No. 711,153. Patented Oct. 14, 1902.

E. E. FLORA.

INCANDESCENT OIL LAMP.

(Application filed May 9, 1902.)

(No Model.)

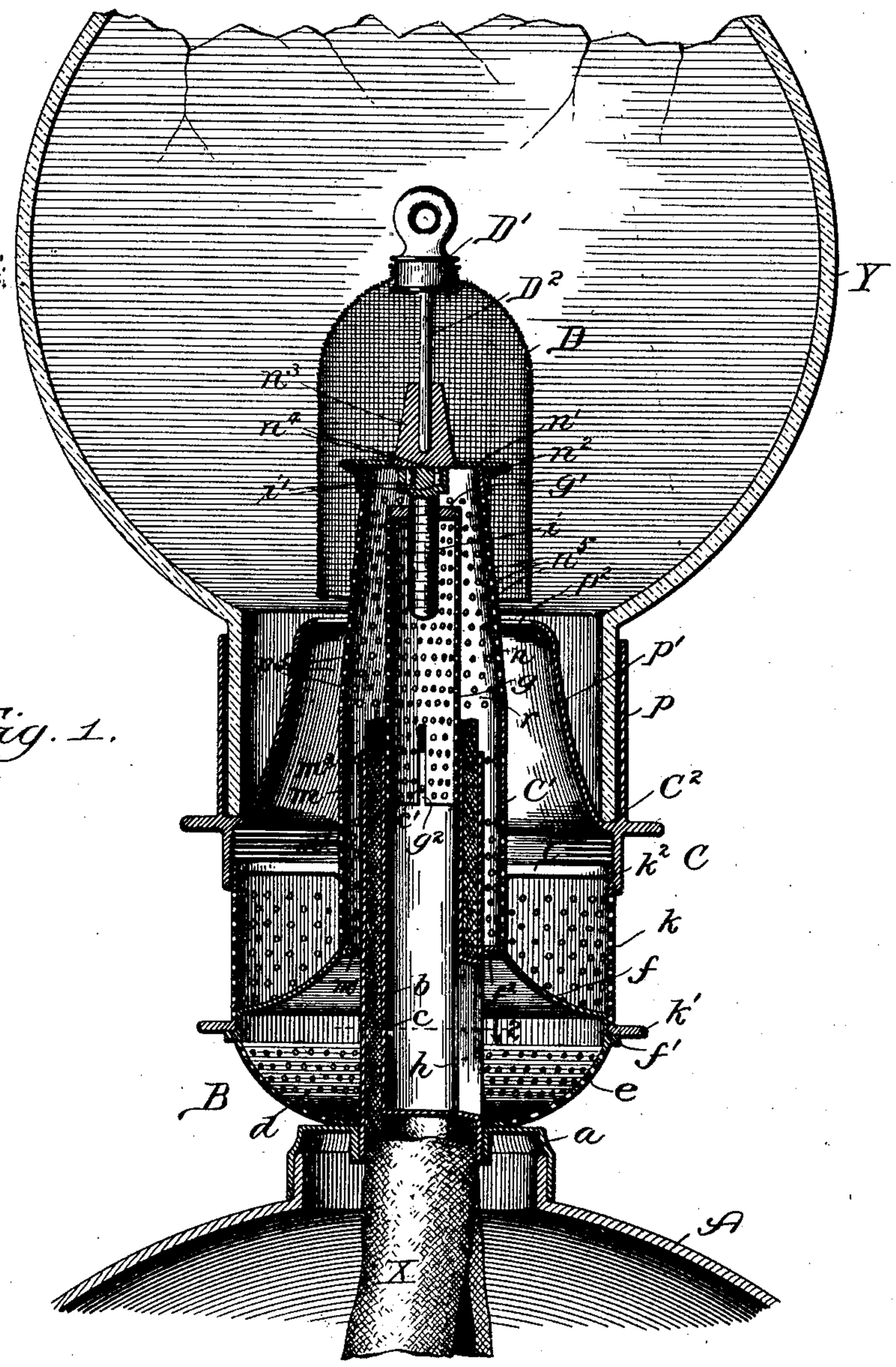

Fig. 1.

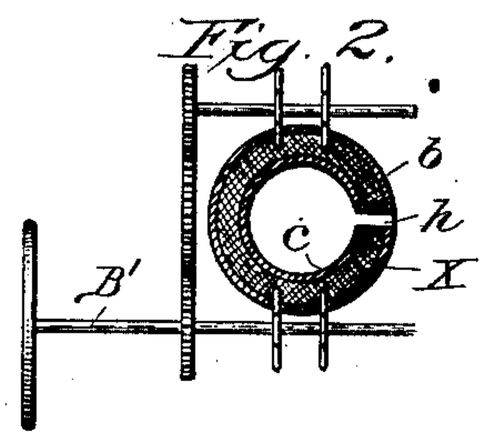

Fig. 2.

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INCANDESCENT OIL-LAMP.

SPECIFICATION forming part of Letters Patent No. 711,153, dated October 14, 1902.

Application filed May 9, 1902. Serial No. 106,615. (No model.)

To all whom it may concern:

Be it known that I, ELLSWORTH E. FLORA, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Incandescent Oil-Lamps, of which the following is a specification.

My object is to provide an oil-burning incandescent lamp of improved construction in the use of which comparatively great illuminating power may be obtained at a minimum expense of hydrocarbon oil and wherein oil of the grade usually employed in kerosene-lamps may be used without danger of offensive odor and without material wear of the wick.

In carrying out my invention I employ an annular burner surmounted by an incandescent hood or mantle and having an oil-conducting wick, all so arranged that the oil from the wick is gasified by the heat of the burner, then mixed with air, and then discharged and ignited in the mantle, whereby a blue flame, the result of substantially perfect combustion, is produced far enough away from the wick to avoid charring the same and of a volume and intensity which renders the hood or mantle employed incandescent throughout.

In the drawings, Figure 1 is a broken view showing my improved burner in vertical section, and Fig. 2 a plan section on line 2 in Fig. 1.

A is the font or oil-reservoir of a lamp, having the usual threaded burner-engaging collar *a*. The burner, as I prefer to construct it, is in two main readily-separable parts B and C. The lower part B consists of annular concentric tubes *b c*, forming between them an annular tube or chamber for a wick X, a chamber or casing *d* around and in fixed relation to the lower part of the tubes *b c*, having a perforated cup-shaped base *e* and imperforate frusto-conical top *f*, and an adjustable extension *g*. The tube *b* is threaded along its lower end portion to enter and engage the collar *a* and hold the part B firmly upon the lamp-body, and the inner tube *c* forms a central draft-tube, closed at its base to the font or oil-reservoir. A narrow vertically-elongated passage *h* extends between the chamber *d* and the central draft-tube, and the wick is split to pass across the same. In the chamber *d* and extending through the outer tube *b* is wick raising and lowering mechanism B′ of common construction. On the casing *d* is an annular seating-flange *f′* and an annular seat f^2 around the tube *b*. The tube extension *g* is perforated throughout, as shown, and fits and slides along its lower end portion vertically in the draft-tube *c*. In the top of the tube extension *g* is a plug *g′*, provided with a central threaded opening fitted with an adjusting-screw *i*. In the lower end portion of the tube extension *g* is a vertical slot g^2, fitting over a pin *c′* in the tube *c*, which prevents axial turning of the tube extension *g* in the tube *c*. The upper removable part C of the burner comprises a perforated cylindrical wall *k*, having a base-flange *k′* and threaded upper part k^2, a central tube C′, connected with the wall *k* by a spider *l*, and a gallery C^2, screwed upon the threaded portion k^2 of the wall *k*. The tube C′ is formed with a cylindrical lower part *m* and a frusto-conical upper part *n*. At the lower end of the part *m* is an inner annular spacing-flange *m′*, which fits about the tube *b* and rests upon the seat f^2, while the flange *k′* rests upon the seat *f′*. At the top of the tube C′ is an imperforate cap *n′*, formed with a spreader-flange n^2 and carrying a socket-piece n^3. On the under side of the cap *n′* is a pair of downward-projecting pins or studs n^4, adapted to enter sockets *i″* in the head of the screw *i*. The gallery C^2 has an outer wall *p* to receive a chimney Y and an inward-projecting frusto-conical dome or hood *p′*. The perforated wall *k* and dome *p′* form an air-inlet chamber with an annular outlet p^2 at the top about the frusto-conical portion of the tube C′. The tube C′ forms the external wall of an annular mixing-chamber *r* above the wick-tube *b* and about the tube extension *g*. The tube C′ is provided along the lower part of the cylindrical portion *m* with a series of perforations m^2, as shown, and also with an annular series of perforations m^3, adjacent to the top of the tube *b*. The frusto-conical portion *n* of the tube C′ surrounding the tube extension *g* is provided with a series of perforations n^5, forming the burner-openings.

D is an incandescent hood or mantle, which may be of what is known as the "Welsbach" type, mounted upon a supporting-head D', having a central downward-extending stem D^2, fitting into the socket-piece n^3.

In practice the part C of the burner, which includes the parts k, C', and C^2, is lifted from the part B to give access to the wick X. A match applied to the top of the wick ignites the oil, causing the flame from the wick to heat the inner tube extension g and wick-tube. These parts become sufficiently heated in about a minute's time, and the flame at the wick may then be extinguished, as by blowing it out. The part C is then replaced, and the stored heat in the tube g and wick-tubes c b has the effect of gasifying the oil rising to the top of the wick, and this gas rises in the mixing-chamber r between the tubes C' g and escapes through the perforations n^5 of the tube C' into the mantle D. A match is then applied to the mantle to ignite the gas as it escapes from the burner-openings n^5.

As the oil at the wick is volatilized it is met by a current of air passing through the perforations m^2 m^3 and by another current of air passing upward through the central draft-tube and escaping through the perforated tube extension g. It is also met by air entering through the lower perforations n^5 below the top of the hood p'. These air-currents entering from below and opposite sides of the mixing-chamber effect a thorough intimate mixing of atmospheric air with the hydrocarbon gas, resulting in a comparatively large volume of burning fluid. The air escaping upward through the passage p^2 tends to mix with and direct the fluid into the mantle in such a way that the products of combustion in the form of a blue flame of intense heat are directed into the mantle to render the latter incandescent approximately throughout. The flame extends from all the perforations n^5 above the opening p^2, and the tubes C' g are maintained at a temperature sufficiently high to gasify the oil as fast as it is brought to the top of the wick.

The supply of gas may be regulated by raising and lowering the wick, and the inner and outer air-currents may be regulated by raising or lowering the dome p' upon the thread k^2 and by raising or lowering the inner tube extension g. To produce the best results, the inner and outer air-currents should balance, and this can be regulated for the most part by raising or lowering the tube g. When the part C is placed in position, the tube g may be raised to the highest point in the tube c and the pins n^4 on the cap n' will enter the sockets i' in the head of the screw i. If the air-current from the inner air-passage is found to be so strong as to unduly spread the flame, the tube g may be lowered by turning the part C upon the part B in the direction which will cause the screw i to lower the tube g. This lowering of the tube g reduces the number of perforations above the wick-tube through which air from the central draft-passage can escape, and thus reduces the central draft. As before stated, the oil is ignited at the wick initially for a time long enough merely to heat the tube forming the inner wall of the mixing-chamber, the flame at the wick being then extinguished. Thus there is very little wear upon the wick, and it is too far below the flame at the mantle to be charred thereby.

While I prefer to construct my improvements throughout as shown and described, they may be variously modified in the matter of details of construction without departing from the spirit of my invention as defined by the claims.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a liquid-hydrocarbon mantle-incandescing burner, the combination of an air and gas mixing chamber, having perforated external and internal heat-conducting walls, the upper part of said external wall forming the heat-generating portion of the burner surrounded by the mantle, and a wick entering the lower part of said chamber, substantially as set forth.

2. In a lamp, the combination with a liquid-hydrocarbon reservoir, of a mantle-incandescing burner having an air and gas mixing chamber with perforated external and internal air-inlet and heat-conducting walls, and a wick entering the lower part of said chamber from the reservoir, said external wall having burner-openings in its upper part, surrounded by the mantle, and forming the heat-generating portion of the burner, substantially as set forth.

3. In a lamp, the combination with a liquid-hydrocarbon reservoir, of a mantle-incandescing burner having a central draft-tube, an annular wick-tube surrounding said draft-tube, a perforated central-draft-tube extension forming the inner heat-conducting wall of a mixing-chamber above the wick-tube, a tube surrounding said wick-tube and said tube extension, forming an outer heat-conducting wall of said mixing-chamber closed at its upper end and having a lower series of air-inlet openings, and having an upper series of burner-outlets forming the heat-generating portion of the burner surrounded by the mantle, and an air-supply chamber, about said outer wall of the mixing-chamber, having a narrow annular draft-opening around the upper portion of said mixing-chamber, substantially as set forth.

4. In a lamp, the combination with a liquid-hydrocarbon reservoir of a mantle-incandescing burner having a central draft-tube, an annular wick-tube surrounding said draft-tube, a perforated central-draft-tube extension forming the inner heat-conducting wall of a mixing-chamber above the wick-tube, means for raising and lowering said draft-tube extension in said draft-tube, a tube surrounding said wick-tube and said

tube extension, forming the outer heat-conducting wall of said mixing-chamber closed at its upper end and having a lower series of air-inlet openings, and having an upper series of burner-outlets forming the heat-generating portion of the burner surrounded by the mantle, and an air-supply chamber, about said outer wall of the mixing-chamber, having a narrow annular draft-opening around the upper portion of said mixing-chamber, substantially as set forth.

5. In a lamp, the combination with a liquid-hydrocarbon reservoir, of a mantle-incandescing burner having a central draft-tube, an annular wick surrounding said draft-tube, a perforated central-draft-tube extension forming the inner heat-conducting wall of a mixing-chamber above the wick-tube, a tube, having a cylindrical part surrounding said wick-tube, and a frusto-conical part surrounding said tube extension, forming the outer heat-conducting wall of said mixing-chamber closed at its upper end and having a lower series of air-inlet openings about the wick-tube and having an upper series of burner-outlets forming the heat-generating portion of the burner surrounded by the mantle, and an air-supply chamber about said outer wall of the mixing-chamber, having a narrow annular draft-opening around the upper portion of said mixing-chamber, substantially as described.

6. In a lamp, the combination with a liquid-hydrocarbon reservoir of a mantle-incandescing burner having a central draft-tube, an annular wick-tube surrounding said draft-tube, a perforated central-draft-tube extension forming the inner heat-conducting wall of a mixing-chamber above the wick-tube, a tube surrounding said wick-tube and said tube extension, forming the outer heat-conducting wall of said mixing-chamber closed at its upper end and having a lower series of air-inlet openings, and having an upper series of burner-outlets forming the heat-generating portion of the burner surrounded by the mantle, and an air-supply chamber about said outer wall of the mixing-chamber having a narrow annular draft-opening around the upper portion of said mixing-chamber with means for varying the size of said annular draft-opening, substantially as and for the purpose set forth.

7. In a lamp, the combination with a liquid-hydrocarbon reservoir, of a mantle-incandescing burner formed of two main readily separable and replaceable parts, one said part comprising a wick-tube, a central draft-tube surrounded by said wick-tube, a perforated tubular extension of said central draft-tube forming the inner air-inlet and heat-conducting wall of an annular mixing-chamber above the wick-tube, and the other said part comprising a central perforated tube forming the outer air-inlet and heat-conducting wall of said mixing-chamber, a chamber about said central tube having a perforated cylindrical outer wall, a frusto-conical hood forming a narrow draft-opening about said central perforated tube, an imperforate cap at the top of said central perforated tube provided with a spreader-flange, a socket-piece on said cap, a mantle-support mounted in said socket-piece, and a mantle upon said support, all constructed and arranged to operate substantially as set forth.

ELLSWORTH E. FLORA.

In presence of—
ALBERT S. BACCI,
M. S. MACKENZIE.