No. 656,791. Patented Aug. 28, 1900.

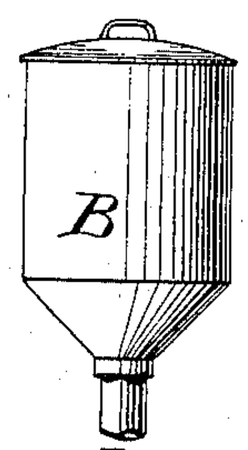
C. J. SEARCH.

VAPOR STOVE.

(Application filed Aug. 18, 1899. Renewed July 14, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.



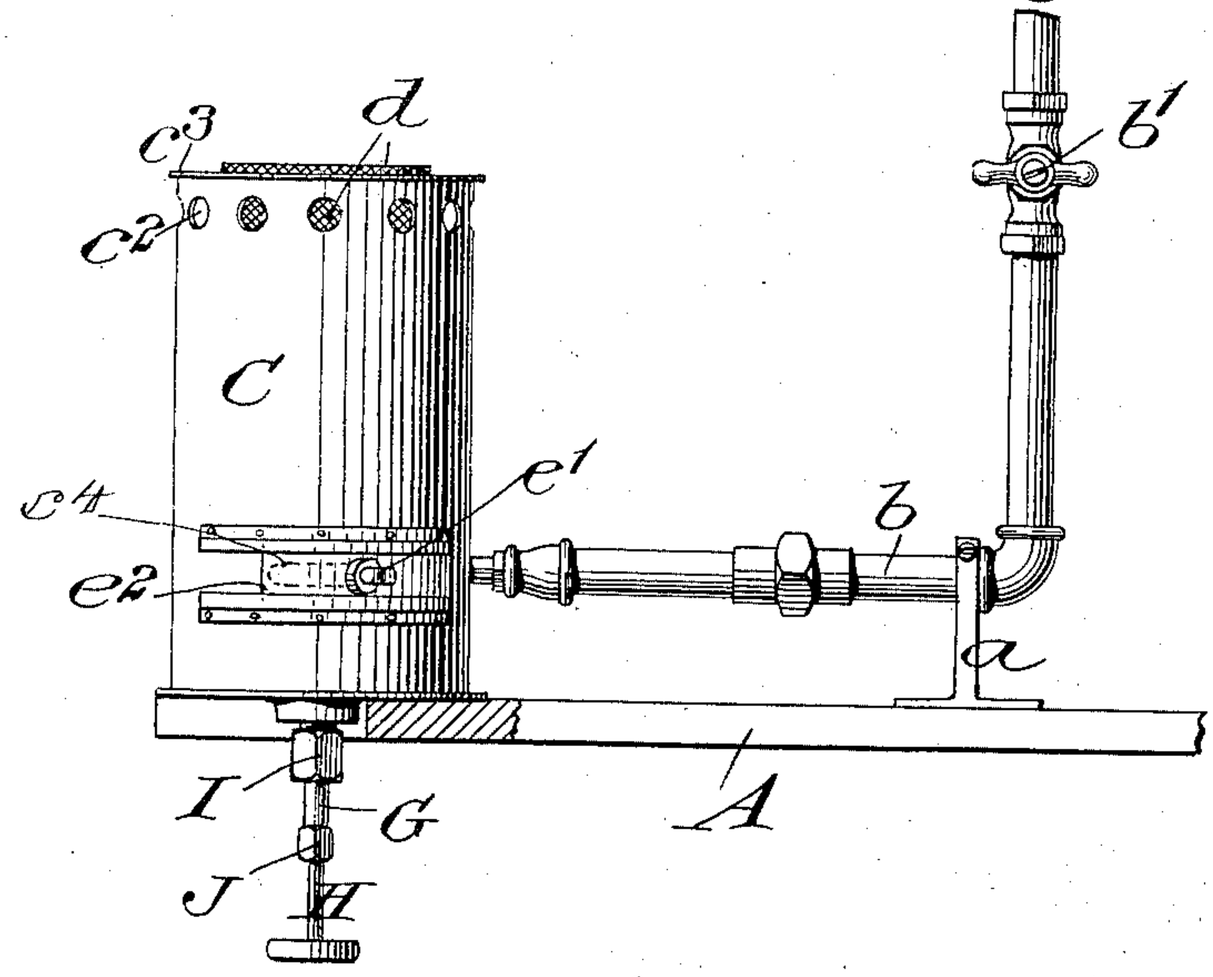
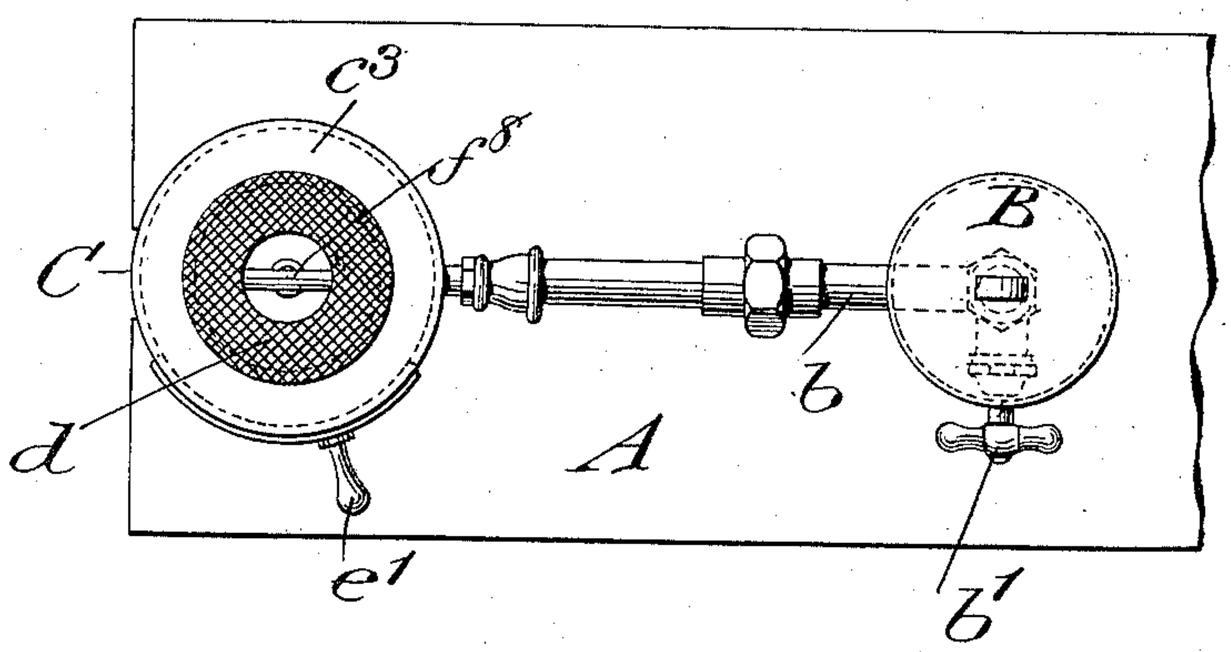


Fig. 2.



Witnesses:-
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Edward Vieser.

Inventor:-
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(No Model.) 2 Sheets—Sheet 2.

Fig. 3.

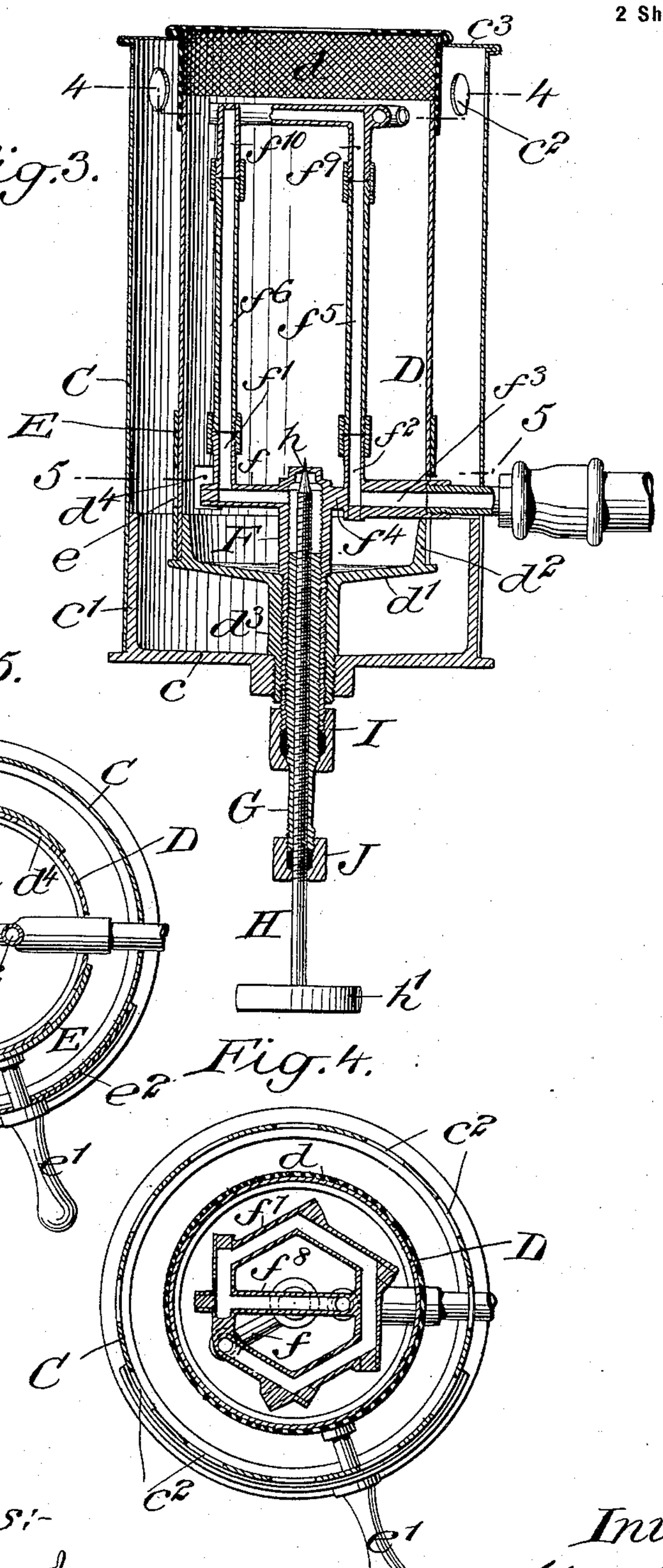

Fig. 5.

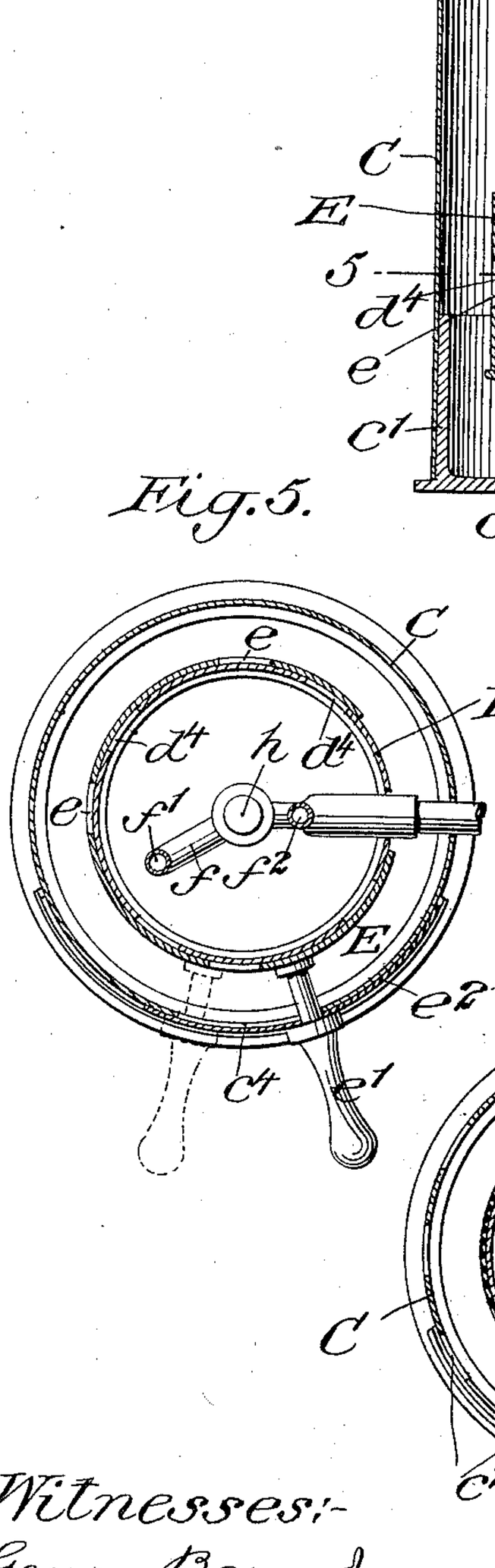

Fig. 4.

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UNITED STATES PATENT OFFICE.

CHARLES J. SEARCH, OF NEW YORK, N. Y.

VAPOR-STOVE.

SPECIFICATION forming part of Letters Patent No. 656,791, dated August 28, 1900.

Application filed August 18, 1899. Renewed July 14, 1900. Serial No. 23,676. (No model.)

To all whom it may concern:

Be it known that I, CHARLES J. SEARCH, a citizen of the United States, and a resident of the borough of Brooklyn, in the city and State of New York, have invented a new and useful Improvement in Vapor-Burners, of which the following is a specification.

My invention relates to an improvement in vapor-burners in which the kerosene or other hydrocarbon oil from which the vapor is formed is fed under its own head or pressure instead of under compression.

One object of my invention is to provide certain new and useful changes in the construction and arrangement of the several parts of the burner whereby the liability of the burner proper becoming clogged by foreign matter in the oil is obviated, in which the intensity of the flame may be very quickly and accurately adjusted, and which will be very simple and convenient to operate.

A further object is to provide a structure in which the oil may be very rapidly converted into vapor by the auxiliary heating means and in which the entire air-supply for the burner proper is first caused to be heated to a high degree before being fed thereto.

A practical embodiment of my invention is represented in the accompanying drawings, in which—

Figure 1 represents a side view of my improved burner. Fig. 2 represents a top plan view of the same. Fig. 3 is an enlarged vertical central section through the burner, the oil-reservoir being removed. Fig. 4 is a transverse horizontal section taken in the plane of the line 4 4 of Fig. 3, and Fig. 5 is a transverse horizontal section taken in the plane of the line 5 5 of Fig. 3.

The supporting-table for the burner is denoted by A, and it is provided with a bracket *a*, which is fitted to support the oil-supply pipe *b*, which leads from the reservoir B first downwardly a considerable distance and thence transversely to the burner. The vertical portion of the oil-supply pipe is provided with a suitable shut-off cock *b'* for regulating the amount of oil to be furnished to the burner. The oil-reservoir B may be located a sufficient distance above the burner to permit the oil to be fed therefrom under the required head or pressure by gravity.

The burner comprises an outer hollow cylindrical shell or casing C and an inner hollow cylindrical shell or casing D, concentric to the outer casing C and spaced therefrom. The outer casing C is provided at its lower end with a suitable base *c*, provided with an upwardly-extended annular flange *c'*, which the outer casing C snugly engages. The outer hollow cylinder-casing C is provided with an annular series of air-inlet openings c^2 adjacent to its top. The open top of the inner cylindrical casing D is located in the plane of the annular series of air-inlet openings c^2, and a perforated cap or cage *d* is fitted to the said top of the casing D, which cap or cage extends to a point slightly above the top of the outer casing C. The space between the top of the outer casing C and the perforated cage *d* is closed by an annular ring c^3, thus compelling all of the air to be fed through the air-inlet openings c^2. The use of this cage serves to effectually muffle or deaden the noise usually so objectionable in this class of burner and also permits part of the air which enters the openings c^2 to pass through the sides of the cage into direct contact with the flame. The bottom of the hollow casing D is closed by a cup-shaped base *d'*, the side walls d^2 of the cup comprising an annular flange, which the bottom of the inner casing D snugly engages. This cup-shaped base *d'* is provided with a downwardly-extended central tube d^3, which has a screw-threaded engagement with the base *c* of the outer casing C, thus spacing the cup-shaped base *d'* a short distance above the base *c*. The lower end of the casing D is provided with an annular series of air-inlet openings d^4. The amount of air to be admitted through the said openings d^4 is accurately controlled by means of a cylindrical damper E, having annular series of openings *e* therein, which damper is also provided with a handle *e'*, projecting through the outer casing C. The horizontally-elongated slot c^4 in the outer casing C for permitting the sliding of the damper E is kept at all times closed by means of a guard e^2.

By the use of the above-described structure the air to be admitted to the interior of the casing D is caused to enter the openings c^2 in the top of the outer casing C and is then caused to pass downwardly exterior to the

inner casing D and thence inwardly through the openings d^4 near the bottom of the said casing D.

The burner proper comprises a vertical tubular base F, which has a screw-threaded engagement with the inner wall of the tubular extension d^3 of the base d' of the inner casing. This tubular base is provided with an L-shaped tubular arm, the horizontal portion of which is denoted by f and the vertical portion of which is denoted by f'. This tubular base is further provided with an inverted-T-shaped arm, the vertical portion f^2 and the horizontal outer branch f^3 of which are tubular and the inner horizontal branch f^4 solid. The oil-feed pipe b is secured to the outer end of the tubular branch f^3, so that communication is established from the pipe b through the branch f^3 and the vertical branch f^2.

An oil-vaporizing frame is mounted above the burner proper in the following manner: A vertical tube f^5 is coupled to the vertical branch f^2, and a second vertical tube f^6 is coupled to the vertical branch f'. A hexagonal-shaped hollow ring f^7 is disposed horizontally above the vertical tubes f^5 f^6, and a pipe f^8 extends across between two of the opposite sides of the ring. A short tubular branch f^9 extends downwardly from the pipe f^8 and is coupled to the upper end of the vertical tube f^5. A second tubular branch f^{10} extends downwardly from the ring f^7 and is coupled to the upper end of the vertical tube f^6. Communication is closed at the end of the pipe f^8, from which the branch f^9 leads, between the interior of the pipe f^8 and the interior of the ring f^7, thus compelling the oil which flows upwardly through the branch f^9 to flow along the interior of the pipe f^3, across the ring directly above the burner. Communication is also closed in the ring f^7 at a point between the place where the pipe f^8 joins the ring f^7 and the junction of the branch f^{10} with the said ring, thus compelling the vapor formed from the oil to pass from the pipe f^8 nearly the entire distance around within the ring f^7 to a point where it may pass down through the branch f^{10}.

By the above structure the oil is exposed to a very extended heating-surface without deflecting to any material degree the flame from the burner.

A tubular plug G has a screw-threaded engagement with the interior of the tubular base of the burner, the top of which plug is located at some distance below the point where the vapor enters the interior of the tubular base through the branch f, thus permitting the foreign matter to drop by gravity away from the said inlet, and thereby preventing the choking of the vapor-inlet and also the burner-top. This tubular plug G extends a considerable distance below the tubular base F of the burner. The stem H of a needle-valve has a screw-threaded engagement with the interior wall of the plug G, the point h of the valve being arranged to open and close the tip of the burner to a greater or lesser degree. The lower end of the stem of the needle-valve projects a distance below the plug G and is there provided with the usual operating-handle h'.

A suitable packing-box I is located between the lower end of the tubular base F of the burner and the plug G, and a second packing-box J is interposed between the lower end of the plug G and the stem H of the needle-valve.

The operation of my invention is as follows: The reservoir B is supplied with a quantity of oil, and the cock b' is turned to permit a portion of the oil to run from the reservoir into the framework surrounding the burner proper. An auxiliary heating fluid—such, for instance, as alcohol—is poured into the cup-shaped base d' of the interior casing D through the top of the said casing, which alcohol is then lighted, thus causing it to heat the framework up to a point sufficient to vaporize the oil therein. As the upper portion of the casing is partially closed by the cage d, the first tendency of the flame from the auxiliary heating fluid is to seek the more ready outlet through the air-inlet openings near the burner, and thus withdraw the heat from the framework. To obviate this, I close the said openings temporarily by using the damper. The openings are closed for a short time only or until an upward draft is established, when the damper is opened, and the air admitted therethrough serves to still further assist in the upward draft. When the oil is vaporized, the needle-valve H is manipulated to permit more or less of the vapor to escape from the burner-tip, where it will be ignited by the auxiliary heating-fluid flame. The heat of the flame from the burner will at all times keep a sufficient quantity of oil, which is fed to the framework above the burner proper, vaporized.

The air to be supplied to the burner is admitted through the top of the outer casing C and is thus caused to pass downwardly along the heated walls of the inner casing D, and it is permitted to pass through the openings at or near the bottom of the inner casing, thus insuring thorough heating of the air before it is fed to the flame.

The amount of air to be fed to the flame may be regulated easily by the damper E through the manipulation of the outwardly-projected handle e'.

Any foreign matter which accumulates in the tubular base of the burner proper may be removed by removing the plug G.

It will be seen that the oil to be vaporized after it reaches the top of the framework above the burner proper is first fed directly across the framework, over the burner, and then by a circuitous path around within the ring, and the vapor is then caused to flow downwrdly to the burner.

What I claim is—

1. A vapor-burner comprising the burner

proper, a hollow casing surrounding the burner having its bottom closed to form a cup for an auxiliary heating fluid, the upper portion of the casing being partially closed, the said hollow casing being further provided with air-inlet openings at points near the burner proper, and a damper for opening and closing the said air-inlet openings, substantially as set forth.

2. A vapor-burner comprising the burner proper, an inner hollow casing surrounding the burner having its bottom closed to form an auxiliary heating-fluid cup and its upper portion partially closed, the said inner casing being provided with air-inlet openings at points near the burner proper, a damper for opening and closing the said air-inlet openings and an outer hollow casing surrounding and spaced from the inner hollow casing, substantially as set forth.

3. A vapor-burner comprising the burner proper, an inner hollow casing surrounding the burner, the bottom of the said casing being closed to form a cup for receiving the auxiliary heating fluid, the said inner casing being provided with air-inlet openings at points near the burner proper and an outer hollow casing surrounding and spaced from the inner hollow casing, the said outer hollow casing being provided with air-inlet openings at points above the openings in the inner casing, substantially as set forth.

4. A vapor-burner comprising the burner proper, an inner hollow casing surrounding the burner proper, an outer hollow casing surrounding the inner casing and spaced therefrom, the inner casing being provided with air-inlet openings adjacent to the burner and the outer casing being provided with air-inlet openings at points above the openings in the inner casing and means extending to the exterior of the outer casing for regulating the amount of air to be supplied through the openings in the inner casing, substantially as set forth.

5. A vapor-burner comprising an inner hollow casing closed at its bottom, a perforated cage or cap forming an extension at the top of the casing, a burner proper and a vaporizer located within the casing and an outer casing surrounding and spaced from the inner casing, the said outer casing having a closed bottom and having its top closed between the top of the cage and the outer casing, the inner casing being provided with air-inlet openings adjacent to the burner proper and the outer casing being provided with air-inlet openings adjacent to the said cage, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 16th day of August, 1899.

CHARLES J. SEARCH.

Witnesses:
FREDK. HAYNES,
C. S. SUNDGREN.