occur. This appears to be contradictory to the foregoing statement, but the condition here is an undiminished or maintained supply of oil at a given place. It then becomes
55 clear that the tendency of the oil to retreat from heat and flame works against the maintenance of an inert oil film or body upon the metallic holder at the point where ignition is desired. We have found, however, that by
60 constantly renewing or replacing the oil film or body, or rather by supplying oil as fast or faster than it is repelled or driven away by the flame, the oil surface can be heated to evolve vapor and ignite. This vaporization
65 and ignition at the oil surface will occur independently of the weight or conductivity of the metal upon which the oil is exposed, pro-

vided the conditions as described are present. Again, if the oil on the oil holding device is in such quantity at the point where it is to
70 be ignited that the gravitating action of the mass asserts itself and overcomes the repelling action of the flame, vaporization and ignition will occur and as the flame grows larger and hotter it causes more or less of the oil to
75 distribute laterally, the flame following behind somewhat and consuming the distributed oil as before described.

It will be understood that the different inherent properties of the oil as specifically described may all enter into and all co-operate
80 in conveying oil laterally on a suitable device. Yet the best conditions for favoring one specific property of the oil may work against or in a measure hinder the tendencies of another
85 specific property, and it will be seen that in different modifications of the conveying device the measure of efficiency contributed by the several forces or tendencies may be very unequal. For instance, if the device
90 is arranged for great capillary capability, the oil on the inner capillary surface is more or less protected from the flame for a certain length of time, and being thus protected the heat repulsion or tendency of the oil to crawl
95 from heat is reduced to a minimum.

In the accompanying drawings, Figure 1 is a partly side elevation and partly a vertical sectional elevation of a burner constructed according to our invention. Fig. 3 is a perspective
100 view of a sectional part of a modified form of holder.

In Fig. 1 the holding device is shown as having a number of separate wires supported on arms *b* at intervals. Pipe B supplies oil
105 to one point of the device as shown, which spreads laterally as previously described. A lighted match or taper is applied to the shelf or holder near the point of supply to initially start the burner. By reason of the quantity
110 of oil supplied being greater than the amount displaced by the initial flame, an oil body is maintained about the metallic surface at this point and the surface of the oil body is brought to a vaporizing condition and ignited,
115 the flame rapidly extending and driving a considerable quantity of oil before it to all points of the holder. When the oil is ignited as described the action is so rapid that the oil appears to travel as a wave and the flame
120 quickly following and burning at all points to quickly heat the burner.

Fig. 2 shows a modification of Fig. 1. In this the wires are closer together and present more capillary capability, and the wire supported on a metallic shelf as shown. In this
125 case the shelf presents in itself conditions for the repulsion of oil by heat, thus contributing to convey a greater quantity of oil laterally. Many other forms of oil holder and
130 conveyer have occurred to us, all of which serve the same purpose as these, but these are deemed sufficient to illustrate the invention. This method, it will be seen, has ad-

vantages over previous methods inasmuch as the action occurs on the under side as well as the upper side of the oil holder. Nor will accumulating of dirt, &c., materially impair the efficiency of the oil holder.

The arrangements contributing to the process as described may be considerably modified. However, it is deemed advisable to have the oil holder made with as little mass of metal as may consistently be used with large surface area, such, for instance, as one or more thin metal shelves or a mass of light wires. In each case the metal has little heat absorbing power compared to the oil exposing area. This is advantageous inasmuch as only a small degree of the initial heat evolved by the flame about the holder is absorbed by the holder, thus permitting all the heat free to be absorbed by the burner parts.

It will be seen that the wall *c* of the vapor chamber inclines forward at the top and that the oil holder is suspended from the upper and outer portion or edge of this wall, or what may be termed the roof of the wall, and extends outward beneath the combustion chamber. This leaves a free space between said holder and wall and relieves the holder after the manner of a shelf supported by brackets. There is thus free circulation all around the oil holder.

In so far as the construction, arrangement and function of the burner feed pipe *B* is concerned, the same forms the subject matter of claims in another application, bearing Serial No. 465,709, and the said pipe is not included or covered herein except in such combination as may be peculiar to this application.

Having thus described our invention, what we claim is—

1. In a hydro-carbon burner, walls forming a combustion chamber, and an initial capillary heating device suspended within said chamber, substantially as set forth.

2. In a vapor burner, walls forming a combustion chamber, and a metallic oil distributor in said chamber constructed to convey the oil by capillary action for the purpose of initially heating the burner, substantially as set forth.

3. A vapor burner and a metallic oil conveyor in said burner constructed and arranged to carry the oil by capillary action for initially heating the burner, substantially as set forth.

4. In a hydro-carbon burner, walls forming a vapor and combustion chamber, said chamber having an enlarged vapor distributing portion, and an initial heating device supported within said vapor distributing portion and apart from the walls of the chamber, substantially as set forth.

5. In a hydro-carbon burner, a combustion chamber formed by suitable walls and enlarged at its lower portion, and a metallic capillary oil distributor supported within said enlarged portion to initially heat the burner, substantially as set forth.

6. A hydro-carbon burner having a chamber at its lower portion with an initial heating device arranged to carry oil, a pipe to deliver oil to said initial heating device, and walls forming a continuation of said chamber and having a narrowed space between them as compared with the said chamber, substantially as set forth.

7. A vapor burner provided with metallic conductors arranged in proximity to each other to cause oil to travel laterally over their surface, substantially as set forth.

8. In a vapor burner, an initial heating device consisting of a series of wires laid side by side, substantially as set forth.

9. In a vapor burner, a combustion chamber, a shelf in the lower portion of said chamber, and wires supported thereon to conduct the oil for initial heating, substantially as set forth.

10. In a vapor burner, walls forming a combustion chamber, an initial heating device arranged to present oil on its under surface in said chamber and a flame space between said under surface and the bottom of the chamber, substantially as set forth.

11. In a vapor burner, a shelf arranged for initially heating the burner and constructed to support the oil by adhesion, thereby assuring a thin spread of oil over its surface and rapid vaporization, substantially as set forth.

12. In a vapor burner, a chamber, a shelf on the surfaces of which the oil for initial starting is supported by the adhesion of the oil, the said shelf supported within the same chamber and having a flame space between it and the bottom of the chamber, substantially as set forth.

13. In a vapor burner, the initial metallic heating device constructed to distribute the oil by capillary action, and the supply pipe arranged to flow the oil to the said device, substantially as set forth.

Witness our hands to the foregoing specification.

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WILLIAM R. JEAVONS.
WILLIAM H. WILDER.

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