No. 668,934. Patented Feb. 26, 1901.

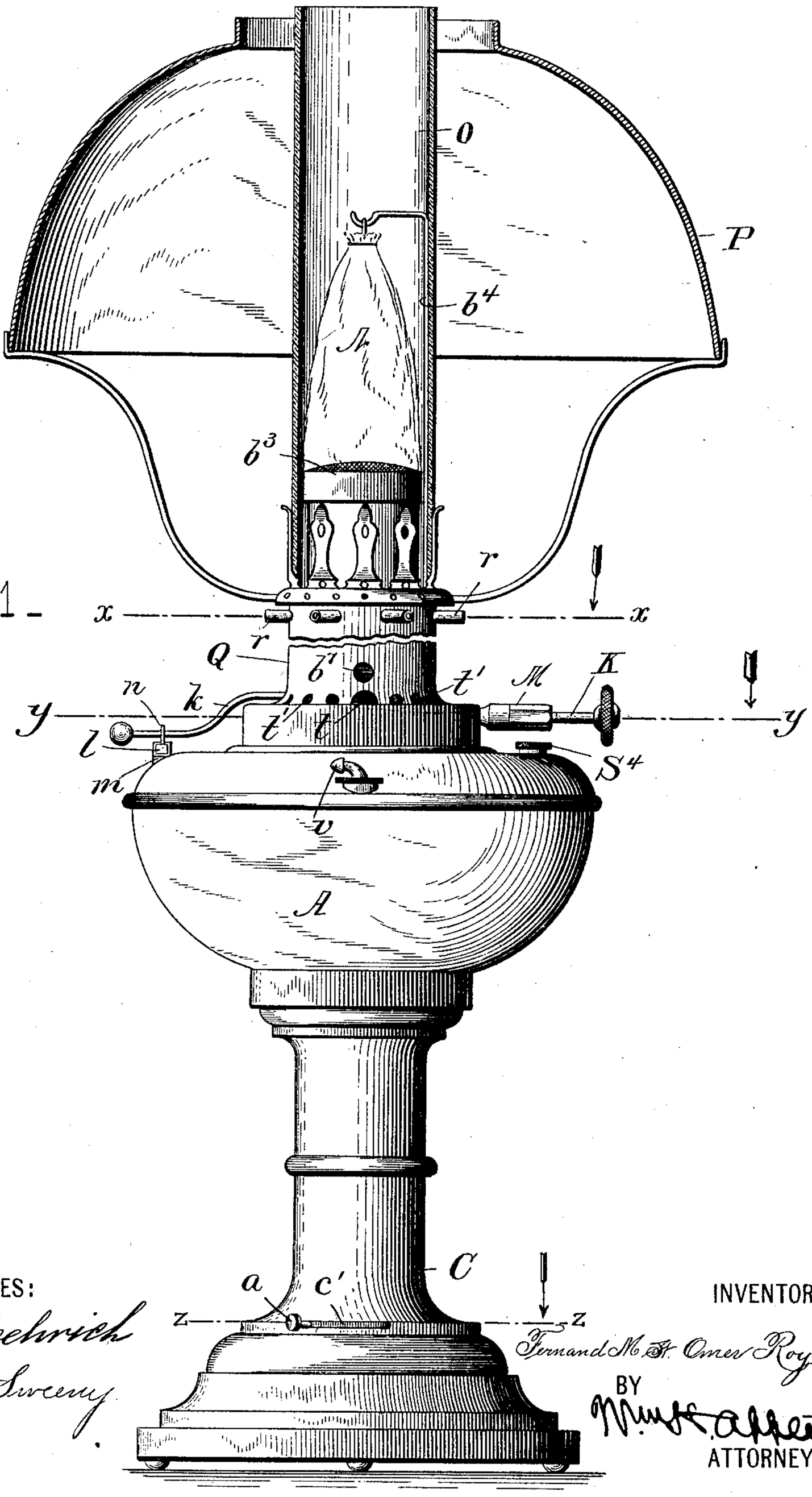
F. M. ST. OMER ROY.

APPARATUS FOR BURNING VAPORS FOR PRODUCING INCANDESCENT LIGHTS.

(Application filed Mar. 3, 1900.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.



WITNESSES:

F. N. Roehrich

R. F. Sweeny

INVENTOR

Fernand M. St. Omer Roy

BY Munn & Allen

ATTORNEY

No. 668,934. Patented Feb. 26, 1901.

F. M. ST. OMER ROY.

APPARATUS FOR BURNING VAPORS FOR PRODUCING INCANDESCENT LIGHTS.

(No Model.) (Application filed Mar. 3, 1900.) 3 Sheets—Sheet 2.

Fig. 3.

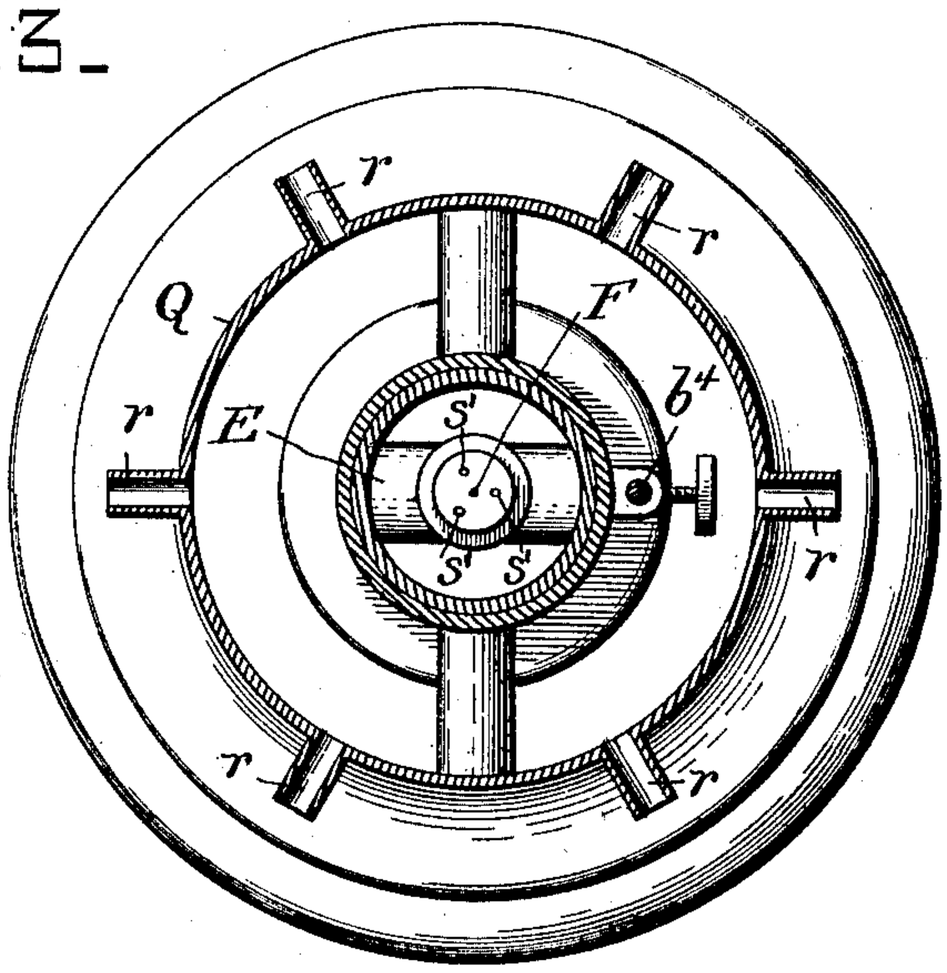


Fig. 2.

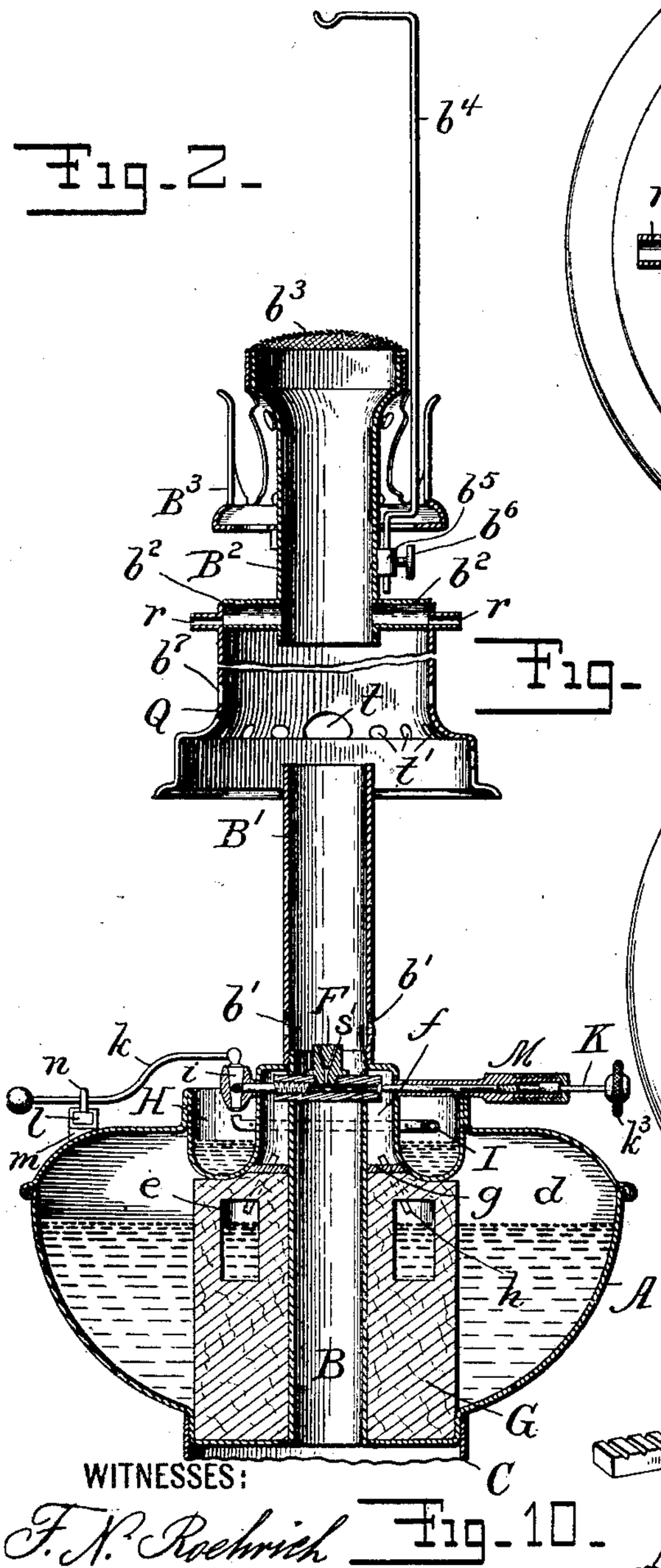


Fig. 4.

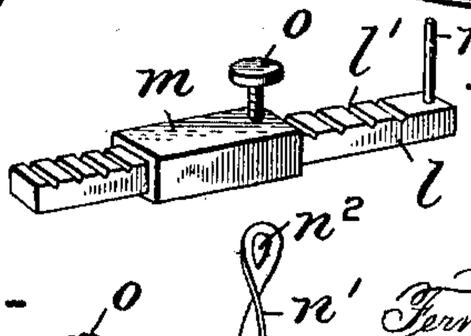


Fig. 9.

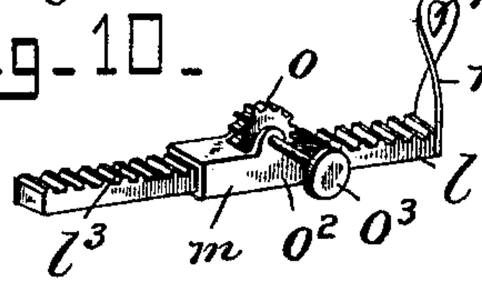


Fig. 10.

WITNESSES:

F. N. Roehrich

A. F. Sweeny

INVENTOR

Fernand M. St. Omer Roy.

BY

Wyatt & Middleton,

ATTORNEY

No. 668,934. Patented Feb. 26, 1901.

F. M. ST. OMER ROY.

APPARATUS FOR BURNING VAPORS FOR PRODUCING INCANDESCENT LIGHTS.

(No Model.) (Application filed Mar. 3, 1900.)

3 Sheets—Sheet 3

Fig. 8.

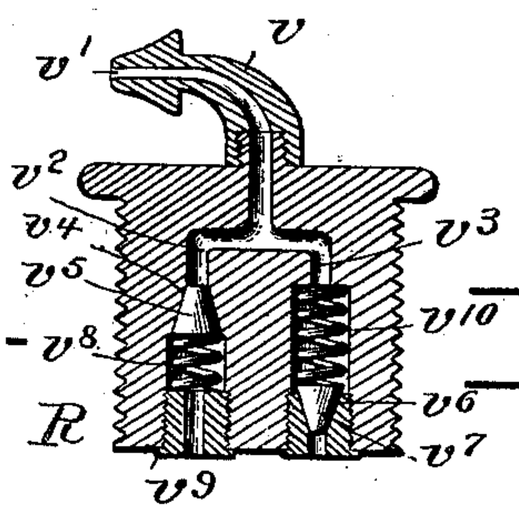


Fig. 11.

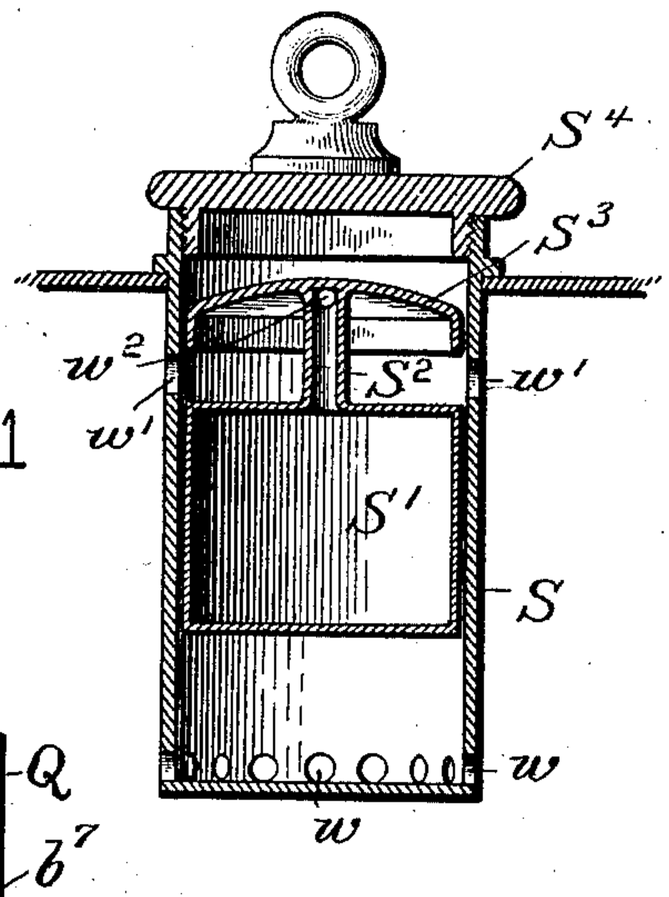


Fig. 5.

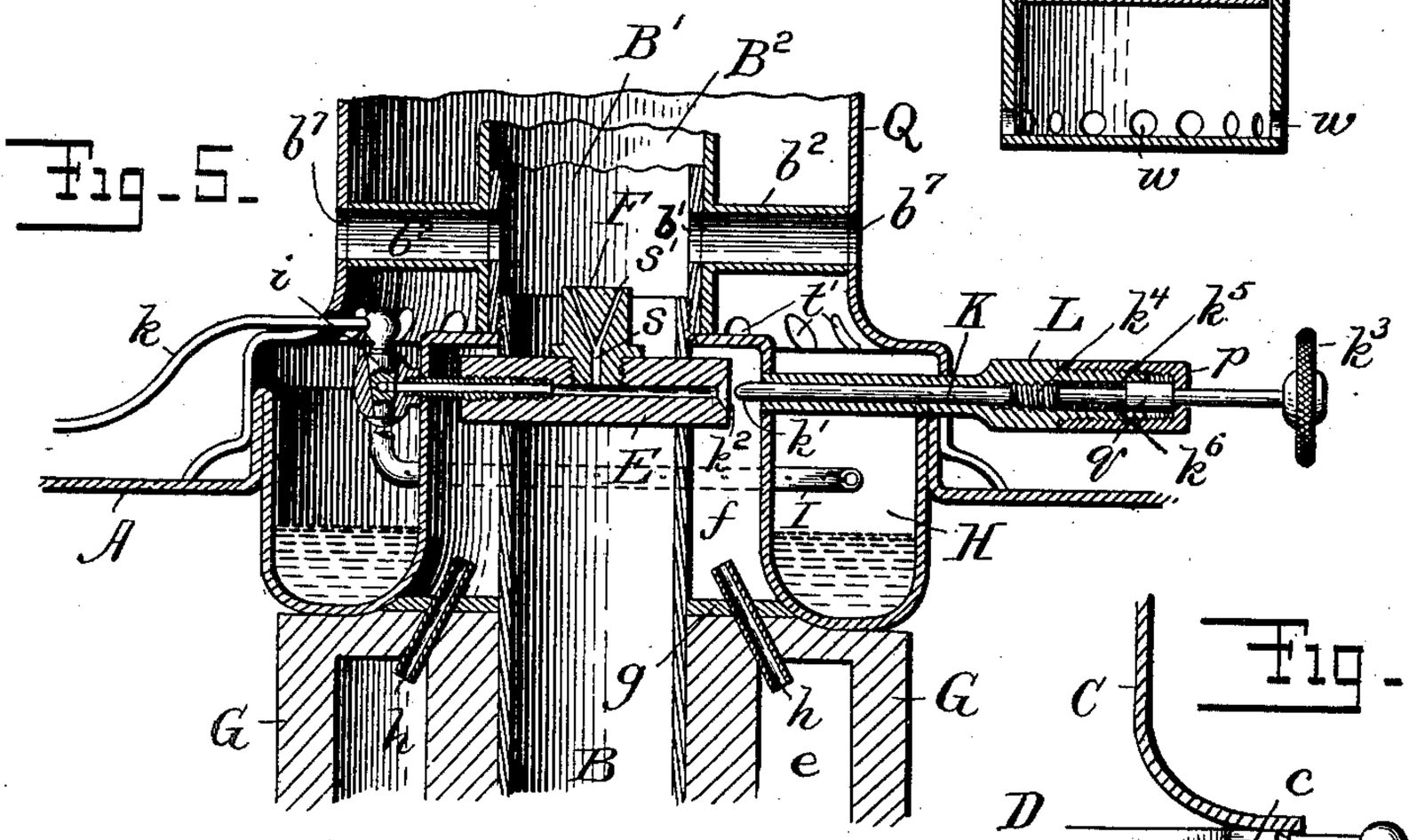


Fig. 7.

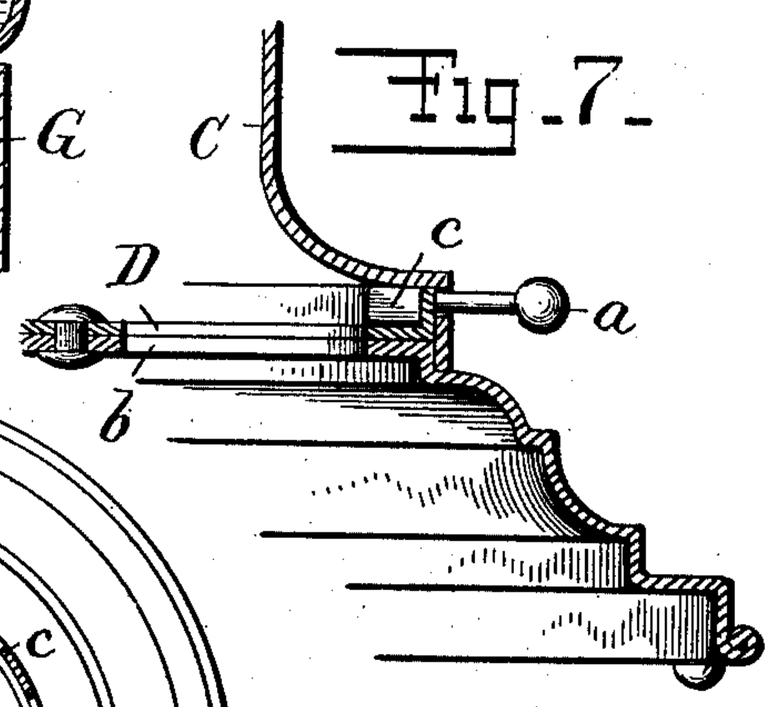
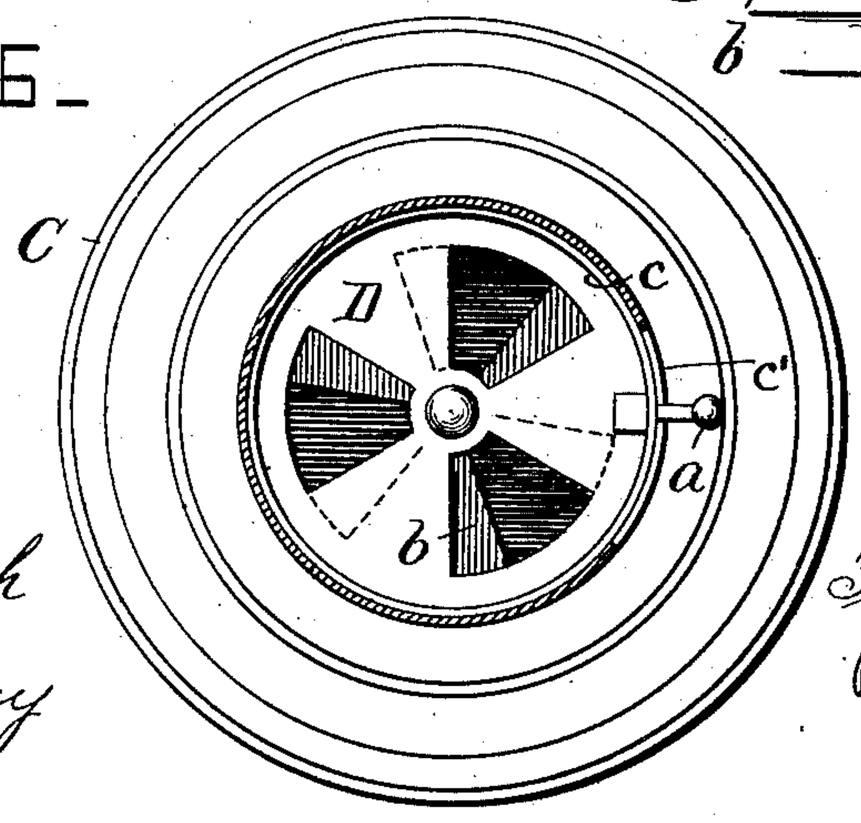


Fig. 6.



WITNESSES:

F. N. Roehrich

R. F. Sweeny

INVENTOR

Fernand M. St. Omer Roy

BY

Wm. Appleton,

ATTORNEY

UNITED STATES PATENT OFFICE.

FERNAND M. ST. OMER ROY, OF NEW YORK, N. Y.

APPARATUS FOR BURNING VAPORS FOR PRODUCING INCANDESCENT LIGHTS.

SPECIFICATION forming part of Letters Patent No. 668,934, dated February 26, 1901.

Application filed March 3, 1900. Serial No. 7,161. (No model.)

To all whom it may concern:

Be it known that I, FERNAND M. ST. OMER ROY, a citizen of the Republic of France, and a resident of the borough of Manhattan, in the city, county, and State of New York, have invented certain new and useful Improvements in Apparatus for Burning Vapor to Produce Incandescent Light, of which the following is a specification.

My invention, while relating to that class of apparatus or devices wherein light hydrocarbons or other easily-vaporizing liquids—such, for instance, as benzin, naphtha, gasolene, and the like—are employed, either alone or in combination with others, as fuel and the gases or vapors arising therefrom burned for illuminating purposes, has reference more particularly to that variety thereof in which an incandescent light is produced, its object being to provide an apparatus of this general class which, while simple in construction, efficient and safe in operation, and affording an intense, steady, and reliable illuminating effect, shall at the same time permit of the ready lighting of the same, the easy regulation of the air-drafts and the consequent intensity of the flame, and remove all danger of overfilling the reservoir or fount, as well as any undue pressure that might be exerted therein.

To these ends the invention consists in various constructions and combinations of parts, the peculiarities and distinguishing characters of which when applied to a lamp will be hereinafter more specifically described.

Referring to the accompanying drawings, which form a part of this specification, Figure 1 is a side elevation, partly in section, of one form of my apparatus shown as applied to a lamp, certain of the parts being broken away for convenience of illustration; Fig. 2, a vertical axial section of the fount or reservoir, showing also the main and feeding valves and the interior chambers or compartments with the chimney-gallery and other parts elevated above their normal position, as when affording access for cleaning or otherwise; Fig. 3, a horizontal section of the apparatus, taken in the plane *x x* of Fig. 1 and looking downward; Fig. 4, a horizontal section thereof, taken in the plane *y y* of Fig. 1, omitting a portion of the main valve-stem and likewise looking downward; Fig. 5, a sectional elevation on a larger scale than Fig. 2, showing the upper portion of the reservoir, the main gas and feeding valves, and a fragment of the movable top piece in place as when the lamp is in operation; Fig. 6, a horizontal section of the lower portion of the structure, taken in the plane *z z* of Fig. 1, showing the air-damper therein and looking downward; Fig. 7, a corresponding vertical sectional elevation of a fragment thereof; Fig. 8, an axial sectional elevation of the safety-plug detached from the reservoir and showing the two oppositely-operating valves therein; Fig. 9, an isometric projection of one form of device for limiting and controlling the movement of the stem of the auxiliary feed-valve in one direction; Fig. 10, a similar view of a slightly-modified form of such device, and Fig. 11 a detail sectional elevation of the safety and indicating appliance employed in the filling-orifice.

In all the figures like letters of reference are employed to indicate corresponding parts.

A indicates a closed fount or reservoir which, as herein shown, is in the general form of a portable lamp-fount as heretofore employed, but which may be of any other form and dimension, as preferred. In the illustration given the lamp is represented as adapted to be carried about by the hand; but the invention contemplates the use of the improvement in other varieties of illuminating apparatus as well—as, for instance, in chandeliers, street-lamps, newel-lamps, and the like—where applicable and advantageous. The fount is supplied with a central tube B for air, which in the form of the invention shown passes through the top and bottom of the fount and is secured against communication with the interior thereof. The standard or base C, of whatever form it may be, is calculated to sustain the fount, which may be secured therein or thereto or made removable therefrom, as may be preferred, and the interior of this standard or base constitutes an air-passage which is in communication with the central air-tube B. Within the lower portion of the base or standard C is a damper-regulator D, having a projecting handle *a* by which it may be turned to open or close the ports in a plate *b*, with which it registers. The preferred construction and arrangement

of this damper is best illustrated in Figs. 6 and 7, wherein it is shown as supplied with a vertical flange *c*, intended to cover the horizontally-extending slot *c'*, formed in the vertical wall of the base C, in which the handle *a* moves. This or an equivalent construction or arrangement is preferred in consequence of the desirability of having the quantity of air permitted to enter at this point to mingle with the vapor or gas always under complete control, so as to insure a proper regulation of the intensity of the illuminating effect, and the air so admitted may enter beneath the standard or through openings cut therein beneath the damper, as may be desired.

Crossing the upper part of the air-tube B, but not obstructing the proper flow of air therethrough, is the main burner-body E of the gas-burner, which may be constructed of any approved material and is brazed or otherwise properly secured at the points where it passes through the walls of the same. At one end of this burner-body is the seat for the main valve, at which seat the gas or vapor enters when the valve is open, and elsewhere in the burner-body is the passage leading to the auxiliary gas-channel, the main jet or nipple F being between the said seat and outlet, as indicated, or otherwise occupying a position in the axis of tube B.

The fount or reservoir may be said to embrace three distinct chambers—viz., a main chamber *d* for containing the supply of liquid fuel and the compressed air thereabove, a safety-chamber *e* containing at no time but very little, if any, fuel in liquid form, through which chamber all liquid which could possibly leave the reservoir must first pass before it could find exit from the lamp, and a vapor-receiving chamber *f*, within which vaporization or conversion of the liquid into gas takes place or within which the vapor is further heated to better prepare it for burning and from which the heat which maintains the constant vaporization is conducted to the upper surface of the liquid. These three chambers, when the lamp is in operation, communicate one with the other, but are closed against admission of air from the exterior of the lamp.

Surrounding the central air-tube B and within the chamber *d* is a quantity of porous material G—such as asbestos, baked clay, wicking, or any other suitable substance—and this is fashioned or wound so as to form the chamber *e* in its upper part. The porous material serves to filter the liquid or the vapor passing through it to the safety-chamber, whereby to prevent the admission of any heavy or other foreign substance thereto by which the jets might become clogged or the issuing vapor rendered too heavy for most advantageous use, and whereby to hold a quantity of the liquid in suspension and in the best condition to be vaporized by a gentle heat, while serving to prevent fluctuations or variations in the matter of feeding and rendering the latter more uniform and constant than is possible with vapor-burning structures heretofore in use.

The vapor-receiving chamber *f* is separated from the porous material and from the chamber *d* by an annular metallic plate *g*, which, fitting closely around the air-tube B and resting upon the porous material or filter, closes the lower part of the adjacent annular vessel to be hereinafter described, the plate *g*, in effect, constituting the bottom of this chamber. Vapor rising from the volume of liquid fuel in the chamber *d* under the action of heat or otherwise will in the operation of the apparatus filter through the porous material and enter the safety-chamber *e*, from which it will pass up to the chamber *f* through suitable tubes *h h*, which are provided for that purpose. The vapor having thus passed to the chamber *f* may be further heated therein when required and then passed on to the nipple and thence onward to the point of consumption or burning.

The seat for the main gas-valve is located within the chamber *f*, and when the valve is unseated the vapor or gas passes therethrough to the nipple *f*, and thence issues therefrom to mingle with air and to be burned.

In the top of the fount A is formed or otherwise supplied an annular gutter or vessel H, one wall of which in the form shown constitutes a portion of the wall of the vapor-receiving chamber *f*. This gutter is intended to receive a small quantity of the inflammable liquid, which being lighted burns in the gutter and heats the surrounding parts to initiate the vaporization. After this initial supply has been consumed the subsequent vaporization is maintained by the auxiliary flames. These flames are supplied with vapor issuing through minute orifices in a tube I, which is located in the gutter surrounding the vapor-receiving chamber *f* and is connected with the passage-way through the burner-body E. In the operation of the apparatus the main valve is opened as soon as the initial vaporization is sufficient, and this is just before the liquid fuel in vessel H has been entirely consumed. Vapor then passes from the chamber *f* to the nipple F and also to the tube I when its valve is open for that purpose, and the auxiliary jets are lighted before the initial quantity of liquid has been consumed and continue to burn as long as the main valve is open or as long as the lamp may be in operation. The rapidity of vaporization of course depends upon the amount of vapor burned at the auxiliary jets, and it becomes important to regulate the flow of vapor to them to the end that the lamp may be used to the best advantage. In order, therefore, to allow of this regulation being effected, the tube I is provided with a cock or valve *i* of any preferred construction, the same having a suitable lever *k* extending to the exterior, where it can be conveniently reached for

adjustment. By this means the regulation of the flow of the vapor to the tube I from the block E may be effected by simply turning the lever *k* in one or the other direction, as required. In some cases this flow will remain constant—as, for instance, when the fuel and other conditions remain the same. In others a variation therein may be required, as when passing from one form of fuel to another. In order, therefore, to provide for the opening of the valve *i* to the same distance at all times when the flow of the vapor to the auxiliary jets is to remain constant and limit its movement in that direction, various means may be employed. I prefer, however, to make use of a bar *l* for this purpose, which, provided with a stop against which the lever *k* of the valve *i* will abut when swung to its limit of movement, is mounted in a suitable stand or keeper *m*, whereby to be capable of a sliding movement back and forth therein secant to the path of travel of the lever *k*. In Fig. 9 I have shown this stop as constructed in the form of an upwardly-projecting pin *n*, with the upper side of the bar *l* provided with transversely-arranged notches *l'*, with which engage a suitable binding-screw *o*, whereby to hold the stop *n* and its carrying-bar in adjusted position. In Fig. 10, on the other hand, I have illustrated it as constructed in the form of an upwardly-projecting bar *n'*, which is provided at or near its upper end with an orifice n^2 for reception of the lever *k*, that passes therethrough, with the upper side of the bar l^2 equipped with rack-teeth l^3, with which engage the teeth of a pinion *o'* on a shaft o^2, that is provided at its outer end with an enlarged milled head o^3, through which the bar may be moved back and forth to effect the required adjustment of the valve, and either of these forms of stop may be employed as preferred and the adjustment of the valve *i* effected with equal facility.

For determining the extent to which the valve *i* should be opened when the apparatus is first operated or a different character of fuel employed the burner will first be lighted by the consumption of the fluid supplied to the gutter or vessel H and the valve between the vapor-receiving chamber *f* and the passage-way through the burner body or piece E opened at the appropriate time. The valve *i* will then be opened to the proper distance to permit of the required amount of vapor passing through the orifices in the tube I by swinging the lever *k* around either by hand or through the rack and pinion to the required point and then securing the stop *n* or *n'* in contact therewith by the binding-screw *o* in the one case and the frictional resistance between the rack l^3 and pinion *o'* in the other. The proper degree of opening of the valve *i* having been thus determined, the valve may remain at all times at that point thereafter, so long as the character of the fuel employed and other conditions present remain the same, but may be changed therefrom when required by a change in either of them or otherwise.

K indicates a valve-stem, of which one extremity is constructed to form a valve *k'*, that is adapted to coöperate with the valve-seat k^2, formed in the burner body or piece E, and the other extremity carries a suitable milled head k^3 or other appliance, through which such stem may be rotated. This stem is provided at the appropriate place along its length with a screw-thread k^4, which engages with a corresponding thread formed in the interior of the housing L, and through this means the valve *k'* may be caused to approach and recede from the seat k^2 as the rotation of the stem in one or the other direction is effected. The housing L, in which the stem is located, connects with the interior of the vapor-receiving chamber *f* and extends across the gutter or vessel H, being securely held in place by brazing or otherwise, whereby to insure of gas and vapor proof joints being formed between it and the walls through which it passes. As thus arranged the stem K is tightly packed in the housing L by suitable packing material—such, for instance, as wicking, asbestos, or the like—which is wound around the same, as shown at k^5, and tightly compressed within the chamber k^6 by a cap *p*, threaded upon the outer end of the housing L and acting through the intermediary of a loose sleeve *q*, which contacts at one end with the interior of the cap and at the other with the packing, as shown in Fig. 5. By this arrangement, as will be seen, I provide for the more thorough compression of the packing between the valve-stem K and the interior of the chamber k^6 than has been practicable heretofore, while yet permitting of its ready removal when new material is to be supplied or otherwise.

Secured to the upper end of the central pipe B by screw-thread or otherwise is an extension B', which is supplied with perforations *b'*, that are located slightly above the level of the top of the nipple F, while surrounding this section B' and closely fitting the same is a tube B^2, that carries near its lower end a number of branch tubes b^2, corresponding to that of the perforations *b'*, with which perforations these tubes normally register when the section B^2 is seated in place. In addition to these branch tubes b^2 this section also carries at its upper end a reticulated plate or wire-gauze b^3, a suitable chimney gallery or holder B^3, and a wire or other suitable standard b^4 for sustaining the mantle, with this wire fitted to slide in a stand b^5 and be held in adjusted position therein by a binding-screw b^6. The mantle is represented at N in Fig. 1 and is suspended over the gauze b^3 and may be elevated or depressed or removed by loosening the binding-screw b^6 and raising or lowering the standard b^4, as required.

O indicates the chimney, and P the shade, which are or may be of any ordinary or pre-

ferred construction, with the latter sustained on arms extending outward from the chimney-gallery, as is usual.

Surrounding the lower end of the tube B^2 and covering the gutter or vessel H is a metallic hood Q, which is capable of being moved up and down on and rotated around the former and is provided near its lower end with perforations b^7, that are adapted to register with the outer ends of the tubes b^2 when the hood is in its normal position, whereby to permit of the flow of the air through such tubes from the exterior to the interior of the section B′ of the interior tube to commingle with the vapor or gas discharged from the nipple F. In addition to the perforations b^7 this hood Q is provided with a series of short tubes r near its upper end, which passing through its walls and extending outward radially of the same to the required distance serve to convey and discharge the products of combustion from the auxiliary flames to points beyond the base of the chimney, whereby to prevent the chimney and its gallery or holder from becoming sooted and the illuminating capacity of the apparatus diminished.

With the parts in position for use and the valve between the vapor-receiving chamber f and the nipple F open the flame may be ignited at or above the chimney by a light applied at that point and the mantle thereupon heated to incandescence. In this condition it will remain so long as the flame is continued, and its degree of incandescence will depend upon the amount of vapor or gas set free from the liquid-fuel contained in the fount or reservoir and the amount or proportion of air that may be commingled therewith in tube-section B′, which latter may be varied and controlled by turning the damper-regulator D in the base of the apparatus or rotating the hood Q around over the tubes b^2, or both, to reduce or increase the entrances for the air, as may be required.

The nipple F, through which the vapor or gas is delivered for consumption, may be of any preferred construction; but the peculiar form selected by me for illustration has inherent advantages. In this construction its central channel or passage s for admission of the vapor communicates with a number of inclined openings s', whereby to impinge upon the inner surface of the tube B′ above the air-inlets b'. This flow being with considerable force tends to cause a vacuum beneath the points of contact of the vapor or gas with the tube B′, and thereby to constantly induce or produce a steady inflow of air through the tubes b^2, while by the necessary deflection of the projected vapor by the inclined openings s' the admixture of air therewith before burning is rendered more certain, uniform, and perfect than would occur by the employment of a single straight and unimpeded jet from the nipple.

For delivering the initial supply of liquid to the gutter H when it is desired to use the apparatus I provide an orifice t, which is formed through the hood Q in proper relation thereto. Similarly for supplying the exterior air to the outside of the flame to support combustion I make use of a series of openings t', which are likewise formed through such hood near its lower end, as shown.

To assist in the constant feeding of the vapor or gas to the illuminating-flame, I sometimes find it convenient to introduce air under slight or sufficient pressure in the fount or reservoir A above the liquid fuel contained therein and for this purpose may employ any of the well-known forms of air-forcing devices—such, for instance, as an air-pump, a rubber bulb, or the like—which may be detachably secured thereto, but which forms no part of my present invention and requires no further description herein. For detachably connecting this air-forcing apparatus to the fount or reservoir when required I make use of a nipple v, which is preferably secured to or formed integrally with a cylindrical block R, that is threaded into or otherwise secured in a seat formed in the upper portion of the fount or reservoir, with an orifice v' extending axially of such nipple and communicating at its inner ends with the branch orifices v^2 and v^3, formed in the block R and extending downward therein to its lower end. In the first of these branches v^2 is formed a valve-seat v^4, with which coöperates a suitable valve v^5, while in the other of these branches v^3 there is supported a similar valve-seat v^6, with which coöperates an appropriate valve v^7. The valve v^5 is arranged to yield and allow of the ingress of air from the air-forcing apparatus to the interior of the fount or reservoir, but prevent the escape of any in an opposite direction, being normally forced against its seat v^4 with yielding pressure through the intervention of a coiled spring v^8 and a screw v^9, while the valve v^7, on the other hand, is arranged to prevent the ingress of air to the interior of such fount or reservoir, but yield and permit of its egress therefrom when it exceeds a certain pressure, being in like manner normally pressed against its seat v^6 with yielding pressure through the intermediary of a second coiled spring v^{10}. By this arrangement, as will be seen, the ingress of air to the interior of the fount or reservoir is permitted when a pressure therein is required, and an escape of the air or vapor therefrom allowed when from any cause—as, for instance, overheating or too rapid vaporization—the internal pressure becomes too great, in both of which cases the flow of the air or vapor in and out will be through the single orifice v', the valve v^5 yielding to allow of the air passing in the one direction and the valve v^7 yielding and allowing of the vapor or gas passing in the other, while each obstructs and prevents the flow of its particular medium in the opposite direction.

In order to prevent overfilling of the fount

or reservoir and leave a sufficient air-space therein above the liquid fuel, I employ the device represented in Fig. 11, wherein S indicates a metallic pocket that is entered through the top of the fount or reservoir and secured therein, the same reaching a sufficient distance down into the latter and being provided near its lower end with a series of openings w, and near the upper end of its depending portion with a second series of such openings w'. Fitted in this pocket, but so as to easily move up and down therein, is a vessel or float S', which may be constructed of sheet metal or other light material and calculated to rise or fall with the liquid which enters or leaves the pocket through the openings w. Sustained on this vessel or float S' by a tube S^2 is a cap or canopy S^3, which is provided around its outer edge with a depending flange that is calculated to close the openings w' when in proper position for that purpose. The upper end or mouth of pocket S is closed by a removable cap S^4, which when in place will prevent egress of air or vapor from the former.

When the lamp requires to be replenished with liquid fuel, the float S' rests upon the bottom of the pocket S and the cap S^4 is removed. The liquid fuel is then turned into the pocket upon the canopy S^3, which then rests below the series of openings w', and from such canopy it flows to the reservoir through those openings. As the liquid rises in the fount or reservoir it enters the openings w and causes the float S' to rise until the flange on the canopy closes the openings w', when the liquid will overflow at the open mouth of the pocket and allow no more to enter the reservoir, leaving a space in the fount or reservoir for the reception of air above the point determined by the closing of the openings w' by the raising of the canopy S^3 above them. The filling having been completed, the cap S^4 should be replaced, and the apparatus is then ready to receive its air-pressure, if such pressure be necessary, or lighted without it, if it be not required. To the end that heated air may escape from the float and the latter more easily cleared or relieved of any accummulations therein I sometimes find it desirable to provide the float with a perforation w^2, which in the example of the invention shown is preferably located in the tube-like portion S^2, directly beneath the canopy S^3.

While the valve i and its union with the burner-body E are shown as located directly opposite the main gas-valve, they are not of necessity so located, as it is obvious that this union with the burner-body might be located at any other point—as, for instance, at right angles thereto—in which case the horizontal channel through the burner-body E would be so modified as to permit of that change.

The apparatus being constructed and arranged as above explained and the reservoir charged with liquid fuel with air introduced into the fount or reservoir under light pressure and the valves i and k' closed, about one-half of a thimbleful of the liquid will be introduced into the gutter or vessel H and lighted with a match or taper. When the liquid thus introduced is nearly consumed, valve k' will first be opened and then valve i, when a flame may be immediately applied at the top of the chimney, and the combined air and vapor thereby ignited, which, heating the mantle, will produce a perfect white incandescent light. As soon as the mantle is heated to incandescence the feeding-valve i should be set or regulated and the stop n or n' properly adjusted and secured in place, after which no further regulation and adjustment of these parts will be required, as these will practically suffice for once and for all.

In cases where benzene or gasolene is used air may be pumped into the fount or reservoir through nipple v for preliminary lighting instead of burning liquid in the gutter or vessel H, the air in such cases being sufficiently absorptive to take up the requisite amount of the light liquid to support the necessary combustion, while in cases where gasolene of 80° Baumé or over is used the feeding-valve i may be closed at all times, the heat from the main flame being simply sufficient to maintain the desired process of vaporization without the aid of the auxiliary flames.

The apparatus when lighted and the pressure in the reservoir is about three-fourths of an atmosphere affords a uniform, steady, and powerful light. Beyond this pressure the whistling or singing of the burner will indicate that the feeding of the auxiliary flames should be reduced, and in cases where the pressure rises to two atmospheres or thereabout the vapor escapes at the valve v^7 through the orifice v' in the nipple v. By proper manipulation of the damper D and hood Q enough air may be introduced to the interior of the tube B' to raise the combustion high enough to produce a light of greatly-increased power.

As thus constructed the overturning of the apparatus will instantly extinguish the flame, and there being no possibility of leakage the apparatus is safe to use notwithstanding the character of the liquid employed for fuel.

The tube B^2 and hood Q are easily lifted from their places to expose the interior of the gutter or vessel H for cleaning or otherwise, while the tube B' may be unscrewed from the tube B when necessary to reach the nipple F for a like or other purpose.

Although in the foregoing I have described certain of the ways in which my invention is or may be carried into effect, I wish it distinctly understood that I do not limit myself strictly thereto, as it is obvious that I may modify the same in various ways without departing from the spirit thereof.

Having now described my invention and specified the best means contemplated by me

for carrying it into effect, I claim and desire to secure by Letters Patent of the United States—

1. The combination in a vapor-burning apparatus, with a fount or reservoir for the storage of fuel, having a central air-tube extending through the same, a hollow standard or support for such fount or reservoir through which air may pass to said tube, and means for controlling the flow of this air therethrough, of a tubular burner-body arranged across such tube and provided with a perforated nipple, means through which vapor or gas may be supplied to the interior of the burner-body and a valve by which the flow of this gas or vapor thereto may be controlled, substantially as described.

2. The combination in a vapor-burning apparatus, with a fount or reservoir for the storage of fuel, having a central air-tube extending through the same and a gutter or vessel formed in its upper side around such tube, a hollow standard or support for such fount or reservoir through which air may pass to said tube, a tubular burner-body arranged across this tube and provided with a perforated nipple upon its side, means through which vapor or gas may be supplied to the interior of the burner-body, and devices by which the flow of this gas or vapor may be controlled, of a perforated tube arranged in the gutter or vessel and connected with the interior of the burner-body, and a valve for controlling the flow of the gas or vapor from the burner-body to the tube, substantially as described.

3. The combination, with a fount or reservoir provided with a central air-tube extending upward through it and a vapor-receiving chamber located in its upper portion, of a body of porous material arranged within the fount or reservoir and provided with a chamber, a plate for separating the vapor-receiving chamber from the body of such fount or reservoir and preventing the passage of the fuel from the latter to the former, and tubes for connecting the chamber in the porous material with the vapor-receiving chamber, substantially as described.

4. The combination, with the fount or reservoir provided with a central air-tube extending upward through it and a vapor-receiving chamber located in its upper portion, a body of porous material arranged within the fount or reservoir around the central air-tube and provided with a chamber therein, a partition for separating the vapor-receiving chamber from the body of such fount or reservoir and preventing the passage of the fuel from the latter to the former, and tubes for connecting the chamber in the porous material with the vapor-receiving chamber, of a tubular burner-body arranged across said air-tube with one of its ends extending into the vapor-receiving chamber and provided with a perforated nipple protruding from its upper side, and a valve for controlling the flow of gas or vapor from such vapor-receiving chamber to the interior of the burner-body, substantially as described.

5. The combination, with a fount or reservoir having a central air-tube extending upward through the same and a vapor-receiving chamber constructed in its upper portion, and a burner-body arranged across such tube with its end entering the vapor-receiving chamber and provided with a valve-seat therein, of a valve-stem for coöperating with such valve-seat, and a housing for said stem secured to the fount or reservoir in proper relation to the valve-seat, substantially as described.

6. The combination, with the fount or reservoir having a central air-tube extending upward through it, a vaporizing-chamber, and a gutter or vessel formed in its upper portion, and a burner-block arranged across such tube with one of its ends extending into the vapor-receiving chamber, of a perforated tube arranged in the gutter or vessel and connected with the other end of such burner-body, a valve arranged in the perforated tube and provided with an operating-lever, and an adjustable stop for limiting the movement of such lever in one direction, substantially as described.

7. The combination, with the base of the fount or reservoir support having a vertical wall and a horizontally-extending slot formed therein, and a fixed plate extending across such base and provided with ports through which air may pass, of a damper provided with corresponding ports pivoted to said plate and provided with a vertical flange extending upward across such horizontally-extending slot to close the same, and a projection or handle extending through said slot to operate the damper, substantially as described.

8. The combination, with the fount or reservoir having a central air-tube extending upward through it, and an upper section detachably secured to such tube and provided with orifices through its walls, of a second tube adapted to fit over such upper detachable section and provided with outwardly-extending tubes which register at their inner ends with said orifices, and a hood for enveloping this last-mentioned tube and provided with orifices for registering with the other ends of such outwardly-extending tubes, substantially as described.

9. The combination, with the fount or reservoir having a central air-tube extending upward through it and a gutter or vessel in its upper side, an upper section detachably secured to the upper end of such tube, and a second tube adapted to fit over said upper detachable section and provided at its upper end with a reticulated or gauze cap and at a point lower down with a chimney gallery or support, of a hood adapted to envelop the last-mentioned tube and the gutter or vessel, and provided near its upper end with a series of outwardly-extending tubes for carry-

ing and delivering the smoke and products of combustion arising in the gutter or vessel outward beyond the chimney and its support, substantially as described.

10. The combination, with a fount or reservoir, and a pocket arranged to depend therein and provided with a series of orifices near its lower end and a second series near the upper end of its depending portion, of a float arranged therein and provided at its upper end with a cap or canopy which is constructed with a downwardly-extending flange, and a cap for closing the upper end of the pocket, substantially as described.

11. The combination, with a pocket or case adapted to be suspended in a fount or reservoir and provided with a series of orifices near its lower end and a second series near its upper end, of a float arranged therein composed of a body and upwardly-extending tube which is provided with an orifice in its side and a cap or canopy secured to the upper end of such tube, and a detachable cap for closing the upper end of the pocket or case, substantially as described.

12. A device for permitting the ingress of air and egress of gas or vapor, consisting of a suitable body adapted to be secured in a fount or reservoir and provided with a nipple at its outer end, a main and branch orifices, and reversely-arranged valve-seats in such branches, valves for coöperating with said seats, and springs and screws through which such valves are normally held pressed toward their respective seats while yet free to move backward therefrom when the pressure exerted upon them exceeds a certain limit, substantially as described.

In witness whereof I have hereunto set my hand this 7th day of February, 1900.

FERNAND M. ST. OMER ROY.

Witnesses:

WM. H. APPLETON,

R. F. SWEENY.