

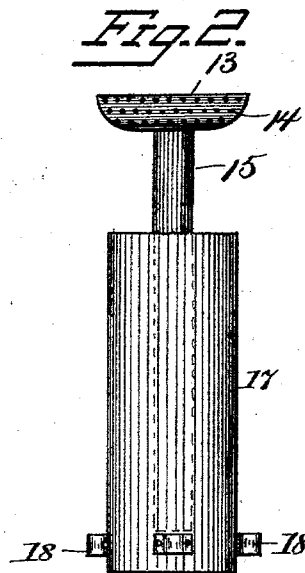
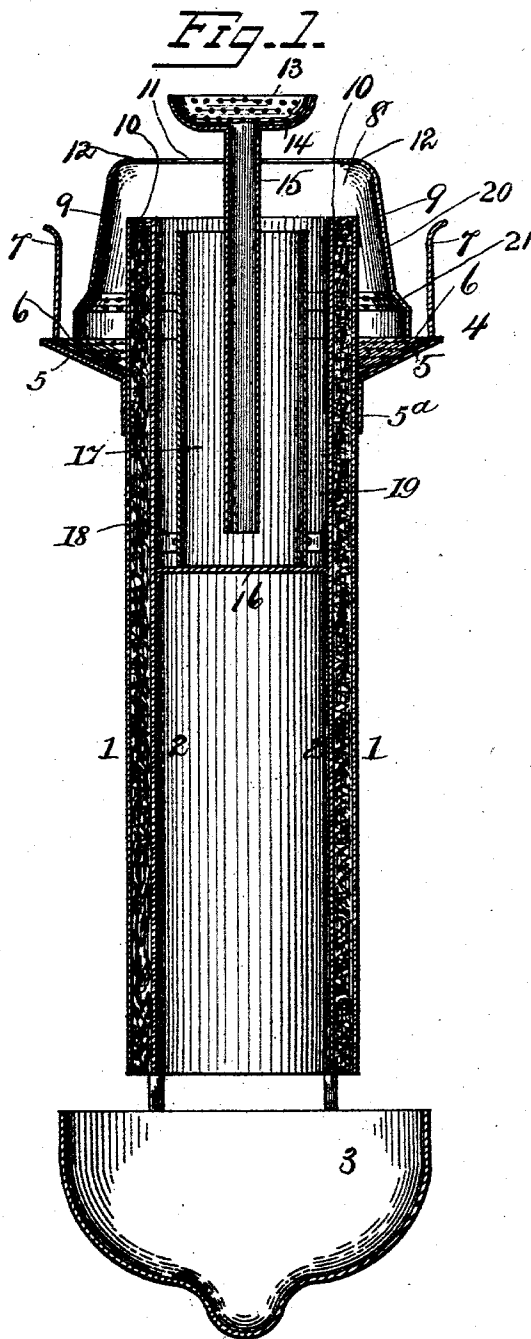
No. 634,794.

Patented Oct. 10, 1899.

C. L. BALLARD.
HYDROCARBON LIGHTING DEVICE.

(Application filed Mar. 9, 1897.)

(No Model.)



WITNESSES
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UNITED STATES PATENT OFFICE.

CASPER L. BALLARD, OF OTTAWA, ILLINOIS, ASSIGNOR OF ONE-HALF TO
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HYDROCARBON-LIGHTING DEVICE.

SPECIFICATION forming part of Letters Patent No. 634,794, dated October 10, 1899.

Application filed March 9, 1897. Serial No. 626,616. (No model.)

To all whom it may concern:

Be it known that I, CASPER L. BALLARD, a citizen of the United States, residing at Ottawa, in the county of La Salle and State of Illinois, have invented certain new and useful Improvements in Hydrocarbon-Lighting Devices; 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 figures of reference marked thereon, which form a part of this specification.

This invention relates to improvements in hydrocarbon-lighting apparatus of the general character shown and described in United States Letters Patent No. 484,354, issued October 11, 1892.

The invention relates more particularly to the burner and to means for condensing the flame at the proper point and for directing the air-supply thereto, whereby the oxygen in the air and the carbon of the flame will be most advantageously mixed.

In the drawings, Figure 1 is a central vertical section of a burner constructed in accordance with my invention. Fig. 2 is an elevation of the spreader-cylinder and spreader removed.

In said drawings only the parts referring to the burner proper are shown in detail, it being understood that the parts below the same are made substantially like those shown in said above-mentioned United States Letters Patent.

As shown in said drawings, 1 and 2 designate outer and inner concentric cylindric sections or tubes extending from the drip-cup 3 to the combustion-chamber. The inner tube 2 is of less external diameter than the internal diameter of the outer tube, thereby providing between the same a vertical annular space 10, adapted for the reception of a wick and constituting the wick-tube. Between the upper end of said wick-tube and the drip-cup the wick will be in communication with any suitable source of oil-supply. Within said inner tube 2 is a central air-passage, which is in communication at its lower end with a suitable source of air-supply.

5 designates an upwardly-flaring foraminated flange, which is secured adjacent the upper end of the outer tube 1 by means of a sleeve 5^a. To the upper surface of said flange is secured a dome-like casing 8, which is concentric with the cylindric sections or tubes 1 and 2. In practice the casing 8 is attached permanently to the flange 5, so that said flange constitutes the bottom of the casing, and the sleeve 5^a is made of such diameter as to enable the parts to be readily removed and replaced as a whole. Said upper part of the casing is of conical shape, being made of less diameter at its upper than at its lower end, thereby providing an annular upwardly-converging flue or passage 20 between said casing and the outer tube 1. Said casing has at its upper end an opening 11 and is provided with an inwardly-extending annular flange 12, which overhangs the wick-tube 10, thereby making said opening of less diameter than said wick-tube. The flange 5 is provided near its outer edges with the usual guard-fingers 7, and the annular space between the lower ends of said fingers and the casing constitutes a seat for the lamp-chimney.

The wall of the casing 8 is desirably provided near the base thereof with an oblique annular foraminated section 21, which permits a portion of the air entering the casing through the screen-like bottom 5 to pass outside of the casing and pass upwardly to the outside of the flame and between the casing and the lamp-chimney.

13 designates a spreader-plate which is located over the opening 11 in the casing 8 and at a short distance therefrom. Said plate is supported by means of a vertical stem 15, which is connected in any suitable manner with a short cylindric section or tube 17, which is located within the air-passage inside the inner tube 2 and concentric therewith. Said tube 17 is supported by means of a cross-bar 16, attached to the inner walls of the inner tube 2, and is provided with spring-arms 18, which engage the inner walls of said tube, by means of which it is held in place. Said tube 17 is of such diameter as to provide between the same and the tube 2 an annular air-space which is in communication at its lower end with said central air-passage and through

which a current of air may be supplied to the inner side of the flame adjacent to the initial point of combustion. Said spreader-plate 13 is of foraminated construction to permit the air to pass therethrough to supply the inner part of the upper end of the flame and is made of less diameter than that of the wick-tube 10 and the opening in the upper end of the casing 8. Said plate is herein shown as cup-shaped in its upperside, but may be made flat with equally good results. The stem 15 will preferably be made hollow throughout its length, as shown, and is in communication at its lower end with the central air-passage, whereby a current of air may pass centrally upwardly therethrough to the inner side of the upper part of the flame.

The chimney employed with the burner described will be an ordinary cylindric tube provided in its part surrounding the burner with an enlarged globular portion to permit the flame to spread without coming into contact with the inner surface of the same.

In the operation of the burner the flame is supplied at its inner lower portion with air which passes through the annular space or flue 19 and with a portion of the air which passes through the cylindric section 17, and the inner upper portion is provided with a portion of the air which passes through said cylindric section or tube 17 and upwardly through the deflector and through the tubular stem 15. The outer lower portion of the flame is supplied with air which passes through the space 20, while the outer upper portion is supplied with air which passes through the space between the outer surface of the casing and the inner surface of the lamp-chimney.

The provision of the substantially horizontal flange 12 on the casing 8 and which overhangs the wick-tube in connection with the spreader-plate 13, which is of less diameter than said tube, is of great importance, as will be seen from a consideration of the following: The flame as it rises from the wick is deflected inwardly by the overhanging portion of the casing. It will be noted that the supply of air to the flame through the passages 17 and 19 is substantially equal to the supply through the passage 20, so that the deflection of the said generated gases by the overhanging part 12 of the casing against the upwardly-moving current through the spaces 17 and 19 will cause the movement of the same to be for a moment checked at a point just underneath the overhanging part or flange 12. The result is that the oxygen of the air-currents on both the inner and outer sides of said gases becomes thoroughly intermixed with the same before the flame issues from the opening 11 in the upper end of the casing, thereby producing an intense heat within the casing, so that all the particles of carbon become highly

luminous and produce a brilliant white flame. Another factor which aids in producing the improved results is that the air-currents both from the passage 20, which is directed to the outside of the flame, and the passages 17 and 19, which are directed to the inner side of the flame, are converged upon the flame at a point underneath the flange 12, thereby greatly aiding in the thorough mixture of the combustible gases.

I have found by experiment that with the construction described I am enabled to greatly decrease the length of the flame, thereby being enabled to increase the brilliancy thereof in a comparatively restricted area, which would otherwise be less brilliant and spread over a greater area. The diameter of the flame is also obviously greatly decreased, which aids in bringing about the condensation of the flame and the improved illumination.

The making of the deflector 13 of less diameter than the wick-tube and the opening in the upper end of the casing 8 is obviously of great importance, as it prevents the tendency of the flame from being deflected or spread outwardly so as to smoke the chimney, as would be true if the deflector be of sufficient diameter as to overhang the opening in said casing.

I claim as my invention—

A hydrocarbon-burner comprising concentric cylindric sections 1 and 2, forming between the same an annular wick-tube, a casing surmounting the upper end of the same having an obliquely-arranged foraminated bottom, 5, and an open-ended conical upper portion, 8, of greater diameter at its base than said wick-tube and forming between the same and said tube an air-passage 20, said upper part of the casing extending above said wick-tube, and provided with an inwardly-directed imperforate annular flange, 12, which overhangs said wick-tube and having its inner edge located in a horizontal plane, a foraminated spreader-plate 13, located above the opening in said casing and of less diameter than said opening, said wick-tube being provided with a central longitudinal air-passage which is in communication at its lower end with a source of air-supply and opens at its upper end in the space between the end of the wick-tube and said flange 12, and guard-fingers 7, attached to said foraminated bottom 5, outside of the base of the conical part 8.

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

CASPER L. BALLARD.

Witnesses:

BEN F. BRADY,
S. S. PEARSEN.